

## Prairie Hills Audubon Society

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October 6, 2026

Director, Ecosystem Management Coordination

USDA Forest Service, 201 14th Street SW, Mailstop 1108, Washington, DC 20250-1124

Submitted via <https://www.regulations.gov>, Docket FS-2025-0001

**Re: Comments of Prairie Hills Audubon Society on the Proposed Rescission of the 2001 Roadless Area Conservation Rule, RIN 0596-AD66, 91 Fed. Reg. 53,827 (Aug. 20, 2026). TRANSMITTAL OF ATTACHMENTS FOR THE ADMINISTRATIVE RECORD — SUBMISSION 1 OF 3 (ATTACHMENTS A01–A08)**

Dear Director:

This letter transmits the attachments to the comments of Prairie Hills Audubon Society (PHAS) on the proposed rescission of the 2001 Roadless Area Conservation Rule and the associated Draft Environmental Impact Statement. PHAS's comment letter was submitted earlier this evening in a separate submission on this docket. Because of file-size limits on the portal, PHAS is submitting the attachments in several submissions, each led by a copy of this transmittal. This submission contains Attachments A01–A08.

PHAS requests that its comment letter and all of these submissions be treated together as one integrated comment, and that every attached document be placed in the administrative record for this rulemaking and considered in the final EIS and any final rule. The attachments are:

- A01** John Muir Project et al., "Stop the Roadless Rescission. Close the Loopholes." Organizational sign-on letter (2026), signed by PHAS.
- A02** Biodiversity Conservation Alliance et al., Amended Petition to the Wyoming Environmental Quality Council for Designation of an Area Known as Sand Creek as Very Rare or Uncommon (Aug. 12, 2009), endorsed by PHAS.
- A03–A04** Graham, Battaglia & Jain, A Scenario-Based Assessment to Inform Sustainable Ponderosa Pine Timber Harvest on the Black Hills National Forest, RMRS-GTR-422 (USDA Forest Service, 2021), in two parts.
- A05** Coalition letter to the Acting Regional Forester requesting a meeting on unsustainable logging, Black Hills National Forest (Feb. 16, 2021).
- A06** Coalition letter to the Regional Forester following the May 5, 2021 meeting (May 17, 2021).
- A07** Coalition letter: the Forest Service must undertake supplemental environmental review of the Black Hills Resilient Landscapes project and cease using the Mountain Pine Beetle Response project analysis (June 16, 2021).
- A08** Coalition letter to the Regional Forester requesting a meeting concerning the Black Hills National Forest (Jan. 31, 2023).
- A09a–b** Letter to USDA requesting a meeting on unsustainable logging on the Black Hills National Forest (July 12, 2023), in two parts; Part 2 is the attached opportunity-analysis map.
- A10** John Muir Project et al., comments on the Draft EIS for Amendments to Land Management Plans to Address Old-Growth Forests (Sept. 17, 2024).
- A11** PHAS letter to the Grand River Ranger District on grazing improvements and roadless area eligibility, with excerpt of a 1999 appeal (May 27, 2009).
- A12** Complaint, Center for Biological Diversity and Sierra Club v. U.S. Department of Agriculture, No. 3:26-cv-00866 (N.D. Cal., filed Jan. 28, 2026).
- A13** Earthjustice comments on the USDA NEPA Interim Final Rule, Docket USDA-2025-0008 (Aug. 4, 2025).
- A14** PHAS scoping comments on the Forest Service Travel Management Rule rewrite, Docket

FS-2026-0100 (Sept. 23, 2026).

- A15** Sand Creek area: Sierra Club proposed wilderness boundary map, older Forest Service structural-stage map, and photographs by Nancy Hilding.
- A16** PHAS summary of recreation opportunity spectrum and scenic integrity statistics from the 1997 Black Hills National Forest Revised Forest Plan Record of Decision.
- A17** Excerpts from The Economic Impact of Travel in Wyoming, 2020p (Dean Runyan Associates for the Wyoming Office of Tourism): statewide county summary and Crook and Weston County detail.
- A18** National Audubon Society, North American Grasslands and Birds Report (2019).
- A19** Nebraska National Forest Units Land and Resource Management Plan, Chapter 3, Management Area Direction, including Management Area 1.2, Recommended for Wilderness (Amendment 2, 2009).

Sincerely,

Nancy Hilding, President  
Prairie Hills Audubon Society

Stop the Roadless Rescission. Close the Loopholes. Sign by Monday, Oct 5, EOB

We, the undersigned public lands advocates and scientists, on behalf of our members, supporters, and ourselves oppose the rescission of the 2001 Roadless Area Conservation Rule. However, we also reject the premise that the only choices on the table are rescission, mostly-rescission, or maintaining the rule as is. The Draft Environmental Impact Statement (DEIS) for the Roadless Rule rescission proposal claims (p. 10) that there is a need for more “active management”, in the form of road building and logging, ostensibly to better address “increasing wildfire risk”, “forest health”, and “community protection”. Yet the failure of the USDA to consider an alternative which would meet these stated objectives through greater, not lesser, protections for Roadless Areas ultimately renders the DEIS illegal under the National Environmental Policy Act and the Administrative Procedures Act. For the reasons articulated below, the DEIS in its current form should be withdrawn.

### **The Draft EIS Concedes that the Action Alternatives Fail to Meet the Agency’s Claimed Goals**

Throughout the DEIS, the USDA repeatedly invokes the need to reduce wildfire risk and improve forest health as the central reasons for the proposed rescission of the Roadless Rule, and yet their own analysis shows that less protection, and more roads and logging, as envisioned by Alternatives 2 (Rescission of the Roadless Rule) and 3 (Rescission of the Roadless Rule in most Roadless Areas), is likely to undermine these stated goals. The DEIS admits (p. 22) that “impacts from road construction and timber harvest activities” include “increased fire frequency (human-caused)”. The DEIS (p. 24) further admits that “the number, frequency, and density of wildfire ignitions are lower in designated wilderness and potentially affected IRAs [Roadless Areas] compared to other NFS lands”, and that building roads into Roadless Areas will likely “increase the number and frequency of wildfires as human-ignitions are more likely near roads.” It also admits (p. 24) that road building and logging would “increase the extent” of “invasive plant species”, which are highly combustible. Nowhere does the DEIS analyze or disclose the increased threat to communities that would result from the intensified and expanded wildfire activity that would result from the road-building/logging action alternatives.

The DEIS (p. 24) then states that “public access could be limited to minimize fire hazard”, which would be caused and increased by the road building and logging that would occur under the action alternatives, in certain “high-risk areas”. In other words, the DEIS proposes to close an undisclosed acreage—potentially millions of acres—to hikers, equestrians, hunters, mountain bikers, and cars or trucks as a way to partially mitigate the increased wildfire activity and spread the Forest Service’s proposal would cause, by the agency’s own admission. Nowhere does the DEIS divulge the specific or estimated extent of this serious and potentially landscape-scale exclusion of the public from public lands.

The DEIS (p. 22) also admits that the road building and logging that would occur under the action alternatives would cause degradation of forest health, including, “sedimentation and impacts to water quality”, “landscape fragmentation”, and “adverse impacts to threatened, endangered, or sensitive wildlife and plants”. There would also be an increase in mining and development of forests for fossil fuel extraction under the existing action alternatives (DEIS, p. 23). The DEIS (p. 24) further elaborates on the degradation of forest health that would be caused by the road building and logging envisioned by the action alternatives, including “loss of vegetation”, “soil erosion and compaction”, “loss of soil productivity”, “increased water runoff” (i.e., increased flooding), and “reduced water quality”, as well as “reduced air quality”. In a shocking admission, the DEIS (p. 25) states that the road building and logging that would occur under the action alternatives “is likely to adversely affect” a total of “327 ESA-listed species and 71 critical habitats”.

Notably, the DEIS (p. 22) states that the road-building/logging action alternatives would cause “economic losses related to recreation” but would benefit economic interests “that value timber harvest and potential mineral and energy development” (DEIS, p. 26). The DEIS (p. 26) also admits that these action alternatives would cause “adverse affects” to the “spiritual” and “religious” interests of Tribes, including “cultural practices and ceremonies”, as well as adversely impacting the “plant and animal life” important to Tribes.

### **Mixed Intensity Wildfire is Beneficial to Forest Ecosystems**

Mixed-intensity fire is a natural and necessary process in these forests. It is not a hazard to be corrected. The Forest Service’s rationale treats fire itself as the failure state. That premise is false, and no amount of extraction framed as a response to it will make it true. Roadless Areas should be a place where natural processes like lightning fires can occur without interference, for the benefit of biodiversity, instead of wildfire activity that is artificially increased by human exploitation, as would occur under Alternatives 2 and 3.

Unlogged, unmanaged Roadless and wilderness areas function as an experimental control for our public lands. They show how these forests respond to fire, insects, and other natural disturbance without human intervention. Without unlogged acres to compare against, logging can no longer be tested against what the forest does on its own, and the agency’s premises about mechanical intervention go unexamined by the data that would otherwise test them.

### **Grazing Increases Fire Risk**

The DEIS never examines one of the best-documented drivers of wildfire risk to communities and human infrastructure in dry forests: livestock grazing. Cattle grazing is currently permitted across over ten million acres of Inventoried Roadless Areas. Cattle selectively graze palatable native perennial bunchgrasses and trample the biological soil crusts that stabilize soils and resist invasion, leaving openings for invasive annual grasses such as cheatgrass to establish themselves. Those annuals cure early, stay dry through the fire season, and form continuous fine fuels, while live bunchgrasses are further spaced, keep moisture and burn less readily. The DEIS acknowledges this without actually analysing it. It names livestock as an ongoing invasive-plant vector (p. 107) and claims that ".... grazing [has] disrupted natural fire cycles" across the National Forest System (p. 215). Yet grazing appears only in a list of activities allowed under every alternative (p. 21). The DEIS's stated purpose and need for reducing wildfire risk ignores an ongoing, permitted activity that it admits is part of the problem it allegedly seeks to address. Failure to analyze this issue matters more because rescission of the Roadless Rule could expand grazing's footprint. New and reconstructed roads, the central foreseeable consequence of Alternatives 2 and 3, would make it easier to truck livestock, haul supplements, construct new fences, and build water developments in areas that are now ungrazed or lightly grazed because of limited access. Cattle concentrated in new places would then bring the same soil disturbance, crust damage, and invasive spread into IRAs that currently have invasives on less than one percent of their area (DEIS, p. 24). Under NEPA, that is a reasonably foreseeable indirect effect of the road building the DEIS acknowledges, and leaving it out understates community fire and invasive-species proliferation risks. Neither addresses the well-documented grazing–invasive-annual–fire feedback, which the DEIS never addresses.

#### **Failure to Consider a Reasonable Range of Alternatives**

In light of the foregoing, the DEIS is invalid under NEPA because it fails to consider a reasonable range of alternatives, especially an alternative that would far better meet the Forest Service's claimed purpose and need of addressing wildfire risk and forest health while protecting communities. Such an action alternative would recognize that the current roadless and unmanaged condition of these roadless areas best addresses the issues of wildfire risk, forest health, and community protection, and would close the current loopholes in the Roadless Rule that allow logging under the guise of deceptive euphemisms like wildfire management and wildlife habitat "improve[ment]", as well as expand the Rule to include Inventoried Roadless Areas identified in forest plans and plan revisions but which are not covered by the current Roadless Rule. Such an action alternative would also prohibit livestock grazing in Roadless Areas, given the degradation of forest health and increased wildfire activity resulting from livestock grazing. The fact that the DEIS fails to include such an alternative renders it illegal under NEPA. Nor could the Forest Service simply include this Increased Protection Alternative in the Final EIS, since that would deprive the public of the opportunity to comment on the Increased Protection Alternative and compare it to the current road-building/logging alternatives. Given this, the DEIS must be withdrawn.

Sincerely,

350 Eugene

350 Pittsburgh

350 Salem Oregon

350 Seattle

A2 (Anthropocene Alliance)

Allegheny Forest Defense Project

Allegheny-Blue Ridge Alliance

Alliance for the Wild Rockies

Athens County's Future Action Network

Bark

Battle Creek Alliance

Biofuelwatch

Blue Mountains Biodiversity Project

Bold Visions Conservation

California Chaparral Institute

Cascadia Climate Action Now

Cherokee Concerned Citizens

Christians Caring for Creation

Climate Communications Coalition

Climate Crisis Solutions

Climate Relations LLC

Connecticut River Conservancy

Conservation Congress

CURE  
Defiance Canyon Raptor Rescue  
Earth Law Center  
Earth Neighborhood Productions  
Eco-Integrity Alliance  
Education, Economics, Environmental, Climate & Health Organization (EEECHO)  
Fertile Ground Conservancy  
Friends of Bell Smith Springs  
Friends of the Bitterroot  
Friends of the Boundary Waters Wilderness  
Friends of the Clearwater  
Friends of the Kalmiopsis  
Friends of the White Salmon River  
Friends of the Wild Swan  
Fungaia  
Gallatin Wildlife Association  
Gallatin Yellowstone Wilderness Alliance  
Green Cove Defense Coalition  
Green Snohomish  
Greenpeace USA  
Heart of the Gila  
Heartwood  
High Country Forest Watch  
Indiana Forest Alliance  
Izaak Walton League Rapid City SD Chapter  
John Muir Project  
Kettle Range Conservation Group  
Klamath Forest Alliance  
Kootenai Environmental Alliance  
Legacy Forest Defense Coalition  
Legal Rights for the Salish Sea  
Los Padres ForestWatch  
Lower San Pedro Watershed Alliance  
Malach Consulting  
Methow Forest Forum  
Mighty Earth  
Minnesota Division Izaak Walton League of America  
Mount Shasta Bioregional Ecology Center  
MountainTrue  
Move Past Plastic (MPP)  
National Treasure Mustang Rescue and Sanctuary  
Natural Resources Law  
Next 100 Coalition  
New Jersey Forest Watch  
Nimiipuu Protecting the Environment  
Northern Alaska Environmental Center  
Old Growth Forest Network  
Olympic Climate Action  
Oregon Wild Horse Organization  
Partnership for Policy Integrity  
PocketForestsOregon.com  
Prairie Hills Audubon Society  
Prairie Protection  
Projectic  
Protect Thacker Pass  
Public Lands Media

Rachel Carson Council  
Religious Campaign for Forest Conservation  
RESTORE: The North Woods  
Rock Creek Alliance  
Rockbridge Conservation  
Rootsong Ecology  
Sage Steppe Wild  
Santa Fe Forest Coalition  
Save Lake Superior Association  
Save Massachusetts Forests  
Save Our Cabinets  
Save Our Sky Blue Waters  
Selkirk Conservation Alliance  
Sequoia Forestkeeper  
Standing Trees  
Swan View Coalition  
Tahoe Forests Matter  
Tennessee Heartwood  
The Center for Responsible Forestry  
The Forest Advocate  
The Ocean Project  
Thurston Climate--Tree Action  
Tualatin Riverkeepers  
Tule River Conservancy  
Umpqua Watersheds  
Utah Physicians for a Healthy Environment  
Virginia Wilderness Committee  
We Advocate Thorough Environmental Review  
West Virginia Rivers Coalition  
Western Watersheds Project  
Whatcom Million Trees Project  
Wild Nature Institute  
Wild Watershed  
WildEarth Guardians  
WildLands Defense  
Wilderness Watch  
Wildlife for All  
Wyoming Untrapped  
Wyoming Wildlife Advocates  
Yellowstone to Uintas Connection  
nhilshat@gmail.com [Switch account](#)

Not shared

\* Indicates required question  
Organization, please avoid abbreviations  
\*

Name \*

Email \*

Are you authorized to sign for your group? \*

Yes

No

Would your organization be interested in participating in future advocacy meetings (e.g., Zoom calls) with congressional offices?

Yes

No

Maybe / Need more info

Which congressional districts or states does your organization primarily work in or focus on?

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**Amended Petition to the Environmental Quality Council  
for Designation of an Area Known as Sand Creek  
as Very Rare or Uncommon**

Under the Authority of the Wyoming Environmental Quality Act,  
W.S. §35-11-112

and

Chapter VII of the Wyoming Department of Environmental Quality  
Rules of Practice and Procedure

Submitted to the Chairman of the Environmental Quality Council

on

August 12, 2009

**Submitted by**

Biodiversity Conservation Alliance

Erik Molvar

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Wayne Prindle

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**Endorsed by**

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Black Hawk, SD 57718

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**Amended Petition to the Environmental Quality Council  
for Designation of an Area Known as Sand Creek  
as Very Rare or Uncommon**

Under the Authority of the Wyoming Environmental Quality Act,  
W.S. §35-11-112

and

Chapter VII of the Wyoming Department of Environmental Quality  
Rules of Practice and Procedure

This petition is formatted according to the numbering scheme found in Section 6(a) of Chapter VII of the Department of Environmental Quality Rules of Practice and Procedure. A legal brief outlining the State of Wyoming's authority to render Very Rare or Uncommon designations on lands of federal ownership accompanies this petition as Addendum 1.

**Section 6(a)(i)** The name, address, phone number, and fax number for the petitioner.

**Petitioner:**

Biodiversity Conservation Alliance  
c/o Jeff Kessler, Wayne Prindle, and Erik Molvar  
P.O. Box 1512  
Laramie, WY 82073  
Tel. (307) 742-7978  
Fax (307) 742-7989

**Section 6(a)(ii)** The **location by legal description**, including section, township and range, of the area the petitioner is proposing for designation.

The petition is for surface lands managed solely by the United States Forest Service (USFS) in Crook County, Wyoming, 6<sup>th</sup> Principal Meridian:

**T52N R60W**

Sec. 19 SW $\frac{1}{4}$  ; S $\frac{1}{2}$  NW $\frac{1}{4}$ ; W $\frac{1}{2}$  SE $\frac{1}{4}$

Sec. 30 W $\frac{1}{2}$ ; SE $\frac{1}{4}$ ; W $\frac{1}{2}$  NE $\frac{1}{4}$

Sec. 31

**T52N R61W**

Sec 24 SE $\frac{1}{4}$  SE $\frac{1}{4}$  ; SW $\frac{1}{4}$  SE $\frac{1}{4}$

Sec. 25 E $\frac{1}{2}$ ; SW $\frac{1}{4}$ ; S $\frac{1}{2}$  NW $\frac{1}{4}$

Sec. 26 SE $\frac{1}{4}$  ; S $\frac{1}{2}$  NE $\frac{1}{4}$

Sec. 35 E  $\frac{1}{2}$ ; E  $\frac{1}{2}$  SW $\frac{1}{4}$

Sec. 36

**T51N R61W**

Sec. 1; 12; 24; 25; 11; 13

Sec. 2 E $\frac{1}{2}$ ; SW $\frac{1}{4}$  ; NE $\frac{1}{4}$  NW $\frac{1}{4}$  ; SW $\frac{1}{4}$  NW $\frac{1}{4}$  ; SE $\frac{1}{4}$  NW $\frac{1}{4}$

Sec. 3 SE $\frac{1}{4}$  SE $\frac{1}{4}$

Sec. 10 N $\frac{1}{2}$  NE $\frac{1}{4}$

Sec. 14 E $\frac{1}{2}$ ; NW $\frac{1}{4}$  ; NW $\frac{1}{4}$  SW $\frac{1}{4}$  ; NE $\frac{1}{4}$  SW $\frac{1}{4}$  ; SE $\frac{1}{4}$  SW $\frac{1}{4}$

Sec. 23 E $\frac{1}{2}$  E $\frac{1}{2}$

Sec. 25 N  $\frac{1}{2}$ ; N  $\frac{1}{2}$  SW $\frac{1}{4}$ ; SE $\frac{1}{4}$

Sec. 36 S $\frac{1}{2}$  NE $\frac{1}{4}$ ; N $\frac{1}{2}$  SE $\frac{1}{4}$

**T51N R60W**

Sec. 6; 7; 18; 19; 20; 28; 29; 30; 32; 33

Sec. 8 SW  $\frac{1}{4}$ ; W $\frac{1}{2}$  NW $\frac{1}{4}$

Sec. 21 S  $\frac{1}{2}$ ; S $\frac{1}{2}$  N $\frac{1}{2}$ , NW $\frac{1}{4}$  NW $\frac{1}{4}$

Sec. 17 W $\frac{1}{2}$ ; NW $\frac{1}{4}$  SE $\frac{1}{4}$ ; S $\frac{1}{2}$  SE $\frac{1}{4}$

Sec. 31 N $\frac{1}{2}$ ; N $\frac{1}{2}$  SW $\frac{1}{4}$  ; SE $\frac{1}{4}$

**T50N R60W**

Sec. 4 N $\frac{1}{2}$ ; N $\frac{1}{2}$  S $\frac{1}{2}$

Sec. 5 N $\frac{1}{2}$

Sec. 6 NE $\frac{1}{4}$  NE $\frac{1}{4}$  ,

and excludes privately owned lands in the form of patented mining claims described in the Crook County, Wyoming plat as 5160 28 1 00 001.00, 5160 21 2 00 002.00, 5160 33 1 00 004.00, 5160 28 1 00 005.00, 5160 17 2 00 007.00, 5160 21 3 00 008.00, 5160 28 1 00 009.00, 5160 21 4 00 010.00, 5160 28 1 00 012.00, 5160 04 1 00 551.00, 5160 28 4 01 001.00, and 5160 28 4 01 002.00, with legal descriptions as follows:

- Certain mining claims or premises, known as the Washtenaw, Frankfort, Mountain Side, Tallaho, Florence, Lafayette No. 2, Lafayette No. 3 and Hartford lode mining claims, designated by the Surveyor General as Survey No. 282, embracing a portion of Sections

twenty-eight and thirty-three in Township fifty-one north of Range sixty west of the sixth Principal Meridian, Crook County, Wyoming;

- Certain patented mining claims located in Township 51 North, Range 60 West, Section 21 and more particularly described as the Silverwave, Patent # 18458, M.S. 39; American Eagle, Patent # 21584, M.S. 44; and Dakota Lode, Patent # 18458, M.S. 39, Crook County, Wyoming.
- Certain patented lode mining claims located in Township 51 North, Range 60 West, Sections 21 and 28, designated as Mineral Survey No. 345, Patent # 45587, more particularly described as Humbolt; Lessing; Attila; Attila No. 1; Attila No. 2; Uhland; Arcade; Arcade # 1; Arcade # 2; and Arcade No. 3, Crook County, Wyoming..
- Certain lode and placer mining claims situated in the Hurricane Mining District, in Sections 28, 29, and 32 of T51N R60W, 6<sup>th</sup> Principal Meridian, Crook County, Wyoming, more particularly described as the Brown, Ironside, # 41342, M.S. 161; McCleery, # 41342, M.S. 161; Thompson, Patent # 41342, M.S. 161; Continental, Patent # 30000, M.S. 75; Little Hughie, Patent # 30000, M.S. 75; London, Patent # 30000, M.S. 75; Eastern, Patent # 143575, M.S. 397; Hub, Patent # 143575, M.S. 397; Eclipse, Patent # 41342, M.S. 161; Fox Lode, M.S. 398; Frankfort, Patent # 41342, M.S. 161; Goldcoin, Patent # 41342, M.S. 161; Goldbank, Patent # 41342, M.S. 161; Goldfinch, Patent # 41342, M.S. 161; Interocean, Patent # 39932, M.S. 45; Interocean #2, Patent # 41317, M.S. 163; Interocean #3, Patent # 41317, M.S. 163; Sand Creek & Welcome Gulch, Patent # 22662, M.S. 46; Thompson, Patent # 41342, M.S. 161; and Vanderbilt Tract, Patent # 30000, M.S. 161, Crook County, Wyoming.
- Certain lode and placer mining claims situated in the Hurricane Mining District, in Sections 20, 21, and 28 of T51N R60W, 6<sup>th</sup> Principal Meridian, Crook County, Wyoming, more particularly described as the Blacktail, Patent # 29920, M.S. 74; Creston, Patent # 21673, M.S. 42; Hungry, Patent # 21674, M.S. 41; January, Patent # 29920, M.S. 74; Napoleon, Patent # 30000, M.S. 40; and Parnell, Patent # 21517, M.S. 43, Crook County, Wyoming..
- A certain patented mining claim located in Section 21 of Township 51 North Range 60 West, 6<sup>th</sup> P.M., known as the New Orleans, M.S. 589, Crook County, Wyoming..
- A certain patented mining claim known as the Ypsilanti Fraction, U.S. Mineral Survey No. 282, situated in T51N R60W of the 6<sup>th</sup> P.M., Crook County, Wyoming.
- A certain patented mining claim known as the Florence Mining Claim, M.S. 282, Lots 1 and 2, located in T51 N R 60W Sections 28 and 33, Crook County, Wyoming.
- A certain placer mining claim known as the Ada May No. 3, Survey No. 145, embracing a portion of sections 17 and 18, Township 51 North, Range 60 West, Crook County, Wyoming.

**Section 6(a)(iii) The names by which the area is known locally:**

Portions of the area are known as Upper Sand Creek Canyon, Corral Creek, Idol Spring, Idol Gulch, Dugout Gulch, Thompson Gulch, Bull Hill, Welcome, Sand Creek Crossing, Cement Ridge, Spotted Tail Gulch, Pole Cabin Spring, Pole Cabin Gulch, Cranberry Spring, and Green Hill.

**Section 6(a)(iv)** The distance of the area to the nearest city or town, and the county in which the area is located: The petitioned area is in Crook County, Wyoming. Beulah, Wyoming is the nearest town, approximately 5.5 miles to the north of the petitioned Very Rare or Uncommon area. Sundance, Wyoming is the nearest incorporated town, approximately 11 miles west, and Spearfish, South Dakota is approximately 11.5 miles northeast of the petitioned area.

**Section 6(a)(v)** Original **USGS topographic maps** showing the area in question which reflect the surface land ownership pattern (private, state, federal) in the area are attached to this petition and titled Map 1 (quad A), Map 1 (quad B), and Map 1 (quad C).

**Section 6(a)(vi)** Below is a list of the **names and addresses of the surface and mineral owners whose lands are included within the area proposed** for designation, along with a description of the ownership interest of each surface and mineral owner, including a legal description of the lands in which each person has an interest:.

| <i>Surface Owners and Mineral Owners inside the proposed Very Rare or Uncommon area</i>                                                                                                                                                                                                                                                                                                                                                                                                      |                   |                                   |          |       |       |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-----------------------------------|----------|-------|-------|--|
| Name/Company                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                   | Address                           | City     | State | Zip   |  |
| United States Forest Service                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | All surface lands | 1019 North 5 <sup>th</sup> Street | Custer   | SD    | 57730 |  |
| Description of Lands: All surface lands within the area being petitioned are owned by the United States of America and are managed by the United States Forest Service. See legal description above in section (ii). Some private lands are surrounded by the petition area. These are listed below in the list of adjacent landowners and private inholders.                                                                                                                                |                   |                                   |          |       |       |  |
| U.S. Dept. of Interior Bureau of Land Management (see note 1)                                                                                                                                                                                                                                                                                                                                                                                                                                | Minerals          | 5353 Yellowstone Road             | Cheyenne | WY    | 82009 |  |
| Description of Lands: Minerals within the area being petitioned are owned by the United States of America (with the exception of the Moskee Land Corporation tract listed immediately below) and managed by the U.S. Department of Interior Bureau of Land Management, with the Cooperation of the United States Forest Service. See legal description above in section 6(a)(ii).                                                                                                            |                   |                                   |          |       |       |  |
| Moskee Land Corporation, LLC                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Minerals          | PO Box 939                        | Wayzata  | MN    | 55391 |  |
| Description of Lands: Minerals under T51N, R61W Section 2: SW/4NE/4; SE/4NW/4; Lot 3 (aka Tract 37); SE/4NE/4; N/2SE/4; NE/4SW/4 (aka Tract 40); S/2S/2 (aka Tract 41) aggregating 440 acres; T52N, R61W Section 35: SE/4SW/4, comprising 40 acres; T52N R 60 W Section 30: W/2SE/4; E/2SW/4 – aggregating 160 acres, and also rights of way for road or other access to facilitate mining and other uses on these properties. See also complete list of unpatented claims and owners below. |                   |                                   |          |       |       |  |
| Note 1: There are unpatented mining claims in the petition area. A list of the claimants holding these unperfected mineral claims is attached to this petition on the following page, with legal descriptions in Appendix A.                                                                                                                                                                                                                                                                 |                   |                                   |          |       |       |  |

In addition, the following claimants hold **unpatented mining claims** within the proposed Very Rare or Uncommon Area. While these are not strictly speaking mineral owners (ownership accrues to patented mining claims only, while a claimant holds an exclusive right to explore for and extract minerals from a tract of land), we provide the names and addresses of mining claimants in the table below. A list of claims with legal descriptions is found in Appendix A accompanying this petition.

| Claimant                                  | Address                                                            | Phone       |
|-------------------------------------------|--------------------------------------------------------------------|-------------|
| Sundance Engineering Inc.                 | 1407 Charles St. Spearfish, SD 57783                               |             |
| Bentz Bruce                               | N 215 2nd St. Riverdale, ND 58565                                  |             |
| Ottema Donald R                           | PO Box 364 Whitewood, SD 57793                                     |             |
| Ottema Douglas M                          | 1218 Easy Street Whitewood, SD 57793                               |             |
| Bronco Ck Mining and Exploration          | 1815 East Winsett Street Tucson, Arizona 85719-6547                |             |
| Johnson David                             | Bronco Creek Exploration employee-same as above                    |             |
| Mineral Hill Venture                      | PO Box 33010 Austin, TX 78764                                      |             |
| Jensen Eric                               | 1916 E. Edison St. Tucson, AZ 85719                                |             |
| Hubbard Todd                              | 1407 W Charles St. Spearfish, SD 57783                             |             |
| Pope and Talbot, Inc.                     | Randy Lewis, Newcastle Box 370                                     | (307) 74481 |
|                                           | Corporate Address- 1500 SW First Ave. Suite 200 Portland, OR 97201 |             |
| Thomas C. Barber et al.                   | 5111 Rocky Point Dr Gillette, WY 82718-8402                        |             |
| Mary L. Cullum                            | 48 Montgomery St. Custer, SD 57730                                 |             |
| Erik R. Flesch or Flesca                  | Bronco Creek Exploration employee-same as above                    |             |
| Newmont NA Exploration Unlimited          | 555 Fifth St. Elko NV, 89801                                       |             |
| Board of Crook Cty Commissioners (Public) | PO Box 37 Sundance, Wyoming 82729-0037                             |             |
| BLM                                       | 5353 Yellowstone Road Cheyenne, WY 82009                           |             |
| Wells Fargo, NA                           | 131 W. Hudson St. Spearfish, SD 57783                              | 605-642723  |
| First Western Bank, Sturgis               | 1200 Main St. PO Box 9 Sturgis, SD 57785                           | 605-342562  |
| First Interstate Bank                     | 222 S. Gillette Ave. Gillette, WY                                  |             |
| Osier Terrence: Strathmore Resources US   | 2420 Watt Court Riverton, WY 82501                                 |             |

In addition, while grazing permittees are considered lessees rather than owners (and hold a 10-year revocable privilege to graze publicly owned forage), the table below provides an accounting of lessees who have a grazing allotment that includes lands within the proposed area. All of the permittees below also lease lands contiguous to the proposed area.

| <b>Sand Creek Allotment</b>  |                             |                                               |
|------------------------------|-----------------------------|-----------------------------------------------|
|                              | Charles and Sallie Nicholas | 20026 Bear Ridge Rd., Spearfish, SD 57783     |
| W.W. Thompson and Sons, Inc. | Aaron Thompson              | 10326 Upper Redwater Rd., Spearfish, SD 57783 |
| Haiair Enterprise, Inc.      | Keith Haiair                | 159 Homestake Rd., Spearfish, SD 57783        |
| <b>Idol Allotment</b>        |                             |                                               |
| W.W. Thompson and Sons, Inc. | Aaron Thompson              | 10326 Upper Redwater Rd., Spearfish, SD 57783 |
| Bush Ranches                 | Dewey Turbiville            | P.O. Box 861, Sundance, WY 82729              |
| Betty J Durfee Trust         | Jett Schloredt              | P.O. Box 1064, Sundance, WY 82729             |
|                              |                             |                                               |

|                                 |                            |                                         |
|---------------------------------|----------------------------|-----------------------------------------|
| <b>Willow Springs Allotment</b> |                            |                                         |
| Watson Land, LLC                | Doug Watson                | 171 Moskee Road, Sundance, WY 82729     |
| <b>Cement Ridge Allotment</b>   |                            |                                         |
|                                 | J. Daniel and Renee Schenk | 19757 Red Hill Rd., Spearfish, SD 57783 |

Finally, while by law easements convey a right of a non-owner to access and use a property owner's property, rather than land or mineral ownership pursuant to Section VII, the table below lists easement holders within the proposed area.

| <b>Location</b>                                                                   | <b>Easement Holder</b>                                | <b>Address</b>                                                     | <b>Type of Easement</b> |                                                                                                                                                                                                      |
|-----------------------------------------------------------------------------------|-------------------------------------------------------|--------------------------------------------------------------------|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| T52N R61W<br>Sec. 25, 26                                                          | Red Canyon<br>Ranch Property<br>Owner's Assn.<br>Inc. | c/o Cecilia<br>Rongstad, P.O. Box<br>231, Beulah,<br>Wyoming 82712 | Forest Road<br>Easement |                                                                                                                                                                                                      |
| T52N R61W<br>Sec.26 or<br>Sec. 28                                                 | The Range<br>Telephone<br>Cooperative                 | P.O. Box 127,<br>Rosebud, MT 59347                                 | telephone               | Note: This is almost<br>certainly a recording<br>error and not in fact<br>within the proposed<br>area.                                                                                               |
| T52N R60W<br>Sec. 19,<br>T52N R60W<br>Sec. 30,<br>T52N R62W<br>Sec. 24, 25,<br>26 | U.S. Forest<br>Service                                | 1022 North 5th<br>Street Custer, SD<br>57730                       | Road Easements          | Note: Granted from<br>Homestake Mining<br>to U.S. Forest<br>Service, but fee title<br>for these sections<br>later transferred to<br>USFS, so USFS<br>now holds<br>easements across<br>USFS property. |

**Section 6(a)(vii)** A concise statement of the reasons the area is alleged to be very rare or uncommon and a description of the archaeological, surface geological, historical, wildlife, botanical, or scenic attributes of the area. We present the Concise Statement first in subsection (A) followed by a full description of the attributes and values in subsection (B).

**(A) Concise Statement of the Reasons Sand Creek is Very Rare or Uncommon:**

Present in the Sand Creek area being petitioned is a remarkable convergence of rare and uncommon values. Addressing the specific criteria for designation from Section 6 and Section 11 of Chapter VII of the Rules of Practice and Procedure, these values include:

- (1) Over 4,000 acres of mule deer crucial winter range, which are considered "vital" under the Wyoming Game and Fish Commission mitigation policy, a specific eligibility criterion of the Very Rare or Uncommon Rule . (See Appendix E)
- (2) Seven rare vegetation types, including types in pristine condition for which pristine stands are unusual (plus 80 rare plant species), another specific eligibility criterion in the Rule.

(3) A population of the finescale dace, an extremely rare native fish. This fish is ranked Native Species Status NSS1 (“on-going significant loss of habitat” and “populations are greatly restricted or declining – extirpation appears possible”) by Wyoming Game and Fish Department (hereafter WGFD) and is assigned a mitigation category of “vital” by the Wyoming Game and Fish Commission, an explicit eligibility criterion of the Rare and Uncommon rule (mapped at Appendix B).

(4) The area could affect, and WGFD is on-record expressing concerns directly related to, the Blue Ribbon, Class 1 nationally important trout fishery directly downstream on Sand Creek. This is a specific Rare and Uncommon criterion. In 2005, the downstream fishery contained 6,300 trout per mile with values as high as 8,800 fish per mile in 2002 and 10,700 fish per mile in 1999. The fishery is hydrologically connected to the petition area on the surface, occurring in the same channel/watershed. It is believed to be connected through subsurface waters as well.

(5) Numerous “fragile lands” are present, such as vegetated wetlands, seeps and springs, and concentrations of ecological and aesthetic features (see Appendix J). The extremely high number (71 species) of rare plants present easily meets the “concentration of ecological features” criterion. Additionally, scientists consider Sand Creek to be an Ice Age plant refuge where the cooler and moister conditions allowed populations of boreal plants to survive as the climate warmed at the end of the last ice age, when similar vegetation retreated far to the north. Some of the plants in Sand Creek are separated by hundreds of miles from their current primary populations in the forests of Canada. Thus Sand Creek provides a rare glimpse into the past and can serve as an important living laboratory of substantial scientific value. The aesthetic values of the area have been found by prior analyses to be “outstandingly remarkable,” “some of the most scenic landscape features in the Hills,” and “spectacular scenery,” which would be apparent to a reasonable person. (Marriott and Faber-Langdoen, 1999).

(6) The U.S. Forest Service has recognized some of the rare and uncommon values present in Sand Creek by designating in its Forest Plan an upstream (southern) portion of Sand Creek and Dugout Gulch as “Botanical Areas” and a large part of the downstream portion as a “Late Successional Forest Landscape” (see Appendix I for map). In the most comprehensive and most recent vegetation inventory of the Black Hills, scientists designated a large portion of the Sand Creek petition area as an “exemplary site” because of the presence of high-quality stands of native vegetation. (Marriott and Faber-Langdoen, 1999).

(7) The Wyoming EQC also has previously recognized the rare or uncommon values of the Sand Creek waterbody by designating it a Class 1 Water (see Appendix J). Sand Creek is one of only 15 rivers and lakes in the entire state designated by name as Class 1—the highest and most protective designation that can be applied to a water body within the state of Wyoming. Class 1 Waters are river/stream segments and lakes designated specifically by the EQC “based on value determinations” after considering the aesthetic, scenic, recreational, ecological, agricultural, botanical, zoological, municipal, industrial, historical, geological, cultural, archaeological, fish and wildlife...” and other values. The local and statewide public has supported full protection of the values of Sand Creek via Class 1 designation of the Creek portion flowing through the petition area when attempts have been made to downgrade the classification or allow placer mining in the creek bed.

(8) The area contains surface geological features including sink and rise features on Sand Creek itself and on Pole Cabin Gulch.

(9) Numerous unique scenic values are present in the area.

(10) Historic values in the form of the Cement Ridge historic fire lookout are present in the area.

In summary, biologists, botanists, ecologists, and other scientists have long recognized the very rare or uncommon values present in Sand Creek, and have repeatedly called for their protection. This petition is submitted to gain such protection for this remarkable area.

(B) A description follows of the wildlife, botanical, geological, historical, and scenic attributes of the area, arranged in the order found in Section 11, Criteria for Designation, in Chapter VII of the Rules of Practice and Procedure, subsections (d) for wildlife values, (f) for botanical values, and (g) for scenic values.

(1) **§11(d) - Wildlife Values.** The lands proposed to be designated are very rare or uncommon because they exhibit wildlife values that are very rare or uncommon when compared with other areas of the state or region and are seldom found within the state or region and which, if left unprotected, could become extinct or extirpated. In particular:

(a) 4,035 acres of the petition area has been designated as crucial winter range for mule deer by the Wyoming Game and Fish Department (WGFD 2006a). This is shown on Appendix E. Crucial winter range is considered “vital” under the Wyoming Game and Fish Commission mitigation policy. The presence of lands considered as “vital” habitat meets §11(d)(iii) of the rule. “Vital” habitat is defined as that which “directly limits a community, population, or subpopulation, and restoration or replacement may not be possible (WGF Commission 1998).

(b) A population of finescale dace (ranked S2), an extremely rare native fish, is present in the petition area near the headwaters of Spotted Tail Creek. WGFD ranks finescale dace NSS1 and considers the fish “dangerously close to extirpation in Wyoming” and “ranked highest for conservation efforts with the greatest immediate needs in Wyoming” according to a recent WGFD report (Miller and Weitzel 2003). NSS1 means “there are low population densities, habitat is declining and the species is in danger of disappearing from the state” (WGFD 2007a). Habitat for NSS1 species such as finescale dace is assigned a mitigation category of “vital” by the Wyoming Game and Fish Commission. As mentioned above, “vital” habitat is a criterion under §11(d)(iii) of the Rare and Uncommon rule.

Finescale dace also are glacial relicts, isolated after the last Ice Age. It is possible that these dace populations have formed unique characteristics due to this genetic isolation. According to Stasiak and Cunningham (2006), finescale dace populations

“were forced south into several different refuges during the last Ice Age advance. Finescale dace followed the melting ice as they dispersed back to the north via several different routes. Long after the last glacial retreat, we now have isolated populations of finescale dace that exist in spring seeps in Nebraska, Wyoming, and South Dakota. In many cases, these populations have been separated and isolated from other dace populations for many generations. The dace have had sufficient time in isolation for selection processes to allow genetic changes, and many of these regional populations may be uniquely adapted to their own ecological conditions.”

“Populations of finescale dace throughout USFS Region 2 appear to be declining (Clausen and Stasiak 1994), and given the isolated position of these populations and the unique habitat types required by this relict species, long-term viability is questionable... Every attempt should be made to maintain the natural flow regime in

the streams where this species resides and to manage for the expansion of beaver activity within these watersheds.”

There is some uncertainty regarding the origins of the finescale dace population in the Sand Creek area. Some authorities believe the population was naturally established while other reports indicate the population was planted in 1983 (e.g., WGFD 1996a) using stock from nearby sources. One expert indicated that, despite the difficulty determining if the existing population is native or has been transplanted from nearby sources, the distinction probably doesn't matter at such reduced population sizes (D. Isaak, USDA Forest Service Rocky Mountain Research Station Boise Aquatic Sciences Lab, personal communication 2006). In short, a population of a fish so rare in Wyoming merits protection regardless of its origins.

(c)The Sand Creek watershed feeds a fishery classified as Class I by the Wyoming Game and Fish Department and therefore meets the criterion found at §11(d)(iv) of the Rule. The petition area is in the same drainage and directly upstream from the nationally important Class I trout fishery on Sand Creek starting at Ranch A. The Wyoming Game and Fish Department considers this fishery to be “one of the best wild brown trout streams (Class 1, Blue-Ribbon) in the state” (WGFD 1996a). By definition, Class 1 waters are “premium trout waters of national importance” (WGFD 1995a).

The Wyoming Game and Fish Commission own 284 acres along 1.85 miles of Sand Creek a short distance downstream from Ranch A. An easement for fishing access on an additional 2.75 miles adjacent to the Commission property has been arranged with the Ox Yoke Ranch (WGFD 2007b).

Survey data from 2005 from Sand Creek found a naturally reproducing rainbow and brown trout fishery of 1,400 lbs/mile (6,300 fish/mile), with similar estimates in prior years back to 1999 (WGFD 2006b). Estimates from 1995 were specified for four distinct portions of the fishery and found 2,741 trout per mile (213 pounds per acre) on the Reinecke [Ox Yoke] easement; 2,275 trout per mile (270 pounds per acre) on the State Land (WGFD) section; 5,875 trout per mile (348 pounds per acre) on the Country Club section; and 3,281 trout per mile (255 pounds per acre) on the Ranch A section (WGFD 1996a). The most recent visitor day information WGFD has recorded is from May through October 1985 when they estimated 353 anglers fished in the publically accessible portion of Sand Creek near Ranch A (WGFD 2007c).

Sand Creek begins as a small perennial stream near Cement Ridge and flows north-northwest for about more than five miles at which point it generally sinks underground. For the next several miles, until Ranch A, the flow is ephemeral or intermittent depending on the specific locations and recent climatic conditions. During storms and other meteorological events, surface flow can occur in these nonperennial sections, sometimes at extremely high rates. The Class 1 fishery begins when the creek becomes continuously perennial again at several large cold springs which surface at Ranch A with a discharge of several thousand gallons per minute. It is the second largest spring in the Black Hills (Rahn and Gries 1973).

Agencies and experts have expressed concern that mining which could take place in the petition area may negatively affect the fishery at Ranch A through both surface transport of sediments and pollutants and through impacts to the quality and quantity of the water surfacing at the springs at Ranch A. These concerns have been expressed in response to very small mineral exploration proposals, and it follows that the potential impacts would be much greater from larger mining proposals.

The Sand Creek channel at Ranch A is directly connected through surface flow to the petition area during storm events and floods (Macy 1996). The Wyoming Game and Fish Department has stated that “fishery impacts could occur” from small-scale exploratory or recreational mining “due to elevated quantities of sediments or other pollutants being carried off site by high flow events” (WGFD 1995a). Such high flow events have occurred in Sand Creek in recent years and can be expected to occur again (e.g., highest flood flow on record occurred in May 1995 as reported in WGFD 1996a and Macy 1996).

Larger mining operations would increase WGFD concerns. “If mineral exploration reveals sufficient mineral potential to warrant further development, potential impacts to the fisheries will be greater as will our concerns... [f]urther development would require that major steps be taken to avoid adverse impacts to the downstream fishery” (WGFD 1995a). Even in the ephemeral sections of the channel, WGFD stated that disturbances “are still a cause for concern” (WGFD 1995).

Individuals at WGFD “have seen high flows from the canyon flowing into the Ranch A area - this is also evidenced by the high bedload movement that can be seen in the stream channel throughout,” leading to this concern: “Sand Creek from Ranch A downstream already deals with considerable sediment and further input from upstream perturbations could affect the channel capacity, habitat for fish, and spawning potential for the wild brown and rainbow in lower Sand Creek” (WGFD 2005),

Subsurface flow is also a concern. Hydrology experts believe the petition area contributes to the recharge of the springs upon which the Class 1 fishery at Ranch A depends, and that land management activities in the petition area—such as mining—would be expected to affect the quality of the water in the aquifer and springs (Dr. P. Rahn, Professor Emeritus of Geology and Geological Eng., SD School of Mines, Personal Communication Jan. 4, 2005; Macy 1996). A USFS hydrologist assessing the possible impacts from a mineral exploration proposal found that “perhaps the greatest risk” from this very small proposal was “leaks of any size” of fuel and oil which “have the potential to impact water quality with aquifer contamination possible. Large spills or leaks could cause downstream fish kills.” He goes on to conclude that “Aquifer contamination is possible if fuel or oil is spilled” and “harm to downstream fisheries is possible if a fuel or oil spill occurs” (Macy 1996).

The most comprehensive study of Black Hills hydrology ever conducted found that the aquifer source of the Sand Creek Class I fishery to be “especially sensitive to contamination because of high secondary permeability and potential for streamflow recharge” (Driscoll, et al. 2002).

In addition to the Class I wild fishery at Ranch A, there is a self-sustaining wild brook trout fishery completely within the petition area at Spotted Tail Creek. WGFD considers this a “locally important, naturally reproducing” fishery (WGFD 2006b) According to WGFD, a substantial investment has been made by the Department to improve this fishery:

“Spotted Tail Creek is a short tributary to the upper portion of Sand Creek that supports a wild brook trout population... The last plant of BKT was in 1993, but natural reproduction was considered adequate to sustain the population... A series of 40-50 overpour (plunge) structures and rock riprap/tree revetments were completed by the WGFD on Spotted Tail Creek in 1985. This habitat enhancement has increased the carrying capacity of this stream for BKT [brook trout]. Estimates from electrofishing in 1994 were 1,956 BKT per mile (372 pounds per acre) (WGFD Sheridan Region file records)” (WGFD 1996a).

A third trout population exists in Spotted Tail Pond. This is a supplemented rainbow trout fishery:

“This pond was stocked with catchable rainbow trout (ELR) in 1992, KRB in 1994 and BKT fingerlings and catchable ELR in 1995. The pond is managed as a Put and Take fishery with catchable rainbow (300) scheduled annually. No estimates of angler use of the pond or stream have been made by the WGFD” (WGFD 1996a). The Forest Service describes this area as “one of the more popular fishing areas within the Sand Creek Drainage” (USDA Forest Service 1996a). It is stocked with “approximately 200 catchable trout annually, and is also a fishery of local importance” (WGFD 2006b).

Lastly, another wild brook trout fishery exists near the upper reaches of Sand Creek.

“Portions of the upper end of Sand Creek, rated as a Class 3 trout fishery, support a small, wild population of brook trout” (WGFD 1996a). This fishery “increases/decreases in habitat area based on the intermittent flows, remaining pools as flows recede, and of course, the water year and how the numerous springs in the canyon are functioning (possibly an issue with the mining on how it might affect these springs)” (WGFD 2005).

(d) The area contains fragile lands that offer unique wildlife or scientific values specified in criterion §11(d)(v).

Fragile lands are defined in the Rule at §4(c) as “geographic areas containing natural, ecologic, scientific, or aesthetic resources that could be damaged or destroyed by mining operations,” while the specific criterion in the Rule at §11(d)(v) states these fragile lands must offer “unique wildlife or scientific values.” Thus, it appears the “fragile lands” criterion is not restricted solely to wildlife values but also may include unique scientific values which could be harmed by mining.

The petition area contains numerous values which meet the “fragile lands” criterion. Many are described in some detail in other sections of this petition, while others are not. All are described briefly below.

### Wetlands

Several vegetated wetlands are present in the petition area according to government wetlands inventories (USFWS 1997). Wetlands meet the fragile lands criterion because they are “natural” and “ecologic” resources “that could be damaged or destroyed” by mining. (See Appendix I)

According to the US Fish and Wildlife Service, wetlands present in the petition area include 34 “pond” type wetlands totaling 6.1 acres and 8 linear wetlands totaling 4,452 feet or 0.84 miles. All but one are natural rather than man-made wetlands. Most of the pond-type wetlands are palustrine, aquatic bed, intermittently exposed beaver ponds except for a small number which are classified as emergent. The linear wetlands are palustrine (without flowing water), emergent, seasonally flooded except for two aquatic bed, intermittently exposed, beaver ponds.

According to the definitions in the Wyoming Environmental Quality Act (§35-11-103 (c)(xvi)), “wetland value” means those socially significant attributes of wetlands such as uniqueness, heritage, recreation, aesthetics and a variety of economic values.”

In addition to the fragile lands criterion, the petitioners note that the Wyoming Game and Fish Commission Mitigation Policy assigns wetlands to the “vital” category. The presence of lands

considered as “vital” habitat is an explicit eligibility criterion of the Rare and Uncommon rule at §11(d)(iii).

#### Springs and Seeps

Numerous small springs and seeps present in the area contribute to the conditions which make Sand Creek hospitable for some of the rare plants described in the botanical values section below. Foxtail sedge, Bebb’s sedge, stalk-grain sedge, moschatel, rosy sedge, and highbush cranberry are just a few of the rare plant species in Sand Creek living in these moist habitats. Rare vegetation types such as beaked willow scrub also depend on such conditions made possible in part by springs. The springs also create (or allow beaver to create) biologically rich “hanging” ponds on the terraces above the stream channel.

#### Ice Age Plant Refugium of High Botanical Value

As described further in the botanical values section below, botanists and other scientists consider Sand Creek to be a “refugium” for boreal plants (plants of the north) hundreds of miles distant from the great northern forests of Canada. Sand Creek is the best, most pristine example of this in the region and is of great scientific value. These values would clearly be harmed by mining and meet the fragile lands criterion.

#### Rare Plant Concentration Area

The petition area contains a very large number of rare plant species (described further in the “botanical values” section below). The Rule refers to the surface coal mining rule for examples of fragile lands. The petitioners note that the specific Coal Rule chapter referenced by the Rare and Uncommon Rule have changed and are now found at Chapter 17, Section 1 rather than Section 1(a) Chapter XXVIII. Among the examples of fragile lands found in the Coal Rule are “environmental corridors containing a concentration of ecologic and aesthetic features.” With 71 rare plants in one relatively small area, plus the presence of the boreal ice age relict plants, Sand Creek appears to be exactly the type of value contemplated by the Rule. The presence of several globally rare vegetation types adds to the qualifications of the area. In addition, the concentration of rare plants is of substantial scientific value and certainly could be harmed by mining. It therefore meets this criterion as well.

#### Class 1 Outstanding Water and Rare Native Fish

Sand Creek’s classification as a DEQ Class 1 “Outstanding Water,” which is Wyoming’s highest possible designation, also fits under the “fragile lands” criterion.

The finescale dace population in the petition area is another “ecologic” fragile resource that could easily be harmed by mining. The population has both unique wildlife value and scientific value: unique wildlife value because it is an extremely rare fish in Wyoming ranked of greatest conservation concern by WGFD and habitat considered “vital” by the WGF Commission; unique scientific value because 1) the fish population is a glacial relict left over from the last Ice Age and 2) due to this isolation of populations after the last Ice Age, it is possible that the dace populations have formed unique characteristics due to their genetic isolation. These fish could be unique to this portion of Wyoming.

#### Old Growth/Late Successional Forest

Old growth forest stands in Sand Creek are of great value as demonstrated by the designation by the Forest Service of much of the petition area as “late successional landscape.” These old

growth forest stands meet the “fragile lands” criterion due to the rare wildlife habitat they contain, the special ecological role they play, and their scientific value. Further description of the values of old growth forest is presented below in the “special designations” section.

#### Presence of White Spruce (*Picea glauca*)

White spruce (*Picea glauca*) is a significant component in more mesic (wet) situations, such as lower north-facing slopes of both the main and side drainages. In the wetter northern Black Hills it usually occurs in lower elevations. White spruce is not found in Wyoming outside the Black Hills. The species is considered a disjunct (disconnected) species and was separated from its mother populations during the ice age, and has evolved distinct genetic characteristics due to the long isolation of this population. Black Hills spruce (*Picea glauca* var. *densata*) is a subspecies unique only to the Black Hills.

#### Recreational Value Due to High Environmental Quality

The definition of “fragile lands” in the Rare and Uncommon rule explicitly mentions aesthetic resources, but it is unclear if the criterion for “fragile lands” applies to aesthetic values. The “examples” of fragile lands referred to by the Rule includes “environmental corridors containing a concentration of ecologic and aesthetic features” and “areas of recreational value due to high environmental quality.” Large portions of the petition area have been found by the USFS and local land owners to be “as pristine as any on the Forest,” “essentially undeveloped,” and “‘outstandingly remarkable’ for the solitude it affords” (USDA Forest Service 1996a). These values are discussed further in the “scenery values” section of this petition. However, in response to previous mineral exploration proposals, the local landowners organization, Sand Creek Country Club, has stated that “the upper Sand Creek is an area largely undisturbed from logging and mining... and it deserves to remain this way” (Sand Creek Country Club 1996). Another Sand Creek Country Club member recently characterized the area as “an extremely unique, sensitive, and pristine area, and one of the only rather undeveloped areas within the Black Hills... We are concerned about the effect hard rock, deep mining would have on the springs, which feed Sand Creek, and the run off from mining activity, as it affects water quality, and macro invertebrate populations. Another major concern would be the damage done by mining activity to the pristine and sensitive Northern Black Hills forest, including the wild brook trout populations” (Mortimer 2005).

Finally, in an assessment of the entire Black Hills National Forest, the USFS found large portions of the petition area along the creek to possess scenery, recreation, and ecological/rare plant values that were “outstandingly remarkable” (USDA Forest Service 1996a).

(2) §11(e) – **Surface Geological Values.** The lands proposed to be designated as very rare or uncommon contain a hydrological “sink” in which the entire flow of Sand Creek disappears below the streambed gravels at normal flows inside the proposed Very Rare or Uncommon area, to rise at a large spring at Ranch A, north of the proposed Very Rare or Uncommon area. The entire flow of Pole Cabin Creek disappears at a sink in T51N R60W Sec. 31, at a point in which the drainage takes an abrupt southward turn and the stream disappears into the base of the hillside. Sinks Canyon on the Popo Agie River is one other such geological feature, so rare that it has been designated as a State Park. These “sink and rise” occurrences are very rare or uncommon in Wyoming and therefore this feature is a criterion for designation of this area for protection by the EQC.

(3) **§11(f) - Botanical Values.** The lands proposed to be designated are very rare or uncommon because they have particular botanical value when compared with other areas of the state or region and are seldom found within the state or region and which, if left unprotected, could become extinct or extirpated (Marriott and Faber-Langdoen, 1999).

In particular, the Sand Creek petition area contains stands of rare native vegetation types and contains stands of native vegetation types in pristine conditions for which pristine stands are unusual. Sand Creek meets both criteria. These botanical values are present:

(a) Stands of seven globally rare native vegetation types are found in Sand Creek. All seven, found in a total of eight different sites within the petition area, have been ranked by expert botanists as “critically imperiled,” “imperiled,” or “vulnerable” at a global scale (Marriott and Faber-Langdoen, 1999). Not only are they critically imperiled when viewed from a state perspective, but also from a global perspective. The rare vegetation types are listed in Attachment 1; locations of these rare vegetation types are shown on Appendix D (Marriott and Faber-Langdoen, 1999).

(b) A single site within the petition area contains stands of seven native vegetation types in pristine condition for which pristine stands are unusual. The Cranberry Springs site, totaling 3,450 acres, has been identified by scientists specifically due to the presence of stands of native vegetation types that are in pristine condition for which pristine stands are unusual. The Cranberry Springs site is in the north and western part of the Sand Creek petition area has been designated an “exemplary site” by scientists in the Black Hills Community Inventory, the most comprehensive and most recent vegetation inventory of the Black Hills (Marriott and Faber-Langdoen, 1999). The site was designated due to the presence of high-quality stands of native vegetation listed in Attachment 2. The site is shown on Appendix C.

(c) In addition to rare vegetation types, eighty (80) plant species designated by scientists as rare and imperiled or extremely imperiled are found in Sand Creek. This is an extremely large number of imperiled species in a relatively small area. Only a small number of these species are shown in the enclosed maps because many of the data were not available in map form from Fertig and Oblad (2000). Fourteen of the 71 rare species present in the petition area are so-called “disjunct” species occurring far from other populations of the same species. Disjunct populations are both scientifically important and of great conservation value. A list of the disjunct species is presented in Attachment 3, while Fertig and Oblad (2000) did a survey for rare plants only in the two Special Botanical Areas and the Late Successional Landscape designated in the Black Hills Forest Plan and occurring within the proposed area (see Appendix G and Attachment 4).

NatureServe and the Wyoming Natural Diversity Database recognize “S” rankings as the statewide rankings for rare plants in Wyoming, as follows (Fertig and Beauvais 1999). S1 plants are “Critically imperiled because of extreme rarity (often known from 5 or fewer extant occurrences or very few remaining individuals) or because of some factor of a species’ life history makes it vulnerable to extinction” S2 plants are “Imperiled because of rarity (often known from 6 – 20 occurrences) or because of factors making a species vulnerable to extinction.” S3 plants are “Rare or local throughout its range or found locally in a restricted range (usually known from 21 – 100 occurrences).” Thus S1 and S2 plants would be considered rare on a statewide basis, while S3 plants would be either rare or uncommon (See Attachment 3).

In addition, some of the rare plants found in Sand Creek are at the periphery of their range, common elsewhere in North America but very rare or uncommon in Wyoming. Recent science

has shown that such peripheral populations can have extraordinary conservation value. According to Hooper (2004), “Studies on both persistence and genetics suggest that the distinction between central and peripheral populations may not be an important distinction for conserving biodiversity. Thus, conservation plans should include populations found both near the center and the periphery of a species’ distribution.” The Nature Conservancy, in their scientifically-based conservation plan for the Black Hills (described below in the "Special Designations" section), specifically aimed to protect disjunct and peripheral species as "primary" conservation goals, which they call "targets" (Hall et al. 2002). Other scientists have discussed the high value of both disjuncts and peripherals species like those found in Sand Creek:

“Disjunct populations, such as those in the Black Hills of Wyoming and South Dakota contribute unique components to the flora of the region and special distributional occurrences to the species overall... It is generally agreed upon that conservation of disjunct peripherals to preserve potential genetic diversity and uniqueness is ecologically desirable.”

(Marriott and Faber-Langdoen, 1999). Beyond the huge number of rare plant species present in Sand Creek, an expert in Black Hills fungi and other organisms has located two “noteworthy” lichen species within the petition area, *Icmadophila ericetorum* (L.) Zahlbr. and *Letharia vulpina* (L.) Hue. Both were found in the Cranberry Springs area (Gabel 2006).

(d) Botanists and other scientists consider Sand Creek to be a refuge or “refugium” for Ice Age plants. The boreal plants (plants of the north) found in Sand Creek are hundreds of miles distant from their current populations in the great northern forests of Canada. The boreal forests once extended to the Black Hills and even a bit further south. But by 10,000 years ago, when the climate warmed after the end of the last ice age, the boreal forest retreated far to the north and other vegetation moved in. In only a handful of places, boreal plants found refuge in the cooler and moister climate of the gulches of the northern Black Hills. Sand Creek is the best, most pristine, and most boreal species-rich such refugium in the region with nearly a dozen boreal disjunct species, listed in Attachment 3. These ice age survivors are now widely separated from their main ranges far to the north. As a result, Sand Creek serves as a living laboratory of great scientific value.

Edward Raventon (1994) states in his “*Island in the Plains: A Black Hills Natural History*,”

“With the final retreat of the last ice invasion, many Arctic species of both plants and animals are left stranded high up on the remote peaks and valleys of the Black Hills as small disjunct populations. Their presence will later provide botanists and ecologists with living clues to the Earth’s great changes in climate.”

(e) The Sand Creek area is home to a number of hardwood trees that are typical of eastern deciduous woodlands but which are very rare or uncommon in Wyoming. These include the paper birch, hazelnut, and American elm. These species are not found in native stands in Wyoming outside the Black Hills. (See Appendix C, F, G, and H)

(4) **§11(g) - Scenic Values.** The lands proposed to be designated are very rare and uncommon because they exhibit scenery values that are very rare and uncommon when compared with other areas of the state or region and are seldom found within the state or region and which, if left unprotected, could become extinct or extirpated. In particular, the area has substantial aesthetic value and its value would be apparent to a reasonable person.

In a formal evaluation for possible for Wild and Scenic River designation, the U.S. Forest Service found that the northernmost 4 miles of the river corridor within the petition area (that portion south of Forest Road 863 to 0.3 mile north of Sand Creek Crossing) “is as pristine as any on the Forest.” The Forest Service made particular note of “the scenic cliffs and sandstone outcrops in Grand Canyon and Sand Creek can be seen close to where the two drainages merge. From this vantage point, scenic values are considered ‘outstandingly remarkable.’” This segment was also ranked as “outstandingly remarkable” for recreation due to pristineness and solitude (USDA Forest Service 1996a).

Nearly 3,000 acres (computer maps show 2,968 acres) of the Sand Creek area have been found by another U.S. Forest Service analysis to contain “some of the most scenic landscape features in the Hills” (USFS No Date). The analysis highlighted “valleys with... elevation differences of 500 feet or more” and “significant limestone outcroppings creating dominant scenic features.” These features were given a “Class A – Distinctive” rating by the agency. Class A refers to “unusual and/or outstanding landscape variety that stands out from the common features.” The overall rating given to Sand Creek was “Significant,” which is defined as “infrequently found in the province.”

According to the Forest Service (USDA Forest Service 1996a), Sand Creek

“offers some spectacular scenery” with “cliffs and steep slopes of limestone. As a result of topography, the area is considerably isolated from the sights and sounds of humans. Steep slopes in excess of 45 percent and elevation differences of more than 500 feet nearly surround the area, primarily along Idol Gulch and Spotted Tail Creek.”

The Dugout Gulch Botanical Area is a featured hike in the book *Hiking Wyoming: 110 of the State’s Best Hiking Adventures*. According to author Bill Hunger,

“It’s a world of complete solitude and endless avian chatter amid a forest setting not usually associated with Wyoming” (Hunger 2008).

In the popular guidebook to the Black Hills, *Exploring the Black Hills and Badlands*, author Hiram Rogers states that

“Even to the amateur the diversity of the boreal forest of Sand Creek is a striking contrast to the ponderosa pine-dominated forest typical of the Black Hills... Springtime brings an explosion of wildflowers to the creek bottoms and slopes of the canyons. Buttercups, larkspur, blue flax, geraniums, violets, and even the lowly hound’s tongue brighten the valleys” (Rogers 1993).

Edward Raventon’s “*Island in the Plains: A Black Hills Natural History*” notes that

“Just beyond the log barn (of Ranch A), the canyon opens into a wide park. The west side of the canyon features high, curved walls of smooth white and red rock. This area is an excellent place to hear and see birds at all seasons of the year. In the summer and early fall a host of common hawks and small falcons, along with golden and bald eagles, are often sighted above the west wall where they launch out on the updrafts blowing down the canyon.”

**Section 6(a)(viii)** Description of the **current and historical land use** of the area:

Prior to 1700, Kiowa, Apache, and Crow controlled the Black Hills. Starting in 1700 movements of tribal peoples began as Shoshonean groups begin displacing Athabascan groups. Shoshonean groups, Arapaho and Cheyenne occupied parts of the Black Hills to be replaced eventually by Dakotas in 1775. Access of tribal peoples to horses and guns may have partly influenced these changes. The area is of great spiritual, cultural, and historic significance to the Sioux and other tribes including the Northern Arapaho. Native American use of the area concentrated along ridgetops, stream courses, and at springs.

In the 1840s, wagon trails created conflict with Native Americans and in 1851 the first Fort Laramie Treaty was signed that allowed wagon passage through Indian country. But the U.S. government recognized Indian Territory stretching across the western half of the Dakotas and into Wyoming as far as the Big Horn Mountains. In 1861, the Dakota Territory was created and then in 1868 Wyoming Territory was created. After another conflict with Native Americans in 1868, the U.S. signed a treaty recognizing that the Black Hills belonged to the Sioux in perpetuity. The treaty could be reversed only if three-quarters of all interested adult males signed away the land. Within four years white miners were trespassing in the area due to rumors of "treasures" in the Black Hills.

In 1874, General George A. Custer, in violation of this treaty, led an Army exploration into the Black Hills and discovered gold. This kicked off a gold rush into the Hills.

In 1875, Red Cloud and other chiefs went to Washington, D.C. and were told that the government intended to take possession of the Black Hills. They could sell it or have it taken from them. The chiefs refused to sell. A commission in 1875 tried unsuccessfully to get the Sioux to sell the Black Hills. In December of that year, the Commissioner of Indian Affairs ordered all Indians to vacate the unceded Indian territory and return to the reservation by January 31, 1876. This deadline could not be met, given the harsh winter. In February, all Indians not on the reservation were declared "hostile." A new treaty was signed by some Sioux on the reservations. A military campaign eventually forced most of the "hostiles" onto the reservation by the end of the year.

To this day, many Sioux contest the legality of the new treaty, both because it was signed under duress and it did not include the leaders specified in the 1851 Fort Laramie treaty. The Sioux maintain that they never consented to the cession of the Black Hills. The land claims case has gone through the cycle of the courts a number of times but remains unsettled. The Supreme Court in 1980 held that the government had to pay for the land taken, including more than a hundred years of interest. This sum was above \$100 million, but the tribes refused to accept the money, preferring. *United States v. Sioux Nation of Indians*, 100 S.Ct. 2716 (1980).

Railroad building, mining, and lumbering of the Black Hills soon commenced in earnest. Supplying the Black Hills Gold rush was a commercial boon to Cheyenne. A slaughterhouse was once sited in the lower reaches of Dugout Gulch within the proposed Very rare or Uncommon area according to oral history, although traces of this structure are difficult to locate today.

### ***Livestock Grazing***

Grazing followed mining, as mining played out. A cattle boom began in 1878 or 1879, ran its course by 1883 or 1884 with a hard winter in 1887 bringing down the curtain on the heyday of

cattle raising in the region. Cattle ranching continuous to be a dominant agricultural land-use in the surrounding area into the present.

Portions of the area have historically been grazed by domestic livestock. The petition area includes portions of four Forest Service grazing allotments: Sand Creek, Idol, Cement Ridge, and Willow Springs.

### ***Recreational Uses***

The Sand Creek area has been used since settlement times primarily for livestock grazing as well as hunting and fishing, particularly along Sand Creek itself and in reservoirs and beaver ponds on tributary streams. Guiding and outfitting of hunters and/or fishermen has occurred in the area. Black Hills Discovery Tours currently offers a “Backcountry Tour” that includes a visit to Cement Ridge. Hiking, wildlife viewing, scenic driving, and nature study are current uses of the area, and a botanical trail has been established by the Forest Service in Dugout Gulch. Recreational goldpanning may also occur.

There are several seasonal residences or cabins on private inholdings contiguous to the petition area, including on the Ada May claim near Sand Creek crossing and on the John Green property near Mineral Hill at the former site of Welcome. The Sand Creek Country Club has several dozen seasonal residences along Sand Creek just downstream of the proposed Very Rare or Uncommon Area.

The neighboring historic Ranch A property bounds the northern side of the petition area, and is owned by the State of Wyoming and run as an educational facility.

### ***Mining History***

Both placer mining and lode mining have taken place in specific portions of the petition area, most notably in the Mineral Hill area. Parts of the old Hurricane Mining District fall within the proposed area. Placer mining for gold occurred here, and also some unsuccessful lode mining. Across the state border, the Tinton Mining District had a greater amount of mining activity with greater commercial success, focusing on gold, tin, and tantalum to be found associated with pegmatite dikes that present a very different geological setting than the Wyoming portions of the area (Holland and Coleman 1989). Mining has occurred for gold, copper, and tin. After brief initial success with placer mining for gold, miners had greater difficulty making a living at lode mining for gold and later tin. Much of Mineral Hill is patented mining claim land. The Tinton mining district abuts the petition area to the east and also contains patented land. Portions of the Sand Creek streambed in the petition area have been subjected to placer mining. Prospecting began along Sand Creek (mainly placer claims) and the Bear Gulch District in neighboring South Dakota in 1876, and Forrest City (later Tinton) was a boom town in South Dakota by 1878 (Waterland 1991). There is a record of a hotel and schoolhouse in the mining camp, and at least one record of gunplay after rowdies shot out the lights of the saloon (id.). The Inter Ocean claim above Sand Creek was mined via open cut and short tunnels from 1890 to 1900, and several dwellings and a boarding house were built at the mouth of Welcome Gulch, which became known as “Welcome City” (id.). A stamp mill was built at the Inter Ocean in 1893, but its operation was delayed by an injunction by the State of Wyoming that forbade them from dumping the tailings directly into Sand Creek (id.). The Inter Ocean operation was never a commercial success.

A 1931 account described a placer mining outfit as “old” with “no additional information” available at the time (Driscoll et al. 1931). Mineral Hill Gold Company, Inc. was incorporated in 1933, with 2,200 feet of tunnels and drifts being constructed in pursuit of hard-rock minerals; there is no record of any ore ever being shipped from this operation (Waterland 1991). Humble Oil Company drilled several core samples seeking hard-rock minerals in 1970, but found little; similarly, Molycorp drilled three core holes on Mineral Hill in 1986-87 and found so little that they terminated their mineral leases in the area. (Holland and Coleman 1989). Some recent core drilling for exploration purposes (focused on copper and/or gold prospects) has been conducted by the Bronco Creek company in the Mineral Hill area. Holland and Coleman (1989) surveyed for placer gold prospects in the area, and concluded,

“It is apparent that the placer gold possibilities of those parts of Sand and Spottedtail Creeks are not attractive. Much of the latter stream has been mined. TRYCCO’s sampling shows low and erratic values....On the basis of TRYCCO’s sampling and test work, it is our conclusion that the Caldak property is not economic as a gold operation because of a very modest gravel reserve, much of which has been worked, and the associated magnetite is not a saleable product at present.””

Remnants of an abandoned mine or stamp mill can be located near Spotted Tail Creek.

### ***Logging and Forest Administrative Uses***

Logging has occurred across portions of the petition area, and is typically expressed as old stumps from selective harvest in the midst of timber stands. In the early days in the Black Hills (1870s and 1880s) timber was cut as close as possible to the places where it was needed. According to Mahoney (1998),

"The first timber cuts occurred near mines and settlements. As these timber reserves were depleted, portable sawmills were moved farther from towns, following the timber line".

In 1892, a sawmill was built on Sand Creek by the Power Brothers of Spearfish, S.D., to serve local mines (Waterland 1991). Logging today is limited by Roadless Area designation for 7,700 acres, while Botanical Area and Late Successional designations under the Forest Plan further restrict commercial logging across the majority of the proposed Very Rare or Uncommon unit. Much of the southern portion of the area is dominated by aspen or birch woodlands, which are not commercially suited for timber production. Ponderosa pine stands scattered across the area hold potential for commercial logging in areas where this use is permitted by Forest Service regulations. The Rattlesnake logging project is currently under consideration by the Forest Service and may allow commercial logging in some parts of the proposed Very Rare or Uncommon area to the south of the roadless area.

The Cement Ridge Fire Lookout was constructed in 1941 for the purposes of locating forest fires, and is still in use today. This lookout is a historic feature of the area and is listed on the National Historic Lookout Register, a stepping-stone to National Register of Historic Places designation.

In its scoping notice for the Rattlesnake Timber Sale, which partially overlaps the proposed Very Rare or Uncommon area, the Forest Service described historic uses of the area as follows:

The ridges and springs were sites of prehistoric camps and quarries. One site shows evidence of use at least 9,000 years ago. Many American Indian tribes have long considered the Black Hills sacred. Euro-American settlement began to affect the project area in the 1870s. An

early account (Graves 1899) blames careless hunters for large areas of severely burned forest. Small mining towns developed at Welcome and Mineral City, though they have all but disappeared. Timber harvest took place in most of the accessible parts of the project area.

(USFS 2008). The Rattlesnake Timber Sale awaits approval, and could potentially include harvest units inside the Very Rare or Uncommon area.

**Section 6(a)(ix)** A list of any **special designations or descriptions of the area** made by other governmental agencies, including, but not limited to, designations by the Department of Interior Bureau of Land Management or Office of Surface Mining, designations by the U.S. Fish and Wildlife Service, and designations by the Wyoming Department of Game and Fish:

(a) Sand Creek has long been recognized by scientists as having extraordinary botanical and ecological values. One of the first multi-agency efforts which identified Sand Creek as deserving of and needing protection was the November 1984 Wyoming Natural Area Needs Workshop (Collins 1985). At this workshop, “over 100 scientists, planners, and administrators from government agencies, private organizations, and academic institutions and representing ten states” came together to systematically identify “elements of Wyoming’s natural diversity occurring on federal and state lands” that require protection in a “special management system.”

The workshop designated the “Upper Sand Creek Site” (Sections 20, 21, and 33) as “Category 1, Clearly Significant” based on the presence of vegetation types (“habitat types”) and rare plants. Category 1 is the highest ranking in the Workshop. All Category 1 sites were recommended for special management designation.

(b) The United States Forest Service has applied two special designations to portions of the Sand Creek area. (See G)

(1) The first is known as a “Botanical Area.” Botanical Areas are defined as “a unit of land that contains plant specimens, plant groups, or plant communities that are significant because of their form, color, occurrence, habitat, location, life history, arrangement, ecology, rarity or other features” (USDA Forest Service 1996a). In 1997, the Forest Service designated approximately 7,348 acres of the total Forest as Botanical Area (MA 3.1) with one area called Upper Sand Creek totaling 1,395 acres. This botanical area is part of the Sand Creek petition, and has Botanical Area qualities due to the presence of the paper birch/hazelnut vegetation type and numerous rare plants (USDA Forest Service 1997). Paper birch and hazelnut are both very rare in Wyoming, and do not occur outside the Black Hills. The agency acknowledged that mining activities (“mining exploration”) posed “detrimental risks to the botanical values of the area” and told the public that botanical area designation would provide for withdrawal of designated botanical areas from mineral entry (USDA Forest Service 1996a).

The second Botanical Area managed as MA 3.1 in the Forest Plan that falls within the petition area is known as Dugout Gulch. This area has rare plant associations including paper birch/beaked hazel woodlands and bur oak/ironwood woodlands, and a large number of rare plant occurrences (Burghart, pers. comm.). According to the Forest Service, for Dugout Gulch,

“This area has outstanding examples of rare and common Black Hills plant communities. Plant species found in Dugout Gulch are rare in Wyoming and occur in the Black Hills as populations peripheral and disjunct to the main ranges of the species.”

(USDA Forest Service 1996a). Mining was listed as a potentially detrimental activity that could impact botanical values in this area (id.). Recreational goldpanning has occurred in Sand Creek

in the past, although commercial placer mining has ceased. In 1997, the U.S. Environmental Protection Agency and Department of Environmental Quality agreed that commercial placer mining was not allowable under the Class I designation for Sand Creek, and denied a mining permit to Freedom Minerals for placer exploration using bulldozers in the streamcourse.

The Forest Service admits that, “Exploration or development of oil, gas or other mineral reserves could directly result in the removal of sensitive plant species or their habitat. Such land use can also indirectly affect these areas through hydrologic modification, leaching of waste products, or increased sedimentation... Such projects could adversely affect many species in these areas of interest” (USDA Forest Service 1996a).

Mining on the South Dakota side of the northern portion of the Black Hills has already severely impacted habitat for one of the rare plants present, known as *Vaccinium membranaceum*. “The surface mines in the northern Hills have alone destroyed no less than several hundred acres of habitat for this species in just the last 15 years. If that’s not a downward trend, then I don’t know what is” (Ode, no date).

(2) A second special Forest Service designation has been applied to a separate portion of Sand Creek—Late Successional Forest Landscape. Late successional forest refers to areas of forest with large, older trees. Such older areas of forest are of great value to certain wildlife species (e.g., brown creeper, a bat species known as Black Hills fringed myotis, black-backed woodpecker) and plants which depend upon or spend a great deal of their life cycle within older forest (Wiggins 2005, Keinath 2004). Late succession ponderosa pine forest is now extremely rare, less than 1.5% in the Black Hills (and also very rare elsewhere in Wyoming). According to the Forest Service (1996a), “only light stands of scattered remnant late succession remained on about half the Forest by the 1970s.”

In 1997, the Forest Service designated the Sand Creek Late Successional Forest Landscape in the northernmost half of the petition area, describing it as “one of the few intact late successional landscapes in the Black Hills” (USFS 1997). Relatively denser tree canopy conditions in this part of the Forest were documented as early as 1898” (USDA Forest Service 1997).

A recent U.S. Geological Survey/National Park Service publication succinctly described the values found in late successional forest on the Black Hills:

“many species require the structure and ecosystem processes that characterize old growth forest but do not exist in forest in earlier stages of development. Although this is the reason most often cited for protecting old-growth forest, there are many others (Kaufmann et al. 1992). For example, old-growth areas may harbor genetic resources not found in younger forest stands – those adapted to the environmental conditions of later stages. Old-growth stands also harbor long-term biological records of climate useful for understanding current, and perhaps future, conditions in the context of the past. Old-growth forest can also provide a unique recreational experience. Finally, old-growth areas are part of the cultural and spiritual heritage of indigenous peoples...” (Symstad and Bynum 2005).

According to Forest Service and other experts, late successional ponderosa pine like that found in the petition area “probably afford the best [northern goshawk] nesting habitat in the Black Hills” (USFS 1996a (Appendix I)). For brown creepers, a Forest Service Sensitive Species, “at least 90 percent of all creeper observations in each of the past three years have occurred in mature or late-successional habitats” (USDA Forest Service 2004). Late successional forest is

also important for the range of cavity nesting birds, particularly those requiring large snags which are more plentiful in late successional stands. “The Black Hills National Forest (BHNF) has at least 23 birds and 10 mammals dependent on snags during a portion of their life history” (USDA Forest Service 1996a).

Much of the Sand Creek area is dominated by ponderosa pine forest. It is tempting to view this forest type as common and without need for protection, even though closed-canopy ponderosa pine forests are uncommon throughout Wyoming. Scientists, however, have recognized the importance and uniqueness of the Black Hills ponderosa pine forest.

“Although ponderosa pine, as a species and as a forest type, occurs over a large part of western North America... the combination of species and ecosystem processes in the Black Hills makes the Black Hills ponderosa pine forest a unique ecosystem” (ROD pg. 43 of Forest Plan). Sand Creek is probably the most pristine portion of ponderosa forest in the Black Hills. As mentioned above, the petition area is “one of the few intact late successional landscapes in the Black Hills” (Symstad and Bynum 2005).

(3) Most of the proposed Sand Creek Very Rare or Uncommon area falls within the Sand Creek Inventoried Roadless Area established by the Forest Service in 2000. Inventoried Roadless Areas have been managed for no commercial timber harvest (with exceptions for fire risk reduction) and no additional road construction. Inventoried Roadless Areas combined with designated wilderness comprise approximately two percent of the Black Hills National Forest.

(4) The Cement Ridge fire lookout has been designated as an administrative site by the federal government.

(c) 3,450 acres in the north and western part of the Sand Creek petition area have been designated an “exemplary site” by scientists in the most comprehensive and most recent vegetation inventory of the Black Hills. (See Appendix C) The site was designated due to the presence of high-quality stands of native vegetation. These rare and uncommon values are described further in the botanic values section above. “The Black Hills Community Inventory (BHCI) was launched in 1995 to systematically classify and describe the vegetation of the Black Hills, and to identify high-quality examples of vegetation (plant community association) types (Marriott et al. 1999). The goals of the project were to compile a comprehensive description of the vegetation of the Black Hills; to identify high quality occurrences of each community type throughout the study area; and to identify biologically significant sites where these types occur” (Hall et al. 2002).

(d) Three separate portions of the petition area have been found to be “areas of biodiversity significance” by the Nature Conservancy in their recent plan for conservation of the Black Hills. These sites were chosen to ensure “the long-term survival of all viable native species and community types through the design and conservation of portfolios of sites.” (Hall et al. 2002, The Nature Conservancy 1996). The three areas, and their acreages are Cranberry Springs at 7,172 acres, all USFS; Sand Creek Botanical Area at 1,395 acres, all USFS; and Cement Ridge 1,600 acres, Sand Creek Headwaters at 1,260 acres, all USFS. (See Appendix C)

(e). The Sand Creek water body itself has been designated a Class 1 Water by the Environmental Quality Council (unrelated to the Class 1 fishery designation by WGFD). Class 1, also known as “outstanding waters,” is the highest and most protective designation that can be applied to a water body within the state of Wyoming. Sand Creek is one of only 15 rivers/lakes in the entire

state singled out by name when designated as Class 1. Class 1 Waters are river/stream segments and lakes designated specifically by the EQC “based on value determinations” after considering the aesthetic, scenic, recreational, ecological, agricultural, botanical, zoological, municipal, industrial, historical, geological, cultural, archaeological, fish and wildlife, the presence of significant quantities of developable water and other values of present and future benefit to the people.”

During the late 1990s, there was a proposal to downgrade the portion of Sand Creek within the petition area from Class 1 status. However, a broad spectrum of the public—ranging from local elected officials to local landowners to conservationists from across the state—requested that the EQC continue the strongest possible protection for Sand Creek by maintaining the Class 1 designation. Local State Representative Marlene Simons (now deceased) advocated strongly for maintaining the Class 1 designation for Sand Creek in the petition area (Casper Star-Tribune September 24, 1998). In response to this vocal public outcry, the EQC retained Class 1 status for Sand Creek within the petition area.

(f) As mentioned previously in the wildlife values section, the WGFD has designated over 4,000 acres of the petition Crucial Winter Range for mule deer.

**Section 6(a)(x)** The **names and addresses of all expert witnesses** whose work or whose testimony may be offered by the petitioner to support the petition are:

Dr. Walter Fertig – botanical values, ice age refuge (scientific values)

1117 W Grand Canyon Dr  
Kanab, UT 84741

Ms. Hollis Marriott – botanical values, Ice Age refugium (scientific values)

655 N. Cedar St.  
Laramie, WY 82072

Dr. Perry Rahn – geohydrology, potential impacts to Class 1 fishery

1207 11<sup>th</sup> St.  
Rapid City, SD 57701

Dr. William Baker– values of old growth forest

Dept. of Geography  
Dept. 3371, 1000 E. University Ave.  
Univ. of Wyoming  
Laramie, WY 82071

Edward Raventon – scenic and recreation values

P.O. Box 55  
Faith, SD 57626

Bonnie Heidel – botanical values

University of Wyoming  
Department 3381 // 1000 E. University Ave.  
Laramie, Wyoming 82071

Dr. Gary P. Beauvais- wildlife values

Director, Wyoming Natural Diversity Database  
University of Wyoming  
Department 3381 // 1000 E. University Ave.  
Laramie, Wyoming 82071

Joe Sandrini - (WGFD) – wildlife and big game values

P.O. Box 615  
Newcastle, WY 82701

Paul Mavrakis – (WGFD) - trout fishery at Ranch A, finescale dace population

Fisheries Supervisor  
700 Valley View Drive  
Sheridan, WY 82801

Beth Burkhart – botanical values

Botanist  
Black Hills National Forest  
1019 North Fifth Street  
Custer, SD 57730

Steve Kozel

District Ranger  
Black Hills National Forest, Bearlodge Ranger District  
P.O. Box 680  
Sundance, WY 82729

Nancy Hilding

President, Prairie Hills Audubon Society  
P.O. Box 788  
Black Hawk, SD 57718

Sam Mortimer

President, Sand Creek Country Club

4280 Skyline Ranch Ct.  
Rapid City, SD 57701

James Mortimer

Sand Creek Country Club  
4321 Timberlane Place  
Rapid City, SD 57701

Warren Braun

Sand Creek Country Club  
4322 Timberlane Place  
Rapid City, SD 57701

Jean and Jennifer Adams

1981 State Hwy 585  
Sundance, WY 82729

Matt Stefanich

Wildlife Biologist, Bearlodge Ranger District  
Black Hills National Forest  
P.O. Box 680  
Sundance, WY 82729

**Section 6(a)(xi)** The names and addresses of the surface or mineral owners of lands contiguous to the area proposed for designation are listed in the table below.

|                           | Name of Contiguous Property Owner | Address                                   | Phone |
|---------------------------|-----------------------------------|-------------------------------------------|-------|
| <b>T50N R60W 6th P.M.</b> |                                   |                                           |       |
| Sec. 4, 5, 6              | US Forest Service                 | 1022 North 5th Street<br>Custer, SD 57730 |       |
| <b>T51N R60W 6th P.M.</b> |                                   |                                           |       |
| Sec. 17, 18               | Hart Daniel C and Mary M          | PO Box 615 Upton, WY<br>82730-0615        |       |
| 21                        | Christensen Randall and Patricia  | 432 Hillsvew Dr.<br>Spearfish, SD 57783   |       |
|                           | Ferderer Donald L and Gayle       | PO Box 801 Sundance,<br>WY 82729          |       |
|                           | Maher Patricia A                  | PO Box 801 Sundance,<br>WY 82729          |       |

|                                          |                                          |                                                                                                     |          |
|------------------------------------------|------------------------------------------|-----------------------------------------------------------------------------------------------------|----------|
|                                          | Sleep Richard D and Karen E              | HC 66 Box14 Spearfish,<br>SD 57783                                                                  |          |
|                                          | Steele Gloria G.                         | HC 66 Box14 Spearfish,<br>SD 57783                                                                  |          |
| 28                                       | Tinton Partners- Attn. John Beatty       | 590 Thornwood Ln.<br>Northfield, IL 60093                                                           |          |
|                                          | Reece Bridgette E.                       | 18 Reese Drive Austin, TX<br>78745                                                                  |          |
|                                          | Rebbe Robert Wetal                       | 14650 Hudson St.<br>Sherman Oaks, CA 91403                                                          |          |
|                                          | Rebbe Wilma Maxine Rev Liv Trs           | 14650 Hudson St.<br>Sherman Oaks, CA 91403                                                          |          |
| 28, 32 and 29                            | Mineral Hill Venture Attn: John<br>Green | PO Box 33010 Austin, TX<br>78764                                                                    |          |
|                                          | Utecht Donna M and Robert M              | 21386 Snowshoe Rd<br>Lead, SD 57754-3822                                                            |          |
|                                          | Reece Bridgette E.                       | same as above                                                                                       |          |
| 33                                       | Sleep Richard D and Karen E              | HC 66 Box14 Spearfish,<br>SD 57783                                                                  |          |
|                                          | Steele Gloria G.                         | HC 66 Box14 Spearfish,<br>SD 57783                                                                  |          |
| Sec. 5, 6, 8, 16, 17,<br>21, 31          | US Forest Service                        | 1022 North 5th Street<br>Custer, SD 57730                                                           |          |
| <b>T51N R61W 6th<br/>P.M.</b>            |                                          |                                                                                                     |          |
| Sec. 2, 3, 10, 14, 15,<br>23, 25, 26, 36 | US Forest Service                        | 1022 North 5th Street<br>Custer, SD 57730                                                           |          |
| 3                                        | Medicine Lake Ranch Corp.                | 4339 Old Highway 14,<br>Sundance, WY 82729-<br>9704                                                 | 283-3800 |
| <b>T51N R60W, 6th<br/>P.M.</b>           |                                          |                                                                                                     |          |
| Sec 19                                   | State of Wyoming                         | Office of State Lands and<br>Investments, Herschler<br>Bldg., 3rd Floor West,<br>Cheyenne, WY 82002 |          |
| Sec 19, 29, 30, 32                       | US Forest Service                        | 1022 North 5th Street<br>Custer, SD 57730                                                           |          |
| <b>T52N R61W 6th<br/>P.M.</b>            |                                          |                                                                                                     |          |
| Sec 26                                   | Rongstad John and Cecilia                | Box 231 Beulah, WY<br>82717                                                                         |          |
|                                          | Greschke Jack W and Stoner<br>Susan K    | Box 280 Beulah, WY<br>82717                                                                         |          |
|                                          | Knutson Richard and Virginia             | 2408 Davidson Ave Cody,<br>WY 82414-8461                                                            |          |
|                                          | Pridgeon William L and Elaine P          | 1462 Hi Light Road<br>Gillette, WY 82718                                                            |          |

|                                         |                                                                                      |                                                                                                     |  |
|-----------------------------------------|--------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|--|
|                                         | Bureau of Land Management                                                            | 5353 Yellowstone Rd.,<br>Chenenne, WY 82009                                                         |  |
| Sec. 19, 25, 29, 30,<br>32, 35, 36      | US Forest Service                                                                    | 1022 North 5th Street<br>Custer, SD 57730                                                           |  |
| Sec. 24                                 | State of Wyoming                                                                     | Office of State Lands and<br>Investments, Herschler<br>Bldg., 3rd Floor West,<br>Cheyenne, WY 82002 |  |
| <b>T6N R1E Black Hills<br/>Meridian</b> |                                                                                      |                                                                                                     |  |
| Sec.18                                  | US Forest Service                                                                    | 1022 North 5th Street<br>Custer, SD 57730                                                           |  |
|                                         | Gloria Sleep Steele/Sleep Land &<br>Livestock LLC                                    | 10438 W. Hwy 14<br>Spearfish, SD 57783                                                              |  |
|                                         | Christensen, Randall & Patricia                                                      | \$32 Hillsvie Rd.,<br>Spearfish, SD 57783                                                           |  |
| Sec. 19                                 | US Forest Service                                                                    | 1022 North 5th Street<br>Custer, SD 57730                                                           |  |
|                                         | Tinton Partners, c/o John T Beatty                                                   | 590 Thronwood Ln.,<br>Northfield, IL 60093                                                          |  |
|                                         | Gloria Sleep Steele/Sleep Land &<br>Livestock LLC                                    | 10438 W. Hwy 14<br>Spearfish, SD 57783                                                              |  |
| Sec. 30                                 | US Forest Service                                                                    | 1022 North 5th Street<br>Custer, SD 57730                                                           |  |
|                                         | Sleep Richard and Karen E,<br>Gloria Sleep Steele, and Sleep<br>Land & Livestock LLC | 10438 W. Hwy 14<br>Spearfish, SD 57783                                                              |  |
| Sec. 31                                 | US Forest Service                                                                    | 1022 North 5th Street<br>Custer, SD 57730                                                           |  |

In addition, although easement holders are not land or mineral owners, we have provided a list of holders of easements that are contiguous to the proposed Very Rare or Uncommon area in the table below.

|                         |                                       |                                              |                                                       |  |
|-------------------------|---------------------------------------|----------------------------------------------|-------------------------------------------------------|--|
| T52N<br>R61W Sec.<br>26 | The Range<br>Telephone<br>Cooperative | P.O. Box 127,<br>Rosebud, MT<br>59347        | Telephone ROW,<br>buried<br>telecommunications<br>ROW |  |
| T52N<br>R61W Sec.<br>26 | William and<br>Elaine Pridgeon        | 1462 Hi Light<br>Road, Gillette, WY<br>82718 | ingress/egress                                        |  |
| T52N<br>R61W Sec.<br>26 | Jack Greschke                         | 800 Sand Creek,<br>Sundance, WY<br>92729     | buried<br>telecommunications                          |  |
| T52N<br>R61W Sec.<br>26 | U.S. Forest<br>Service                | 1022 North 5th<br>Street Custer, SD<br>57730 | road easement                                         |  |

|                                                  |                                       |                                                        |                              |  |
|--------------------------------------------------|---------------------------------------|--------------------------------------------------------|------------------------------|--|
| T52N<br>R61W Sec.<br>26, T52N<br>R61W Sec.<br>24 | Powder River<br>Energy<br>Corporation | P.O. Box 930,<br>Sundance, WY<br>82729                 | electrical line<br>easement  |  |
| T52N<br>R61W Sec.<br>26                          | Ron and Amy<br>Hetzer                 | 1013 E Boxelder<br>Road, Gillette, WY<br>82718         | road easement                |  |
| T52N<br>R61W Sec.<br>24                          | Qwest, Inc.                           | 1801 California<br>Ave, Suite 5200,<br>Denver CO 80202 | Telephone line<br>easement   |  |
| T52N<br>R61W Sec.<br>24                          | Crook County                          | P.O. Box 37,<br>Sundance, WY<br>82729                  | County Road right-<br>of-way |  |

Contiguous grazing permittees are the same as the permittees listed above under Section 6(a)(vi).

**Section 6(a)(xii)** The next section is the **list of scientific documents** to be offered by the petitioner to support the petition that discuss the area to be designated.

### **Literature Cited/Documents to be Offered by the Petitioner to Support the Petition**

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| <b>ATTACHMENT 1 – RARE VEGETATION ASSOCIATIONS PRESENT IN SAND CREEK PETITION AREA</b>                                                                                                                                                |                                                                      |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|
| <b>Botanical Name</b>                                                                                                                                                                                                                 | <b>Site Name</b>                                                     |
| Populus tremuloides / Corylus cornuta Forest<br>Aspen/paper birch woodland                                                                                                                                                            | Cranberry Springs                                                    |
| Betula papyrifera / Corylus cornuta Forest<br>Paper birch/beaked hazel woodland                                                                                                                                                       | Cranberry Springs, Upper Sand Creek, Idol<br>Gulch, Pole Cabin Gulch |
| Pinus ponderosa / Quercus macrocarpa<br>Woodland<br>Ponderosa pine/bur oak woodland                                                                                                                                                   | Cranberry Springs, Dugout Gulch                                      |
| Salix bebbiana Shrubland<br>Beaked willow scrub                                                                                                                                                                                       | Sand Creek Headwaters                                                |
| Crataegus douglasii - (Crataegus chrysocarpa)<br>Shrubland<br>Black hawthorn shrubland                                                                                                                                                | Sand Creek Headwaters                                                |
| Sporobolus heterolepis - Stipa richardsonii -<br>Danthonia intermedia Herbaceous Vegetation                                                                                                                                           | Sand Creek Headwaters                                                |
| Quercus macrocarpa - Ostrya virginiana<br>Bur oak/ironwood woodland<br><br>Ostrya virginiana – Crataegus succulenta<br>Hophornbeam/hawthorn woodland<br><br>Ostrya virginiana – Betula papyrifera<br>Hophornbeam/paper birch woodland | Dugout Gulch                                                         |

| <b>ATTACHMENT 2 – Native Vegetation Types in Cranberry Springs Site: Pristine Conditions</b> |                                                       |
|----------------------------------------------------------------------------------------------|-------------------------------------------------------|
| <b>Botanical Name</b>                                                                        | <b>Site Name</b>                                      |
| Aspen / Beaked Hazel Forest (CEGL000583) AB                                                  | Populus tremuloides / Corylus cornuta Forest          |
| Paper Birch / Hazel Forest (CEGL002079) AB                                                   | Betula papyrifera / Corylus cornuta Forest            |
| Ponderosa Pine / Bearberry Woodland<br>(CEGL000844) B                                        | Pinus ponderosa / Arctostaphylos uva-ursi<br>Woodland |
| Ponderosa Pine / Bur Oak Woodland<br>(CEGL000873) AB                                         | Pinus ponderosa / Quercus macrocarpa Woodland         |
| Ponderosa Pine / Chokecherry Forest<br>(CEGL000192) B                                        | Pinus ponderosa / Prunus virginiana Forest            |
| Ponderosa Pine / Little Bluestem Woodland<br>(CEGL000201) B                                  | Pinus ponderosa / Schizachyrium scoparium<br>Woodland |
| Ponderosa Pine / Snowberry Forest (CEGL000203)<br>B,BC                                       | Pinus ponderosa / Symphoricarpos albus Forest         |

| <b>ATTACHMENT 3 – RARE PLANT SPECIES PRESENT IN SAND CREEK PETITION AREA, INCLUDING DISJUNCT SPECIES</b> |                       |             |
|----------------------------------------------------------------------------------------------------------|-----------------------|-------------|
| <b>Scientific Name</b>                                                                                   | <b>Common Name(s)</b> | <b>Rank</b> |
|                                                                                                          |                       |             |

|                                                                        |                                          |      |          |
|------------------------------------------------------------------------|------------------------------------------|------|----------|
| <i>Adoxa moschatellina</i>                                             | Moschatel                                | S2   |          |
| <i>Adenocaulon bicolor</i>                                             | American Trailplant                      | S2   | Disjunct |
| <i>Agastache foeniculum</i>                                            | Blue Giant hyssop                        | S2   |          |
| <i>Agrimonia striata</i>                                               | Woodland Agrimony                        | S2S3 |          |
| <i>Anemone cylindrica</i>                                              | Candle Anemone                           | S2S3 |          |
| <i>Antennaria neglecta</i>                                             | Field Pussytoes                          | S1   |          |
| <i>Apocynum x floribundum</i> (A. medium)                              | Intermediate Dogbane                     | S2   |          |
| <i>Aralia nudicaulis</i>                                               | Wild Sarsaparilla                        | S2   |          |
| <i>Asclepias ovalifolia</i> (oval-leaf milkweed)                       | Dwarf Milkweed                           | S2   |          |
| <i>Athyrium filix-femina</i>                                           | Subarctic Lady Fern                      | S2   |          |
| <i>Betula papyrifera</i>                                               | Paper Birch                              | S2S3 |          |
| <i>Botrychium virginianum</i>                                          | Rattlesnake Fern                         | S2   |          |
| <i>Carex alopecoidea</i>                                               | Foxtail Sedge, USFS R2 Sensitive Species | S2   | Disjunct |
| <i>Carex backii</i> var. <i>backii</i>                                 | Rocky Mountain Sedge                     | S2   |          |
| <i>Carex bebbii</i>                                                    | Bebbs Sedge                              | S2   |          |
| <i>Carex deweyana</i> var. <i>deweyana</i>                             | Short scale sedge                        | S2   |          |
| <i>Carex granularis</i> var. <i>haleana</i>                            | Meadow Sedge                             | S2   |          |
| <i>Carex peckii</i>                                                    | White tinged Sedge                       | S2   |          |
| <i>Carex rosea</i>                                                     | Rosy Sedge                               | S1   | Disjunct |
| <i>Carex stipata</i>                                                   | Awl fruit Sedge                          | S2   |          |
| <i>Carex tenera</i>                                                    | Slender Sedge                            | S2   |          |
| <i>Carex torreyi</i>                                                   | Torrey's Sedge                           | S2   |          |
| <i>Celastrus scandens</i>                                              | Climbing Bittersweet                     | S1S2 |          |
| <i>Cinna latifolia</i>                                                 | Slenderwood Reed Grass                   | S2   |          |
| <i>Circaea alpina</i> var. <i>alpina</i>                               | Small Enchanter's Nightshade             | S1S2 |          |
| <i>Corallorhiza wisteriana</i>                                         | Spring Coralroot                         | S2   |          |
| <i>Cornus canadensis</i>                                               | Dwarf Dogwood                            | S2   |          |
| <i>Corylus cornuta</i>                                                 | Beaked Hazelnut                          | S2   |          |
| <i>Crataegus columbiana</i> var. <i>chrysocarpa</i>                    | Fireberry Hawthorn                       | S2   |          |
| <i>Dichanthelium linearifolium</i>                                     | Slim-leaf Witchgrass                     | S1   |          |
| <i>Diphasiastrum complanatum</i> (syn: <i>Lycopodium complanatum</i> ) | Ground Cedar, USFS R2 Sensitive Species  | S1   | Disjunct |
| <i>Dryopteris filix-mas</i>                                            | Male Fern                                | S2   |          |
| <i>Elymus diversiglumis</i> (interrupted wild rye)                     | Interrupted wild rye                     | S1   |          |
| <i>Equisetum scirpoides</i>                                            | Dwarf Scouring Rush                      | S1   | Disjunct |
| <i>Equisetum sylvaticum</i>                                            | Woodland Horsetail                       | S1   |          |
| <i>Erigeron philadelphicus</i>                                         | Philadelphia Fleabane                    | S2   |          |
| <i>Galium aparine</i> var. <i>aparine</i>                              | Catchweed Bedstraw                       | S3   |          |
| <i>Geranium bicknellii</i>                                             | Bicknell's Northern Crane's bill         | S2   |          |
| <i>Geranium carolinianum</i>                                           | Carolina Crane's bill                    | S2   |          |
| <i>Gymnocarpium dryopteris</i>                                         | Northern Oak Fern                        | S2   | Disjunct |

|                                                      |                                               |          |
|------------------------------------------------------|-----------------------------------------------|----------|
| <i>Habenaria viridis</i> var. <i>bracteata</i>       | SNR- Not Yet Ranked                           |          |
| <i>Halenia deflexa</i>                               | Spurred Gentian S2                            |          |
| <i>Hieracium umbellatum</i> var. <i>umbellatum</i>   | Umbellate Hawkweed S2S3                       |          |
| <i>Lathyrus ochroleucus</i>                          | Creamy peavine S2S3                           |          |
| <i>Liatris ligulistylis</i>                          | Strap-style Gayfeather S2                     |          |
| <i>Lonicera dioica</i> var. <i>glaucescens</i>       | Mountain Honeysuckle S2                       |          |
| <i>Luzula multiflora</i>                             | Common Woodrush S2                            |          |
| <i>Lycopodium annotinum</i>                          | Stiff Clubmoss S2                             |          |
| <i>Lycopodium complanatum</i>                        | S1                                            |          |
| <i>Lycopodium dendroideum</i>                        | Treelike Clubmoss S1S2                        | Disjunct |
| <i>Maianthemum canadense</i>                         | Canada Mayflower, False Lily of the Valley S2 | Disjunct |
| <i>Melica subulata</i>                               | Alaska Onion Grass S2                         |          |
| <i>Muhlenbergia glomerata</i>                        | Marsh Muhly S2                                |          |
| <i>Ostrya virginiana</i>                             | Eastern Hop Hornbeam S2                       | Disjunct |
| <i>Oxalis stricta</i>                                | Common Yellow Woodsorrel S2                   |          |
| <i>Pellaea suksdorfiana</i>                          | Ground Pine S1                                |          |
| <i>Penstemon grandiflorus</i>                        | Large-flower BeardtongueBeartongue S2         |          |
| <i>Picea glauca</i>                                  | White Spruce, Black Hills Spruce S2           | Disjunct |
| <i>Polygala senega</i>                               | Seneca Snakeroot S2                           |          |
| <i>Polystichum lonchitis</i>                         | Northern Holly Fern S2                        |          |
| <i>Prosartes hookeri</i> var. <i>oregano</i>         | Hooker's Mandarin S2                          |          |
| <i>Prunus pennsylvanica</i>                          | Pin Cherry S2                                 |          |
| <i>Pteridium aquilinum</i> var. <i>latiusculum</i>   | Bracket Fern S2                               |          |
| <i>Quercus macrocarpa</i>                            | Bur Oak S2S3                                  |          |
| <i>Ranunculus pennsylvanicus</i>                     | Pennsylvania buttercup S2                     |          |
| <i>Ribes americanum</i>                              | Wild Black Currant S2                         |          |
| <i>Ribes oxycanthoides</i> var. <i>oxycanthoides</i> | Canada Gooseberry S2                          |          |
| <i>Rubus pubescens</i>                               | Dwarf Red Raspberry S2                        |          |
| <i>Sambucus racemosa</i> var. <i>pubens</i>          | European Red Elder Not Yet Ranked             |          |
| <i>Scirpus atrocinctus</i>                           | Black girdle Bullrush S1                      |          |
| <i>Scirpus cyperinus</i>                             | Cottongrass Bulrush S2                        | Disjunct |
| <i>Ulmus americana</i>                               | American Elm S2                               |          |
| <i>Unamia alba</i>                                   | Prairie Golden Rod S2                         |          |
| <i>Vaccinium membranaceum</i>                        | Square-twigged Huckleberry S2                 |          |
| <i>Verbena stricta</i>                               | Hoary Vervain S2                              |          |
| <i>Viburnum lentago</i>                              | Nannyberry, Sheepberry, Wild Raisin S2        | Disjunct |
| <i>Viburnum opulus</i> var. <i>americanum</i>        | Highbush Cranberry S2                         | Disjunct |
| <i>Viola pubescens</i>                               | Downy Yellow Violet S2                        |          |
| <i>Viola renifolia</i> var. <i>brainerdii</i>        | Kidney-leaf White Violet S1                   | Disjunct |

These 80 species have been ranked as critically imperiled or imperiled statewide by Nature Serve, and many are also tracked by WNND as species of concern. Some of these species are common in the Black Hills, but are rare on a statewide basis.

S = State rank assigned by Nature Serve: probability of extinction from Wyoming

These letters are each followed by a numeric, 1-5 score:

1 = Critically imperiled because of extreme rarity (often <5 extant occurrences) or because some factor makes it highly vulnerable to extinction

2 = Imperiled because of rarity (often 6-20 extant occurrences) or because of factors making it vulnerable to extinction

3 = Rare or local throughout its range or found locally in a restricted range (often 21-100 known occurrences)

**Disjunct Species**- populations isolated from the primary range of the species. Disjunct populations often evolve unique genetic characteristics over time.

**Peripheral, Periphery Species**- on or near an edge or constituting an outer boundary; the outer area or edge of the population.

#### ATTACHMENT 4 – RARE PLANT SPECIES PRESENT IN BOTANICAL AREAS AND Late successional landscape (Fertig and Oblad 2000)

| Family | Species                   | Synonym   | GRank | SRank | Dist | Form  | Biome | DG<br>SBA<br>(2) | USC<br>SBA<br>(2) | SC<br>LSL<br>(2) |
|--------|---------------------------|-----------|-------|-------|------|-------|-------|------------------|-------------------|------------------|
| AST    | Adenocaulon<br>bicolor    |           | G5?   | S1    | D    | FORB  | RMF   |                  | X                 | X                |
| ADX    | Adoxa<br>moschatellina    |           | G5    | S1    | S    | FORB  | RMF   |                  | X                 | X                |
| LAM    | Agastache<br>foeniculum   |           | G4G5  | S2    | P    | FORB  | GRS   |                  | X                 | X                |
| ROS    | Agrimonia striata         |           | G5    | S2S3  | W    | FORB  | RMF   |                  | X                 |                  |
| RAN    | Anemone cylindrica        |           | G5    | S2S3  | W    | FORB  | GRS   |                  |                   | X                |
| APO    | Apocynum x<br>floribundum | A. medium | HYB   | S2    | W    | FORB  | RMF   | X                |                   | X                |
| ARL    | Aralia nudicaulis         |           | G5    | S2    | P    | FORB  | EDF   | X                | X                 | X                |
| ASC    | Asclepias ovalifolia      |           | G5?   | S1    | P    | FORB  | GRS   | X                |                   | X                |
| ASL    | Athyrium filix-<br>femina |           | G5    | S2    | W    | FERN  | RMF   |                  | X                 |                  |
| BET    | Betula papyrifera         |           | G5    | S2S3  | P    | TREE  | EDF   | X                | X                 | X                |
| OPH    | Botrychium<br>virginianum |           | G5    | S1    | P    | FERN  | RMF   | X                | X                 |                  |
| CYP    | Carex alopecoidea         |           | G5    | S1    | D    | GRASS | WET   |                  | X                 |                  |

|     |                                       |                                 |      |      |   |        |     |   |   |   |
|-----|---------------------------------------|---------------------------------|------|------|---|--------|-----|---|---|---|
| CYP | Carex backii var. backii              |                                 | G4   | S2   | P | GRASS  | RMF | X | X |   |
| CYP | Carex bebbii                          |                                 | G5   | S2   | W | GRASS  | WET | X |   | X |
| CYP | Carex deweyana var. deweyana          |                                 | G5T? | S2   | P | GRASS  | EDF | X | X | X |
| CYP | Carex peckii                          |                                 | G4G5 | S2   | P | GRASS  | EDF | X | X |   |
| CYP | Carex stipata                         |                                 | G5   | S2   | W | GRASS  | WET |   |   | X |
| CYP | Carex tenera                          |                                 | G5   | S2   | P | GRASS  | EDF |   |   | X |
| CYP | Carex torreyi                         |                                 | G4   | S2   | W | GRASS  | GRS | X | X |   |
| CEL | Celastrus scandens                    |                                 | G5   | S1S2 | P | FORB   | EDF | X |   | X |
| POA | Cinna latifolia                       |                                 | G5   | S2   | W | GRASS  | RMF |   | X |   |
| ONA | Circaea alpina var. alpina            |                                 | G5T? | S1S2 | S | FORB   | RMF |   | X | X |
| ORC | Corallorrhiza wisteriana              |                                 | G5   | S2   | W | FORB   | RMF |   | X |   |
| COR | Cornus canadensis                     |                                 | G5   | S2   | P | FORB   | RMF |   | X |   |
| BET | Corylus cornuta                       |                                 | G5   | S2   | D | SHRUB  | EDF | X | X |   |
| ROS | Crataegus columbiana var. chrysocarpa | C. chrysocarpa; C. rotundifolia | G5   | S2   | W | SHRUB  | RMF | X |   | X |
| ASL | Dryopteris filix-mas                  |                                 | G5   | S2   | W | FERN   | RMF |   | X |   |
| POA | Elymus diversiglumis                  | Elymus interruptus              | G3?Q | S1   | P | GRASS  | EDF |   | X |   |
| EQU | Equisetum scirpoides                  |                                 | G5   | S1   | D | FERN   | EDF |   | X |   |
| AST | Erigeron philadelphicus               |                                 | G5   | S2   | P | FORB   | GRS | X | X | X |
| RUB | Galium aparine var. aparine           |                                 | G5T? | S2   | W | A-FORB | WET | X | X |   |
| GER | Geranium bicknellii                   |                                 | G5   | S2   | W | FORB   | RMF |   | X |   |
| GER | Geranium carolinianum                 |                                 | G5   | S2   | P | A-FORB | GRS |   |   | X |
| ORC | Habenaria viridis var. bracteata      | Coeloglossum viride             | G5   | S2   | W | FORB   | RMF |   | X | X |
| GEN | Halenia deflexa                       |                                 | G5   | S2   | D | A-FORB | WET | X | X | X |
| AST | Hieracium umbellatum var.             |                                 | G5?  | S2   | W | FORB   | RMF |   | X |   |

|     |                                          |                               |       |      |   |        |     |    |   |   |
|-----|------------------------------------------|-------------------------------|-------|------|---|--------|-----|----|---|---|
|     | umbellatum                               |                               |       |      |   |        |     |    |   |   |
| FAB | Lathyrus ochroleucus                     |                               | G4G5  | S2S3 | P | FORB   | EDF | X  | X | X |
| AST | Liatris ligulistylis                     |                               | G5?   | S2   | W | FORB   | GRS |    | X |   |
| CPR | Lonicera dioica var. glaucescens         |                               | G5TU  | S2   | P | FORB   | EDF |    | X | X |
| JUN | Luzula multiflora                        | L. campestris var. multiflora | G5    | S2   | W | GRASS  | RMF |    | X |   |
| LYC | Lycopodium annotinum                     |                               | G5    | S2   | W | FERN   | RMF |    | X |   |
| LYC | Lycopodium complanatum                   | Diphasiastrum complanatum     | G5    | S1   | D | FERN   | EDF |    | X |   |
| LIL | Maianthemum canadense                    |                               | G5    | S2   | W | FORB   | EDF | X  | X | X |
| POA | Melica subulata                          |                               | G5    | S2   | W | GRASS  | RMF |    |   | X |
| BET | Ostrya virginiana                        |                               | G5    | S1   | P | TREE   | EDF | X  | X |   |
| OXL | Oxalis stricta                           |                               | G5    | S2   | P | FORB   | GRS | X  |   | X |
| ADI | Pellaea suksdorfiana                     | P. glabella var. simplex      | G5T4? | S1   | P | FERN   | RMF |    |   | X |
| SCR | Penstemon grandiflorus                   |                               | G5?   | S2   | P | FORB   | GRS |    |   | X |
| PIN | Picea glauca                             |                               | G5    | S2   | D | TREE   | RMF |    | X |   |
| PGL | Polygala senega                          |                               | G4G5  | S2   | P | FORB   | EDF | X  | X | X |
| ASL | Polystichum lonchitis                    |                               | G5    | S2   | W | FERN   | RMF | X? | X |   |
| ROS | Prunus pensylvanica                      |                               | G5    | S2   | P | TREE   | RMF |    | X |   |
| DST | Pteridium aquilinum var. latiusculum     |                               |       | S2   | D | FERN   | RMF |    | X | X |
| FAG | Quercus macrocarpa                       |                               | G5    | S2S3 | P | TREE   | EDF | X  | X | X |
| RAN | Ranunculus pensylvanicus                 |                               | G5    | S2   | W | A-FORB | WET |    |   | X |
| GRS | Ribes americanum                         |                               | G5    | S2   | W | SHRUB  | WET |    | X |   |
| GRS | Ribes oxyacanthoides var. oxyacanthoides |                               | G5T?  | S2   | W | SHRUB  | GRS |    | X |   |
| ROS | Rubus pubescens                          |                               | G5    | S2   | P | FORB   | RMF | X  | X | X |

|     |                                    |                                |        |    |   |       |     |    |   |   |
|-----|------------------------------------|--------------------------------|--------|----|---|-------|-----|----|---|---|
| CPR | Sambucus racemosa<br>var. pubens   | S. racemosa var.<br>leucocarpa | G5T4T5 | S2 | P | SHRUB | RMF | X  | X | X |
| CYP | Scirpus atrocinctus                | S. cyperinus                   | G5     | S1 | D | GRASS | WET |    | X |   |
| ULM | Ulmus americana                    |                                | G5?    | S2 | P | TREE  | EDF | X  |   | X |
| AST | Unamia alba                        | Solidago<br>ptarmicoides       | G5     | S2 | W | FORB  | GRS | X  | X |   |
| ERI | Vaccinium<br>membranaceum          |                                | G5     | S2 | W | SHRUB | RMF |    | X |   |
| VRB | Verbena stricta                    |                                | G5     | S2 | W | FORB  | GRS |    |   | X |
| CPR | Viburnum lentago                   |                                | G5     | S2 | P | SHRUB | EDF | X? | X | X |
| CPR | Viburnum opulus<br>var. americana  |                                | G5T5   | S1 | D | SHRUB | EDF | X  | X |   |
| VIO | Viola pubescens                    |                                | G5     | S2 | P | FORB  | EDF | X  | X |   |
| VIO | Viola renifolia var.<br>brainerdii |                                | G5T5   | S1 | D | FORB  | RMF |    |   | X |

|              |                                         |  |  |
|--------------|-----------------------------------------|--|--|
| <b>NOTE:</b> |                                         |  |  |
| DGSBA=       | Dugout Gulch<br>Botanical Area          |  |  |
| USCSBA=      | U. Sand Ck. Bot.<br>Area                |  |  |
| SCLSL=       | S. Ck. Late<br>Succession.<br>Landscape |  |  |



Run Date: 08/20/08

UNEMPLOYMENT REPORT OF THE MONTH  
 REPORT OF UNEMPLOYMENT  
 LIST OF UNEMPLOYED BY MONTH

Run Date: 08/20/08  
 Page 1 of 1

MTWTFSS: 08 031004 080209 020

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NO LIABILITY IS MADE BY BLM FOR USE OF THE DATA FOR PURPOSES NOT INTENDED BY BLM

Run Date: 06/21/08

MTR3: 06/05/08 0400PM 026

Serial Number

Serial  
Item Date

Quantity

Quantity

Location

Case  
Type  
Status

Unit  
Amount

UNITED STATES DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT  
LIST OF ISSUING OFFICES BY REGION

Run Date:

06/20/08  
Page 3 of 7

MTR3: 06/05/08 0400PM 026

Serial Number

Serial  
Item Date

Quantity

Quantity

Location

Case  
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Status

Unit  
Amount



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## Appendix A

333

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| Age Group | Total (%) | Male (%) | Female (%) | Unknown (%) |
|-----------|-----------|----------|------------|-------------|
| 18-24     | 100       | 100      | 100        | 100         |
| 25-34     | 100       | 100      | 100        | 100         |
| 35-44     | 100       | 100      | 100        | 100         |
| 45-54     | 100       | 100      | 100        | 100         |
| 55-64     | 100       | 100      | 100        | 100         |
| 65+       | 100       | 100      | 100        | 100         |

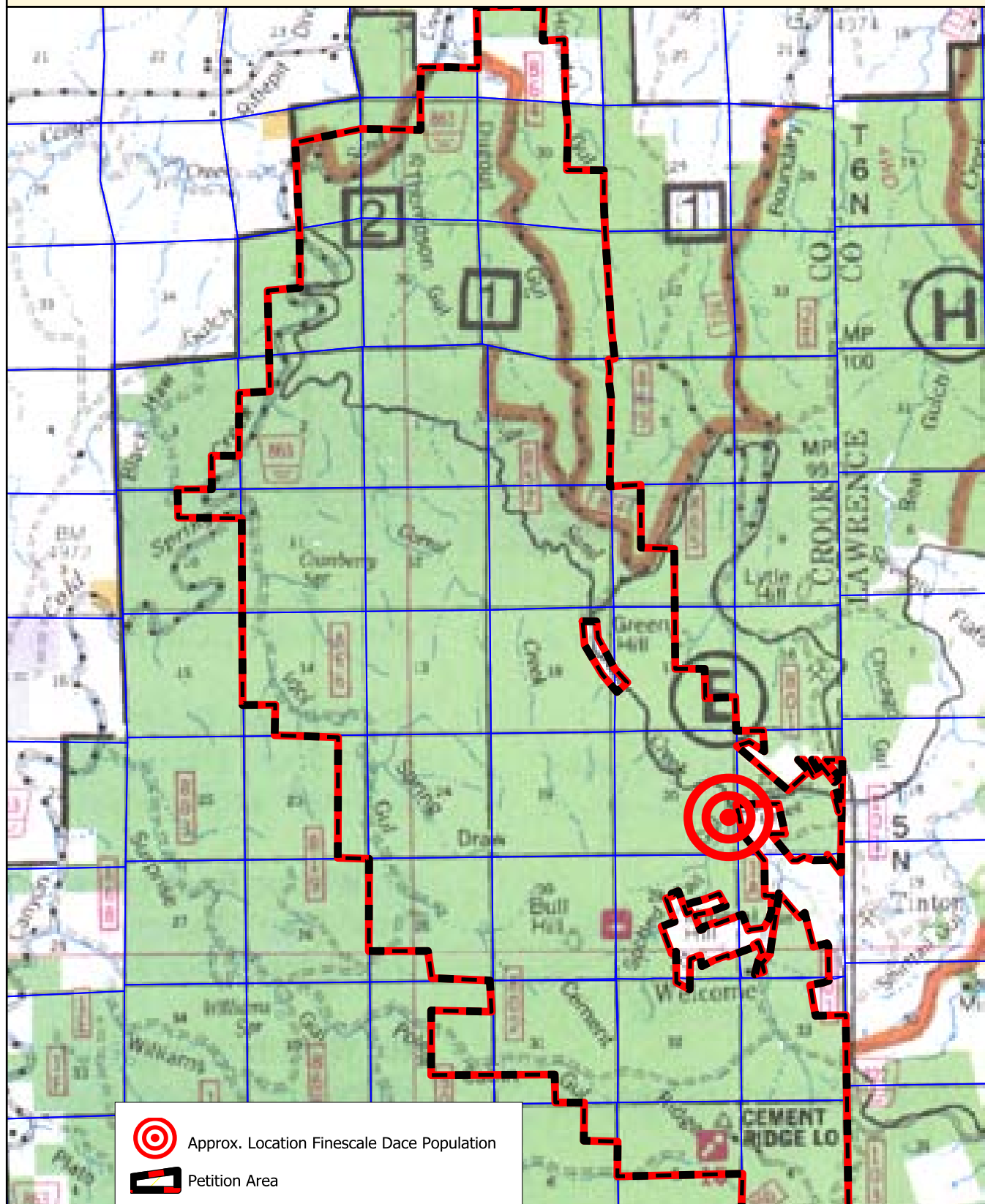
With the introduction of the new standards, we will have to pay more attention to the quality of the work.

UNITED STATES DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT  
1017 G STREET, N.W., WASHINGTON, D.C. 20540

| Lead City   | Year | Median  | Lead Rank | Annual |
|-------------|------|---------|-----------|--------|
| Atlanta, GA | 2000 | AC 2000 | 1         | 2000   |
| Atlanta, GA | 2001 | AC 2001 | 1         | 2001   |
| Atlanta, GA | 2002 | AC 2002 | 1         | 2002   |
| Atlanta, GA | 2003 | AC 2003 | 1         | 2003   |
| Atlanta, GA | 2004 | AC 2004 | 1         | 2004   |
| Atlanta, GA | 2005 | AC 2005 | 1         | 2005   |
| Atlanta, GA | 2006 | AC 2006 | 1         | 2006   |
| Atlanta, GA | 2007 | AC 2007 | 1         | 2007   |
| Atlanta, GA | 2008 | AC 2008 | 1         | 2008   |
| Atlanta, GA | 2009 | AC 2009 | 1         | 2009   |
| Atlanta, GA | 2010 | AC 2010 | 1         | 2010   |
| Atlanta, GA | 2011 | AC 2011 | 1         | 2011   |
| Atlanta, GA | 2012 | AC 2012 | 1         | 2012   |
| Atlanta, GA | 2013 | AC 2013 | 1         | 2013   |
| Atlanta, GA | 2014 | AC 2014 | 1         | 2014   |
| Atlanta, GA | 2015 | AC 2015 | 1         | 2015   |
| Atlanta, GA | 2016 | AC 2016 | 1         | 2016   |
| Atlanta, GA | 2017 | AC 2017 | 1         | 2017   |
| Atlanta, GA | 2018 | AC 2018 | 1         | 2018   |
| Atlanta, GA | 2019 | AC 2019 | 1         | 2019   |
| Atlanta, GA | 2020 | AC 2020 | 1         | 2020   |
| Atlanta, GA | 2021 | AC 2021 | 1         | 2021   |
| Atlanta, GA | 2022 | AC 2022 | 1         | 2022   |
| Atlanta, GA | 2023 | AC 2023 | 1         | 2023   |
| Atlanta, GA | 2024 | AC 2024 | 1         | 2024   |
| Atlanta, GA | 2025 | AC 2025 | 1         | 2025   |
| Atlanta, GA | 2026 | AC 2026 | 1         | 2026   |
| Atlanta, GA | 2027 | AC 2027 | 1         | 2027   |
| Atlanta, GA | 2028 | AC 2028 | 1         | 2028   |
| Atlanta, GA | 2029 | AC 2029 | 1         | 2029   |
| Atlanta, GA | 2030 | AC 2030 | 1         | 2030   |
| Atlanta, GA | 2031 | AC 2031 | 1         | 2031   |
| Atlanta, GA | 2032 | AC 2032 | 1         | 2032   |
| Atlanta, GA | 2033 | AC 2033 | 1         | 2033   |
| Atlanta, GA | 2034 | AC 2034 | 1         | 2034   |
| Atlanta, GA | 2035 | AC 2035 | 1         | 2035   |
| Atlanta, GA | 2036 | AC 2036 | 1         | 2036   |
| Atlanta, GA | 2037 | AC 2037 | 1         | 2037   |
| Atlanta, GA | 2038 | AC 2038 | 1         | 2038   |
| Atlanta, GA | 2039 | AC 2039 | 1         | 2039   |
| Atlanta, GA | 2040 | AC 2040 | 1         | 2040   |
| Atlanta, GA | 2041 | AC 2041 | 1         | 2041   |
| Atlanta, GA | 2042 | AC 2042 | 1         | 2042   |
| Atlanta, GA | 2043 | AC 2043 | 1         | 2043   |
| Atlanta, GA | 2044 | AC 2044 | 1         | 2044   |
| Atlanta, GA | 2045 | AC 2045 | 1         | 2045   |
| Atlanta, GA | 2046 | AC 2046 | 1         | 2046   |
| Atlanta, GA | 2047 | AC 2047 | 1         | 2047   |
| Atlanta, GA | 2048 | AC 2048 | 1         | 2048   |
| Atlanta, GA | 2049 | AC 2049 | 1         | 2049   |
| Atlanta, GA | 2050 | AC 2050 | 1         | 2050   |
| Atlanta, GA | 2051 | AC 2051 | 1         | 2051   |
| Atlanta, GA | 2052 | AC 2052 | 1         | 2052   |
| Atlanta, GA | 2053 | AC 2053 | 1         | 2053   |
| Atlanta, GA | 2054 | AC 2054 | 1         | 2054   |
| Atlanta, GA | 2055 | AC 2055 | 1         | 2055   |
| Atlanta, GA | 2056 | AC 2056 | 1         | 2056   |
| Atlanta, GA | 2057 | AC 2057 | 1         | 2057   |
| Atlanta, GA | 2058 | AC 2058 | 1         | 2058   |
| Atlanta, GA | 2059 | AC 2059 | 1         | 2059   |
| Atlanta, GA | 2060 | AC 2060 | 1         | 2060   |
| Atlanta, GA | 2061 | AC 2061 | 1         | 2061   |
| Atlanta, GA | 2062 | AC 2062 | 1         | 2062   |
| Atlanta, GA | 2063 | AC 2063 | 1         | 2063   |
| Atlanta, GA | 2064 | AC 2064 | 1         | 2064   |
| Atlanta, GA | 2065 | AC 2065 | 1         | 2065   |
| Atlanta, GA | 2066 | AC 2066 | 1         | 2066   |
| Atlanta, GA | 2067 | AC 2067 | 1         | 2067   |
| Atlanta, GA | 2068 | AC 2068 | 1         | 2068   |
| Atlanta, GA | 2069 | AC 2069 | 1         | 2069   |
| Atlanta, GA | 2070 | AC 2070 | 1         | 2070   |
| Atlanta, GA | 2071 | AC 2071 | 1         | 2071   |
| Atlanta, GA | 2072 | AC 2072 | 1         | 2072   |
| Atlanta, GA | 2073 | AC 2073 | 1         | 2073   |
| Atlanta, GA | 2074 | AC 2074 | 1         | 2074   |
| Atlanta, GA | 2075 | AC 2075 | 1         | 2075   |
| Atlanta, GA | 2076 | AC 2076 | 1         | 2076   |
| Atlanta, GA | 2077 | AC 2077 | 1         | 2077   |
| Atlanta, GA | 2078 | AC 2078 | 1         | 2078   |
| Atlanta, GA | 2079 | AC 2079 | 1         | 2079   |
| Atlanta, GA | 2080 | AC 2080 | 1         | 2080   |
| Atlanta, GA | 2081 | AC 2081 | 1         | 2081   |
| Atlanta, GA | 2082 | AC 2082 | 1         | 2082   |
| Atlanta, GA | 2083 | AC 2083 | 1         | 2083   |
| Atlanta, GA | 2084 | AC 2084 | 1         | 2084   |
| Atlanta, GA | 2085 | AC 2085 | 1         | 2085   |
| Atlanta, GA | 2086 | AC 2086 | 1         | 2086   |
| Atlanta, GA | 2087 | AC 2087 | 1         | 2087   |
| Atlanta, GA | 2088 | AC 2088 | 1         | 2088   |
| Atlanta, GA | 2089 | AC 2089 | 1         | 2089   |
| Atlanta, GA | 2090 | AC 2090 | 1         | 2090   |
| Atlanta, GA | 2091 | AC 2091 | 1         | 2091   |
| Atlanta, GA | 2092 | AC 2092 | 1         | 2092   |
| Atlanta, GA | 2093 | AC 2093 | 1         | 2093   |
| Atlanta, GA | 2094 | AC 2094 | 1         | 2094   |
| Atlanta, GA | 2095 | AC 2095 | 1         | 2095   |
| Atlanta, GA | 2096 | AC 2096 | 1         | 2096   |
| Atlanta, GA | 2097 | AC 2097 | 1         | 2097   |
| Atlanta, GA | 2098 | AC 2098 | 1         | 2098   |
| Atlanta, GA | 2099 | AC 2099 | 1         | 2099   |
| Atlanta, GA | 2100 | AC 2100 | 1         | 2100   |

[illegible]

# Finescale Dace (approximate location shown to protect population)



0 1 mi

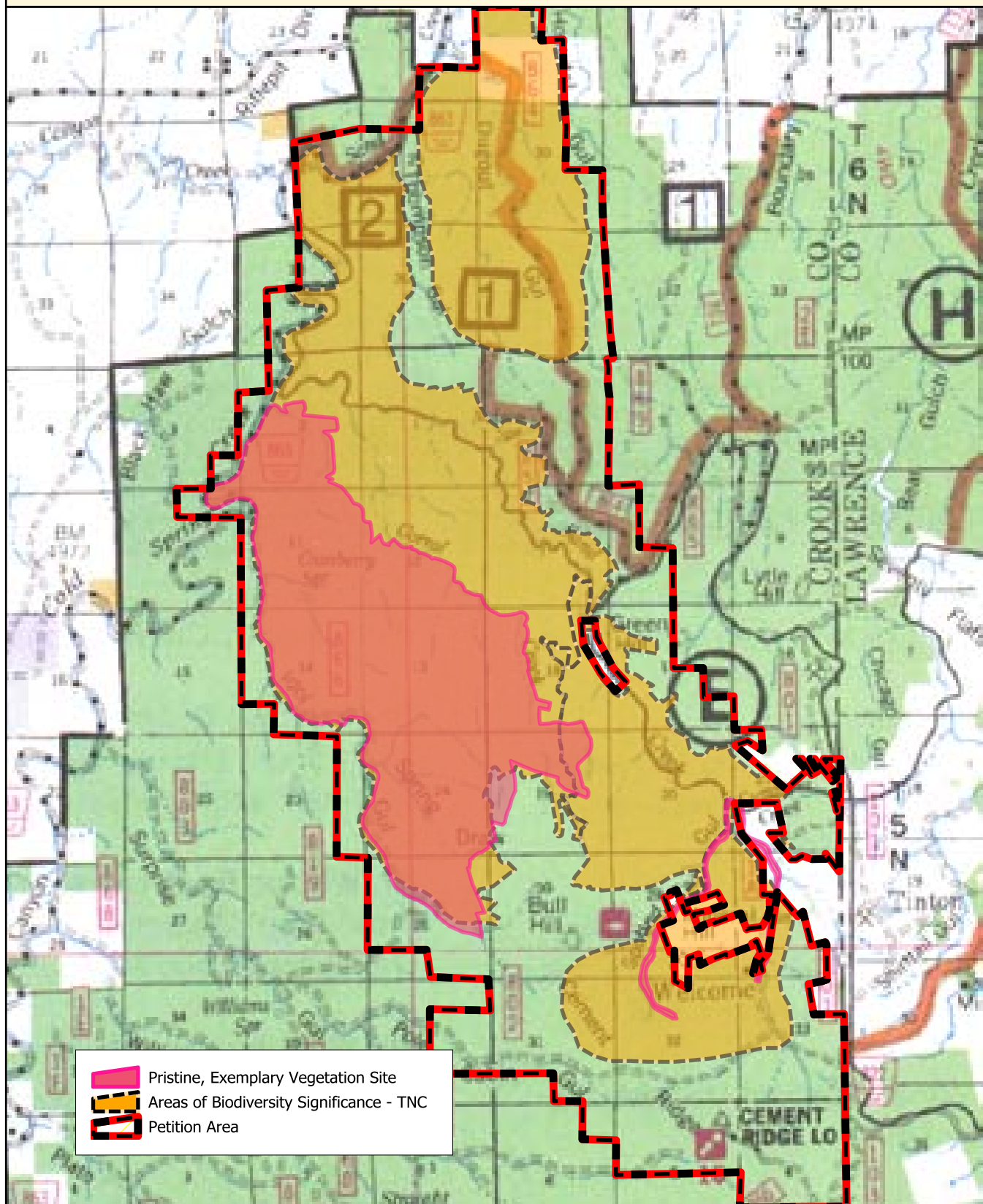
Universal Transverse Mercator - Zone 13 (N)



Petition Before the Wyoming EQC  
to Designate Sand Creek as Rare and Uncommon

Appendix B

# Special Designations by The Nature Conservancy and Black Hills Community Inventory



0 1 mi

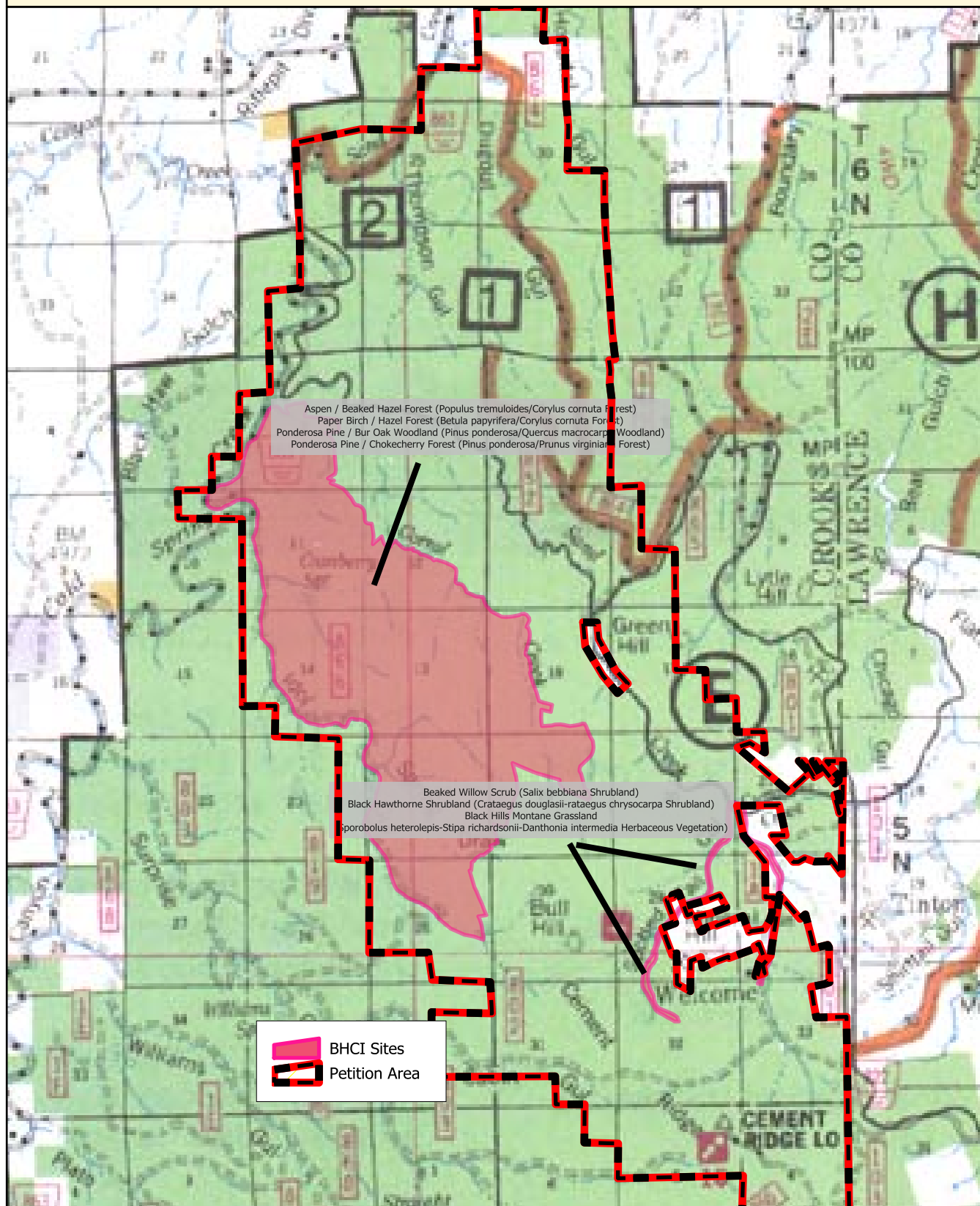
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Universal Transverse Mercator - Zone 13 (N)

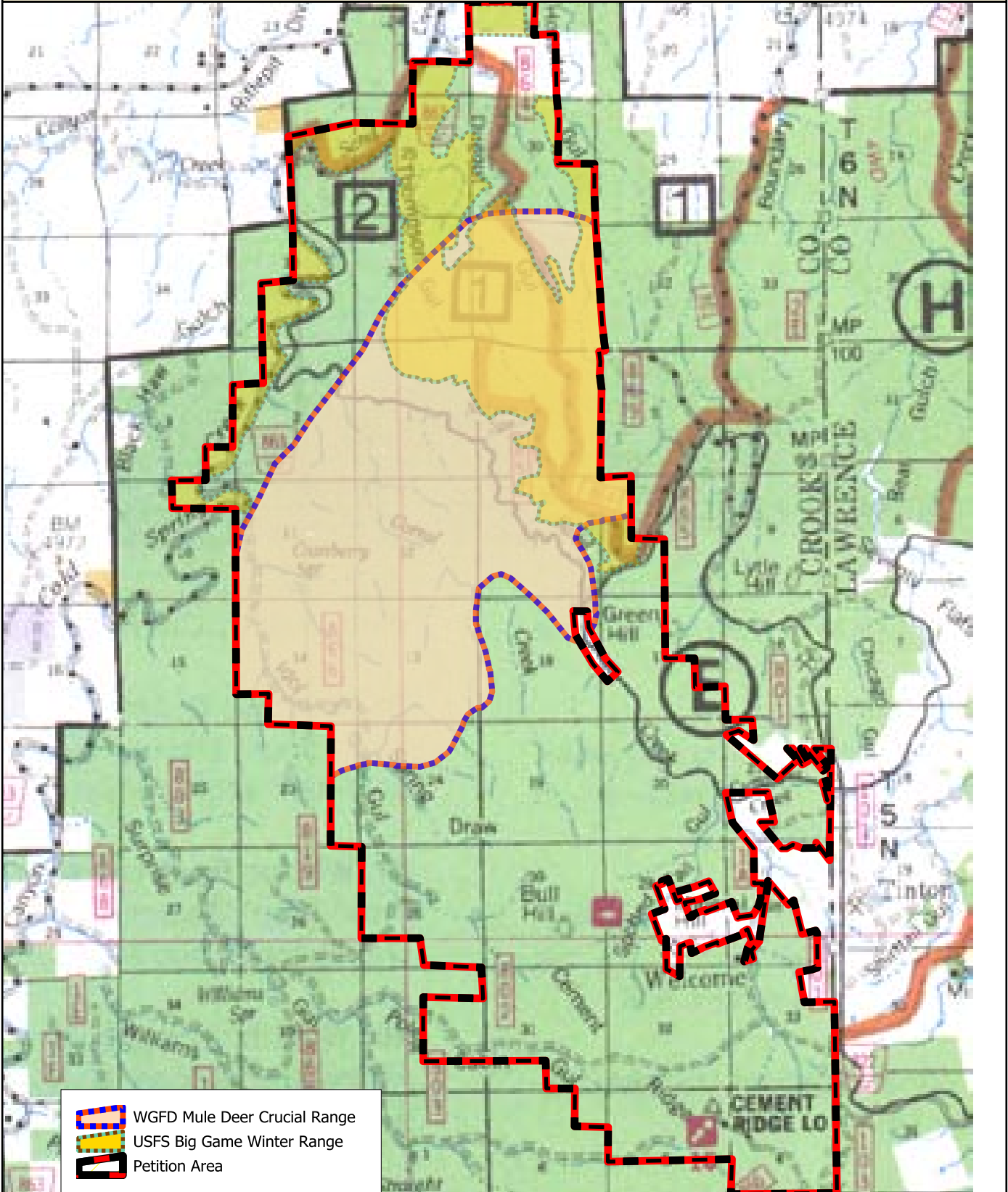
Petition Before the Wyoming EQC  
to Designate Sand Creek as Rare and Uncommon

Appendix C

# Rare Vegetation Types from Black Hills Community Inventory

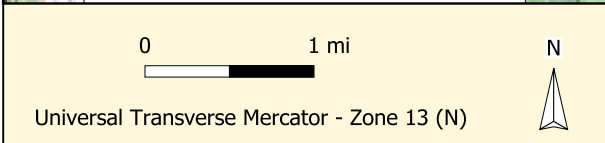


**Mule Deer Crucial Winter Range (WGFD)  
and Big Game Winter Range (USFS)**



0 1 mi

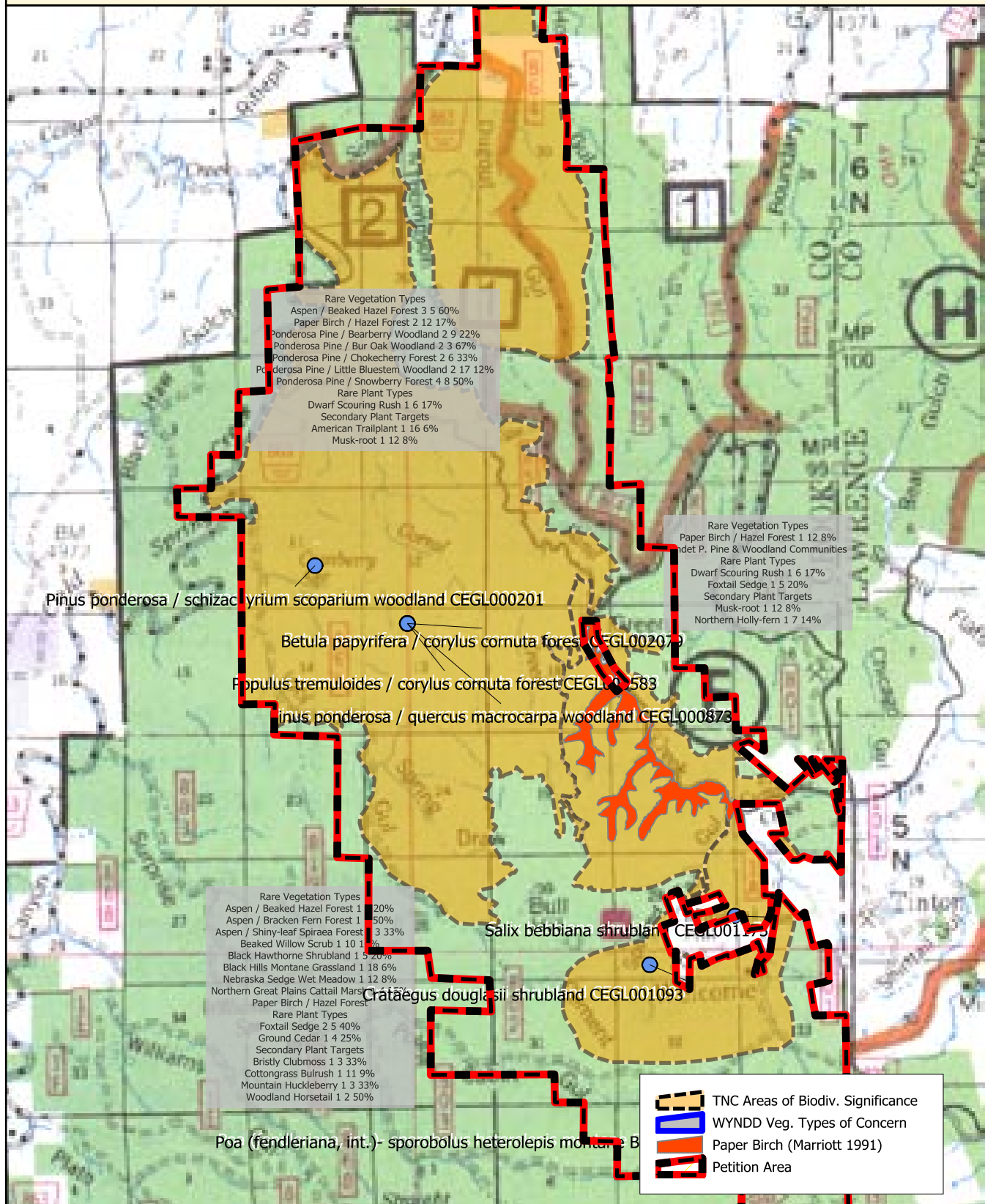
Universal Transverse Mercator - Zone 13 (N)



Petition Before the Wyoming EQC  
to Designate Sand Creek as Rare and Uncommon  
Appendix E

Petition Before the Wyoming EQC  
to Designate Sand Creek as Rare and Uncommon  
Appendix E

# Rare Plants and Vegetation Types from TNC and Others



0 1 mi

N

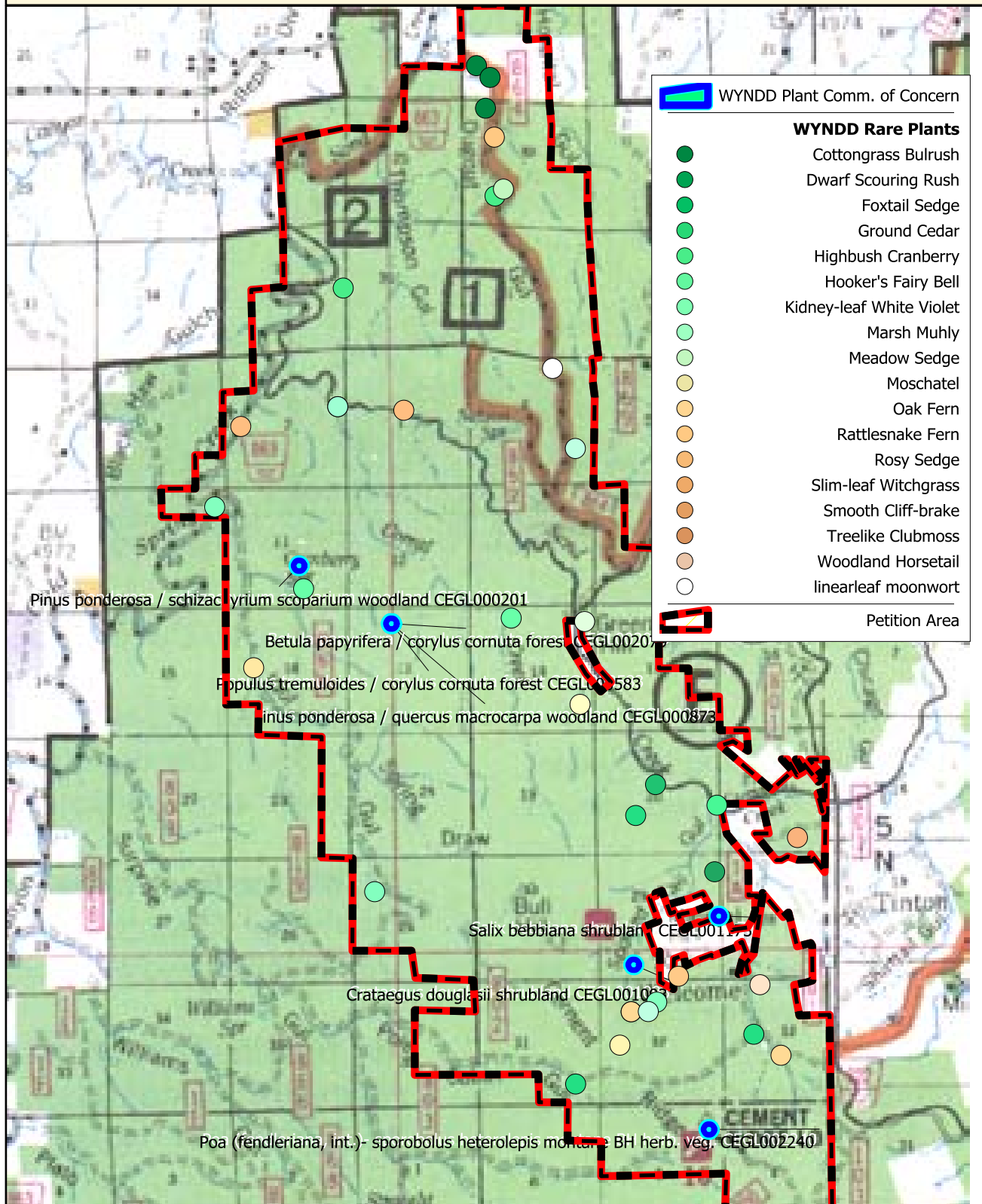
Universal Transverse Mercator - Zone 13 (N)



Petition Before the Wyoming EQC  
to Designate Sand Creek as Rare and Uncommon

Appendix F

# Rare Plants and Vegetation Types from Wyoming Natural Diversity Database



0 1 mi

N

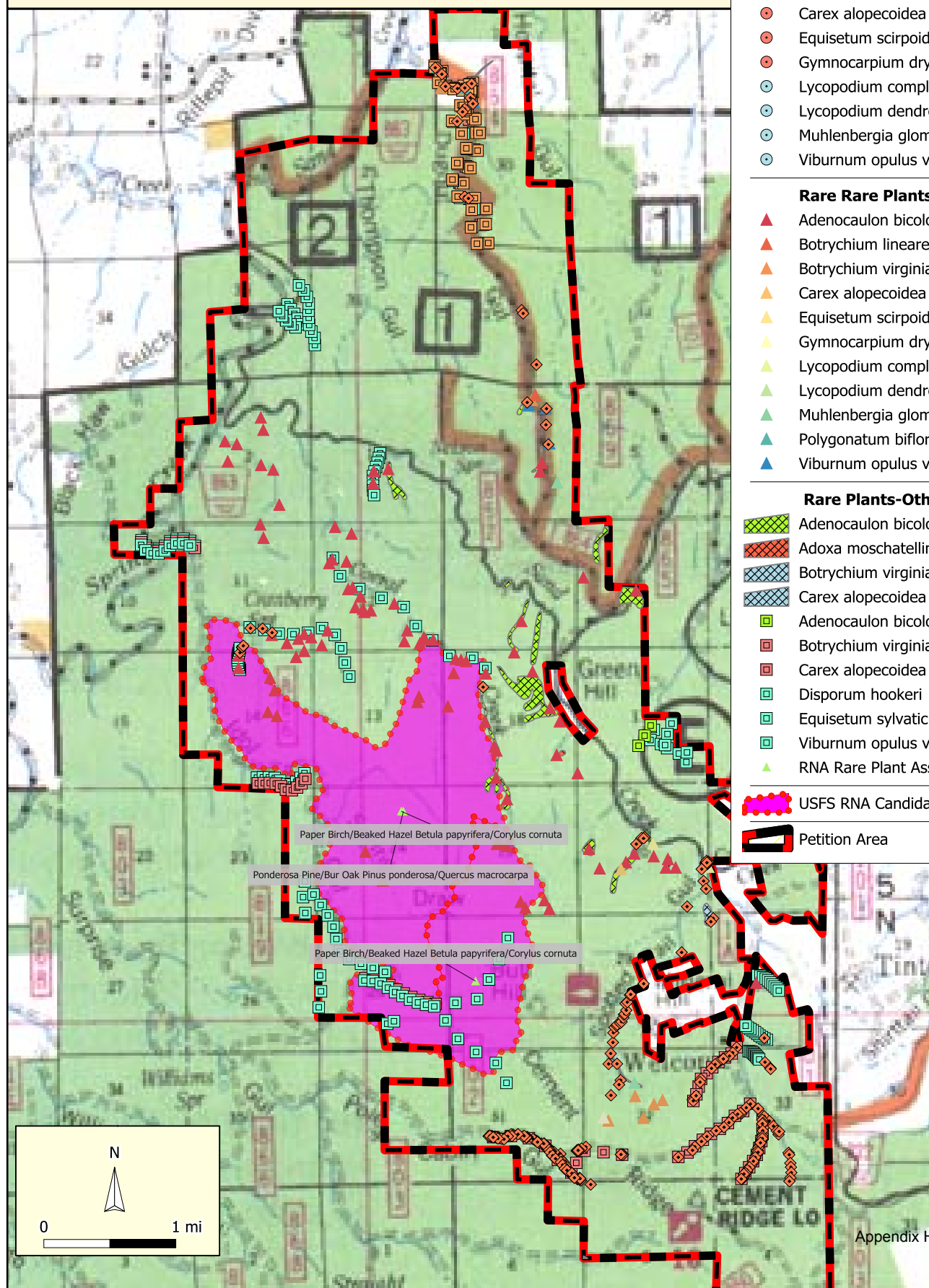
Universal Transverse Mercator - Zone 13 (N)



Petition Before the Wyoming EQC  
to Designate Sand Creek as Rare and Uncommon

Appendix G

# Sand Creek Rare Plants and Vegetation Types from USFS



## ◆ S1 Species from Monitoring

### Rare Plants Request 1

- Adenocaulon bicolor
- Botrychium virginianum
- Carex alopecoidea
- Equisetum scirpoides
- Gymnocarpium dryopteris
- Lycopodium complanatum
- Lycopodium dendroideum
- Muhlenbergia glomerata
- Viburnum opulus var. americanum

### Rare Rare Plants Request 2

- ▲ Adenocaulon bicolor
- ▲ Botrychium lineare
- ▲ Botrychium virginianum
- ▲ Carex alopecoidea
- ▲ Equisetum scirpoides
- ▲ Gymnocarpium dryopteris
- ▲ Lycopodium complanatum
- ▲ Lycopodium dendroideum
- ▲ Muhlenbergia glomerata
- ▲ Polygonatum biflorum
- ▲ Viburnum opulus var. americanum

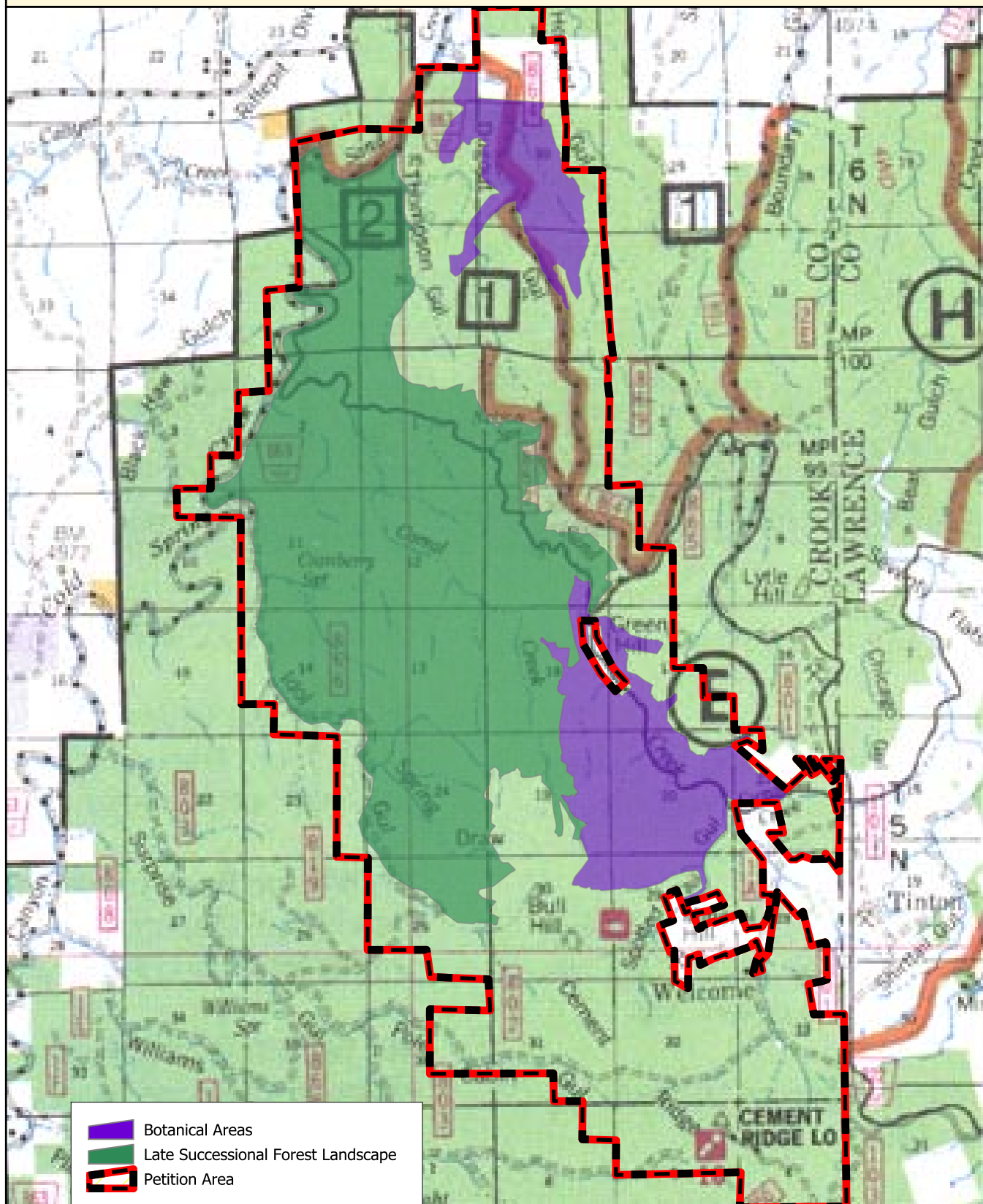
### Rare Plants-Other Requests

- Adenocaulon bicolor
- Adoxa moschatellina
- Botrychium virginianum
- Carex alopecoidea
- Adenocaulon bicolor
- Botrychium virginianum
- Carex alopecoidea
- Disporum hookeri
- Equisetum sylvaticum
- Viburnum opulus var. americanum
- ▲ RNA Rare Plant Associations

USFS RNA Candidate

Petition Area

# Designated Late Successional Forest Landscape and Botanical Areas (USFS)



0 1 mi

N

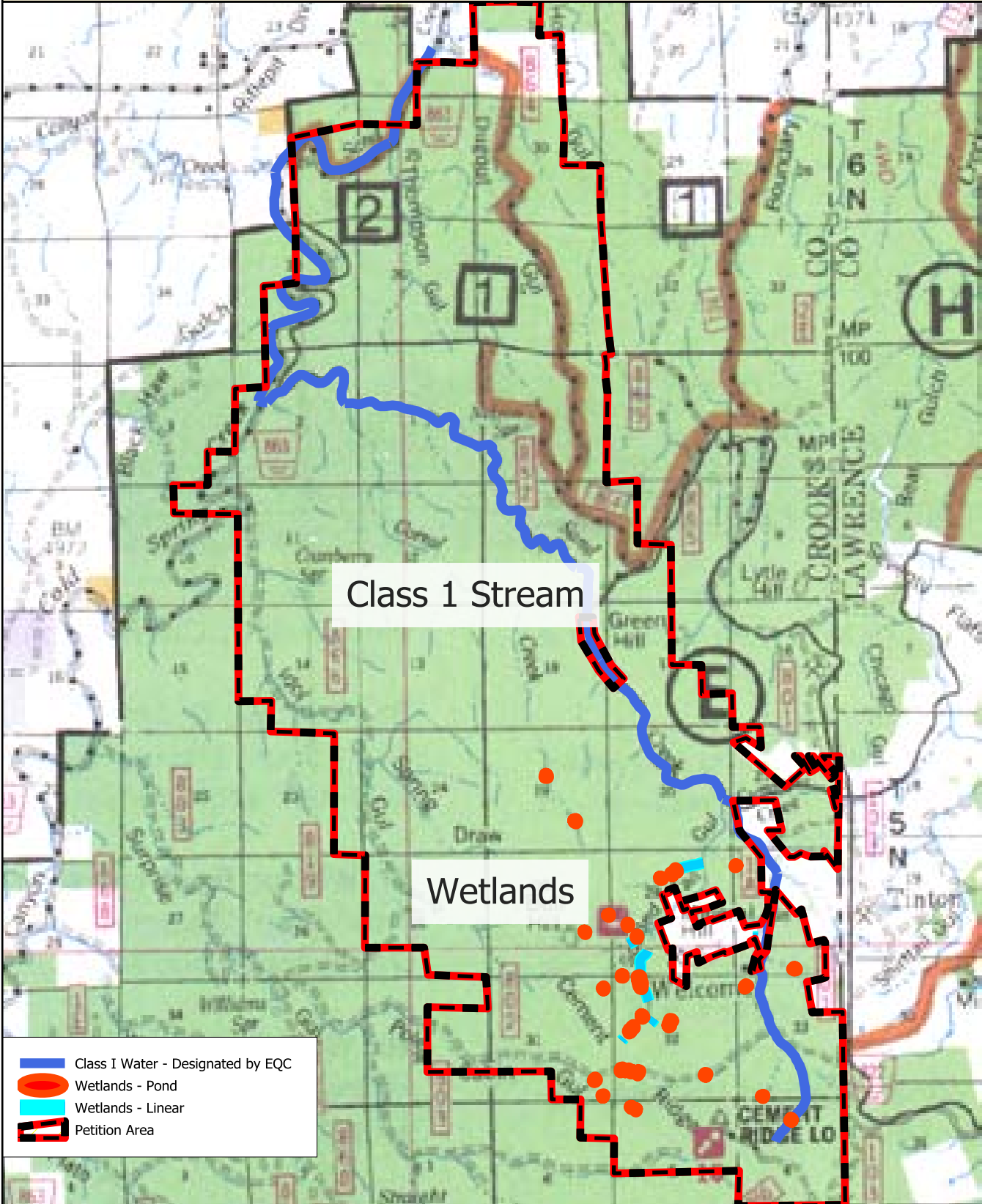
Universal Transverse Mercator - Zone 13 (N)



Petition Before the Wyoming EQC  
to Designate Sand Creek as Rare and Uncommon

Appendix I

# Wetlands and Class 1 Water (WYDEQ)



Class 1 Stream

Wetlands

- Class I Water - Designated by EQC
- Wetlands - Pond
- Wetlands - Linear
- Petition Area

0 1 mi

N

Universal Transverse Mercator - Zone 13 (N)



Petition Before the Wyoming EQC  
to Designate Sand Creek as Rare and Uncommon

Appendix J

## WESTERN MINING ACTION PROJECT

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### MEMORANDUM

To: Erik Molvar, Biodiversity Conservation Alliance

From: Roger Flynn, Director and Managing Attorney

Date: July 22, 2009

Re: Wyoming's Very Rare or Uncommon Designation and Federal Public Land and Mining Laws

Per your request, the following is an analysis of the legal issues involving Wyoming's Very Rare or Uncommon Designation ("VRUD") in relation to federal public land and mining laws. Some questions have been raised as to whether the Environmental Quality's Council's ("EQC") declaration of a VRUD area is pre-empted by federal law.

QUESTION PRESENTED: Is the EQC's declaration of a VRUD area pre-empted by federal public land and mining law? More specifically, does the fact that a person/company has federal mining claims in a VRUD area override or nullify the VRUD designation?

SHORT ANSWER: No. The establishment of a VRUD area is not pre-empted by federal law. The Wyoming Supreme Court has held that a VRUD designation is an appropriate method for exercising the state's right to enact reasonable regulations applicable to federal land in Wyoming. In addition, under applicable decisions of the U.S. Supreme Court, other state and federal courts, as well as federal laws and regulations, such reasonable regulations may be applied to operations conducted on federal land mining claims.

## DISCUSSION

### FEDERAL MINING AND PUBLIC LAND LAWS DO NOT PREEMPT THE EQC'S AUTHORITY TO DESIGNATE A VRUD AREA

#### A. Federal Constitutional and Statutory Background

Every western state asserts jurisdiction over mining operations on federal lands within their borders. *See* 65 Fed. Reg. 69998, 70008-70009 (Nov. 21, 2000) (preamble to Interior Department mining regulations confirming state regulation of mining along with federal agencies). While Congress is the proprietor of minerals located on the federal lands under the General Mining Law of 1872 and has legislative power over federal lands pursuant to the Property Clause of the Constitution, U.S. Const. art. IV, § 3, cl. 2, the states still may exercise their police power to regulate activities on federal lands within their boundaries without violating the Supremacy Clause of the Constitution, U.S. Const. art. VI, cl. 2. California Coastal Comm'n v. Granite Rock Co., 480 U.S. 572, 107 S.Ct. 1419 (1987). Thus, mining activities on the public domain are subject to dual regulation by the federal and state governments.

Under the Tenth Amendment to the United States Constitution, those “powers not delegated to the United States... are reserved to the States respectively, or to the people.” U.S. Const. Amend. X. The Tenth Amendment “expressly declares the constitutional policy that Congress may not exercise power in a fashion that impairs the States’ integrity or their ability to function in a federal system.” Fry v. United States, 421 U.S. 542, 547 n. 7 (1975). The power of the State to regulate its “police, its domestic trade, and to govern its own citizens” was first recognized in Gibbons v. Ogden, 22 U.S. 1(1824), giving rise to the modern day police power derived from this constitutional provision. The police power includes the power to protect the public health, safety, morality, and general welfare. It is from these roots that the states retain the authority to regulate activities such as mining on federal lands.

The police power is a legitimate purpose for a variety of regulations related to the health, safety, and welfare of the community. The police power may be the source of land use planning functions, and many courts recognize that environmental impacts are a legitimate concern included in the “general welfare” of a community. From these roots, the police power has become a well-settled source for environmental regulation and has been upheld as providing authority for regulation of water and air pollution. *See e.g., Huron Portland Cement Co. v. City of Detroit*, 362 U.S. 440 (1960).

When a state or local government enacts regulations of mining on federal lands, the issue of preemption by the existing federal regulatory framework may be implicated. There is a “presumption that state or local regulation of matters related to health and safety is not invalidated under the Supremacy Clause.” *Hillsborough County v. Automated Med. Labs., Inc.*, 471 U.S. 707, 715 (1985). “When considering pre-emption, ‘we start with the assumption that the historic police powers of the States were not to be superseded by the Federal Act unless that was the clear and manifest purpose of Congress.’” *Wisconsin Public Intervenor v. Mortier*, 501 U.S. 597, 605 (1991), *quoting* *Rice v. Santa Fe Elevator Corp.*, 331 U.S. 218, 230 (1947).

If preemption is not clearly expressed by Congress, preemption may still occur in either of two circumstances: either through “field” preemption or “conflict” preemption. In its leading case on preemption regarding federal land, the Supreme Court articulated the distinction between these two types of preemption:

[S]tate law can be preempted in either of two general ways. If Congress evidences an intent to occupy a given field, any state law falling within that field is pre-empted. If Congress has not entirely displaced state regulation over the matter in question, state law is still pre-empted to the extent it actually conflicts with federal law, that is, when it is impossible to comply with both state and federal law, or where the state law stands as an obstacle to the accomplishment of the full purposes and objectives of Congress.

*Granite Rock Co.*, 480 U.S. at 582.

In this case, as discussed in more detail below, there is no express declaration of preemptive effect in the regulatory framework for mining on federal lands. Further, the relevant Forest Service and BLM regulations are not so broad as to preclude any state regulation, and in fact recognize the applicability of state law. Therefore, local regulation of mining on federal lands is valid unless “it is impossible to comply with both state and federal law” (i.e. “conflict preemption”). Granite Rock Co., 480 U.S. at 581.

**B. State Regulation of Mining on Federal Land is Recognized by the U.S. and Wyoming Supreme Courts**

Both the United States and Wyoming Supreme Courts have recognized and confirmed the ability of states to place significant regulations on mining operations on federal land.

1. Granite Rock and other federal court decisions

In Granite Rock, the U.S. Supreme Court held that state and local governments may regulate hardrock mining activities on federal lands. The Court held that states can require holders of mining claims on federal lands to comply with reasonable state environmental regulation.

The Granite Rock Corp. held unpatented mining claims to limestone deposits in the Big Sur region of Los Padres National Forest. Complying with Forest Service regulations, Granite Rock submitted a proposed plan of operations to the Forest Service for approval.<sup>1</sup> The federal agency approved the mine with some alterations to reduce the environmental impacts of the mining. The Granite Rock Corp. began mining without seeking a permit from the California Coastal Commission (CCC) as required under California law.

---

<sup>1</sup> The Forest Service regulations at issue in Granite Rock, 36 C.F.R. Part 228, are similar to the BLM mining regulations, 43 C.F.R. subpart 3809, especially regarding the express acknowledgement of dual federal/state permitting authority over mining on public lands.

Rather than apply for the CCC permit, the Granite Rock Corp. instead sought an injunction in federal district court, arguing that the state regulation was preempted by the 1872 Mining Law (sometimes referred to as the General Mining Law (GML)), the federal Coastal Zone Management Act, and Forest Service regulations, thereby prohibiting the CCC from imposing a permit condition on mining. See Granite Rock at 576. The district court denied the Granite Rock Corp.'s motion for summary judgment and dismissed the action. Granite Rock Co. v. California Coastal Comm'n, 590 F. Supp. 1361 (N.D. Cal. 1984). The Ninth Circuit reversed, holding that the CCC permit requirement was preempted by the General Mining Law and Forest Service regulations. Granite Rock Co. v. California Coastal Comm'n, 768 F.2d 1077 (9<sup>th</sup> Cir. 1985). The Supreme Court reversed the Ninth Circuit decision, finding no preemption of the permit condition in the regulations, the GML, or the Coastal Zone Management Act. Granite Rock Co., 480 U.S. 572 (1987).

In its determination that federal mining regulations did not prohibit concurrent state regulation, the Supreme Court relied on numerous provisions in the regulations that assumed compliance with state laws in areas such as water quality, disposal and treatment of waste, and air quality standards. Other portions of the regulations also made reference to compliance with state law, making it "impossible to divine from these regulations, which expressly contemplate coincident compliance with state law as well as with federal law, an intention to pre-empt all state regulation of unpatented mining claims in national forests." 480 U.S. at 584. The Court also noted that "it is appropriate to expect an administrative regulation to declare any intention to pre-empt state law with some specificity." Id. at 583. Indeed, the 1872 Mining Law specifically states that any activities done pursuant to that law can only occur pursuant to "regulations

prescribed by law,” 30 U.S.C. § 22, and only “so long as they comply with the laws of the United States, and with State, territorial, and local regulations.” 30 U.S.C. § 26.

Having found no field preemption over state regulation of mining on federal land, the Court then looked at the applicable public land statutes to determine if an actual conflict existed between the Forest Service regulations and state law, since these statutes provide the agency authority to enact the regulations. Id. at 585-586. Because the 1872 Mining Law contains express provisions directing agency coordination with state agencies, the Court saw no conflict. Id. at 589.

In its reasoning, the Court drew a distinction between state environmental regulation, which is permitted by the GML on federal lands, and categorical land use planning, which is prohibited. This distinction is described as follows:

Land use planning in essence chooses particular uses for the land; environmental regulation, at its core, does not mandate particular uses of the land but requires only that, however the land is used, damage to the environment is kept within prescribed limits.

Id. at 587. To support this distinction, the Court looked to Congressional recognition of the difference between land use planning and environmental regulation because this recognition provides for different responses by federal agencies to state and local land use planning versus environmental regulation. Id. at 587-588.

The Court did recognize that there is occasionally an overlap between environmental regulation and land use planning. The Court held that a state permit process is acceptable regulation of federal lands so long as the process is intended to be used for “reasonable...environmental regulation.” Id. at 587.

A number of federal court decisions have followed Granite Rock’s finding that state regulation of activities concurrently covered by federal regulations are not in conflict with

federal law. Relying on Granite Rock, the Ninth Circuit upheld Washington State's regulation of the Navy's proposal to construct a port facility partially on federal land. Friends of the Earth v. U.S. Navy, 841 F.2d 927 (9th Cir. 1988). The court paraphrased Granite Rock and stated: "The [Supreme] Court held that the environmental permit requirements of a state statute with both environmental and land use purposes apply to activities on federal land." Friends of the Earth, 841 F.2d at 936. The Ninth Circuit went on to specifically note that such state/local authority is not diminished when a federal agency also has a permit requirement (such as the case here with the Forest Service or BLM). Id.

Other federal courts of appeals have followed this rationale. The Second Circuit expressly cited Granite Rock for the rule that "federal regulations do not reflect intent to preempt state law where regulations expressly contemplate coincident compliance with state law." Luna v. Harris, 888 F.2d 949, 953 (2<sup>nd</sup> Cir. 1989)(upholding state drug treatment laws, even though more stringent than federal regulations, as not in conflict with federal system); see also Shell Oil v. City of Santa Monica, 830 F.2d 1052 (9<sup>th</sup> Cir. 1989); Baltimore & Ohio Railroad v. Oberly, 837 F.2d 108 (3<sup>rd</sup> Cir. 1988); Kerr-McGee v. City of West Chicago, 914 F.2d 820 (7<sup>th</sup> Cir. 1990).

In one unique case, however, an overly-burdensome local regulation was found to be pre-empted by federal mining law. In South Dakota Mining Association, Inc. v. Lawrence County, 155 F.3d 1005 (8<sup>th</sup> Cir. 1998), the court held that a complete and categorical ban on the predominant form of mining in an area, open pit mining, violated the Supreme Court's rule in Granite Rock that prohibitory local/state regulations were pre-empted.

## 2. The Wyoming Supreme Court and other state court decisions

In addition to these federal cases, a number of state courts have upheld the direct regulation of mining activities on federal land. These courts have specifically found that such regulation, even if more stringent than federal review and even in the face of federal approval of the mining operation, was not in conflict with the 1872 Mining Law and related mining and public land laws.

In Wyoming, the leading case is LeFaivre v. Environmental Quality Council, 735 P.2d 428 (Wyo. 1987). In that case, the Wyoming Supreme Court upheld the state's designation of a VRUD area and the denial of a mining permit application submitted by the holder of federal mining claims under the 1872 Mining Law. The court specifically rejected the mining company's argument that federal mining laws precluded the state from denying a permit application in a VRUD area. Relying on Granite Rock, the court affirmed the state's denial based on the need to protect the "special features" of the rock formation in the VRUD area covered by the federal mining claims. Id. at 434.

In Gulf Oil Corp. v. Wyoming Oil and Gas Conservation Commission, the Wyoming Supreme Court also found that the federal Mineral Leasing Act of 1920 did not preempt the state from imposing environmentally protective conditions on drilling activities proposed for federal lands. 693 P.2d 227 (Wyo. 1985). Rather, the court declared that "[w]e find that Congress, far from excluding state participation, has prescribed a significant role for local governments in the regulation of environmental impact of mineral development on federal land." Id. at 235. The Court specifically relied on provisions requiring cooperation with state and local governments under the National Environmental Policy Act (NEPA) – which would be applicable to review of mining proposals on federal land. Id. at 235-236.

Other state courts have upheld the authority of states to place significant and reasonable limitations on mining on federal land. In State ex. rel. Andrus v. Click, the Idaho Supreme Court held that a state law requiring miners to obtain a state permit for dredge mining on federal lands claimed under the 1872 Mining Law was not preempted, even though the dredging was permitted by federal statute. 554 P.2d 969 (Idaho 1976). The Idaho Supreme Court specifically found that the objectives and purposes of Congress in the Mining and Mineral Policy Act of 1970 would not be undermined by the state's ability to deny a mining permit.

An Oregon court rejected a similar challenge to an Oregon state permit requirement in State ex. rel. Cox v. Hibbard, 570 P.2d 1190 (Or. App. 1977). In extensively quoting the Idaho Supreme Court's decision in Andrus v. Click with approval, the Court noted: "We likewise conclude that federal mining laws do not indicate an intent to preempt state regulation and we find no conflict between any particular provision of the federal mining laws and [Oregon law]." 570 P.2d at 1193.

In another case, the Oregon Court of Appeals upheld the state's denial of a water quality permit for a proposed copper mine on federal land. Kinross Copper Corp. v. State, 981 P.2d 833 (Or. App. 1999), *adhered to on reconsideration*, 988 P.2d 400 (Or. App. 1999). In rejecting the mining company's argument that the denial of the permit had taken the company's rights to use its unpatented mining claims on federal land, the court ruled that the fact that the company had federal mining claims did not override the state's authority to deny a permit. As the court stated:

In short, plaintiff's takings claim is predicated on the loss of a right that it never possessed, namely, the "right" to discharge mining wastes into the waters of the state. It necessarily follows that, in denying plaintiff's application for a permit to conduct that activity, the state has not effected a taking of private property within the meaning of either the state or federal constitutions.

Kinross Copper, at 840. The appeals court based its decision on this lack of a “right” to discharge under federal and state mining and water quality laws, and expressed no opinion on the lower court’s somewhat different rationale. The appeals court described the lower court’s ruling:

[T]he trial court explained that, because holding an unpatented mining claim requires proof that the claim continues to be marketable, and, because state regulations render plaintiff’s claims unmarketable [since the mining operation could not be conducted without the ability to discharge pollution], plaintiff’s mining claims were “extinguished,” leaving plaintiff with no property right that could be taken. The extinguishment of the claim did not amount to a taking, the court held, because **unpatented mining claims constitute a unique form of property right that—by definition—is subject to state and federal regulatory authority and is more appropriately regarded as analogous to a contract right that is subject to a condition subsequent.**

Id. at 835 (emphasis added) (citing Michael Graf, *Application of Takings Law to the Regulation of Unpatented Mining Claims*, 24 *ECOLOGY L.Q.* 57 (1997)).

Although the appeals court decision is important in its own right, in confirming that there is no “right” to mine on federal lands absent compliance with environmental requirements, the lower court’s decision is also instructive. Under that ruling, the underlying property interest in a federal mining claim is placed in its proper context, since such an interest is predicated on compliance with environmental protection requirements. Thus, there could be no “taking” of that interest by an environmental requirement.<sup>2</sup>

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<sup>2</sup> This basic theme was specifically noted by the Ninth Circuit in Clouser v. Espy, where the court upheld the Forest Service’s significant restrictions on mining access and operations based on environmental considerations. “Virtually all forms of Forest Service regulation of mining claims—for instance, limiting the permissible methods of mining and prospecting in order to reduce incidental environmental damage—will result in increased operating costs, and thereby will affect claim validity.” Clouser v. Espy, 42 F.3d 1522, 1530 (9th Cir. 1994). In fact, under the Mining Law itself, the expense associated with compliance with environmental regulations may so increase the cost of mining as to render a claim not valuable. United States v. Pittsburgh Pacific, 30 IBLA 388 (1977); Great Basin Mine Watch, 146 IBLA 248, 256 (1998).

In addition to federal and state caselaw precedent, it is important to note that the State of South Dakota, just across the border in the Black Hills, specifically recognizes its ability to designate Special, Exceptional, Critical and Unique Lands (SECUL) in the state, including on federal lands. *See* S.D. Rev. Stat. §§ 45-6B-33 *et seq.* In such areas, the state may require mitigation measures, or prevent mining altogether, to protect the values for which the area was designated. Although not identical, the South Dakota SECUL provisions are similar to Wyoming’s VRU provisions and represent a neighboring state’s position that such designations are not pre-empted by federal mining law.

**C. Federal Law Expressly Contemplates Wyoming’s Regulation of Mining on Federal Land.**

The above caselaw affirms the right of Wyoming to establish a VRUD area and to regulate, even deny, permits to mine on federal land. This authority is related to the applicable federal public land and mining statutes and regulations that cover mining on public land.

The Mining Law of 1872 is one of the statutes that govern mining on federal lands. The Mining Law does not itself provide for any environmental standards to be applied to the federal lands. However, the Mining Law specifically states that any activities done pursuant to that law can only occur “so long as they comply with the laws of the United States, and with State, territorial, and local regulations.” 30 U.S.C. § 26.

The two types of federal land that may be affected by a VRUD designation are lands administered by the Forest Service or BLM. As discussed above, the Supreme Court in Granite Rock specifically recognized the co-existence of state regulation on Forest Service lands. 489 U.S. at 582-586. The Court highlighted the fact that numerous federal laws, such as the National Forest Management Act (NFMA) and the Forest Service’s mining regulations, at 36 CFR Part 228, expressly contemplate state regulation of mining on Forest Service lands. Id.

Regarding BLM lands, the primary land use and environmental statute controlling mining is the Federal Land Policy and Management Act of 1976 (FLPMA), which amended the Mining Law. 43 U.S.C. §§ 1701 et seq. FLPMA provided land management direction to the BLM and authorized the Secretary to “take any action necessary to prevent the unnecessary or undue degradation of the lands” Id. FLPMA specifically intended an accommodation of state regulation on federal lands. 43 U.S.C. § 1712(c)(8) (BLM land use plans must “provide for compliance with applicable pollution control laws, including State and Federal air, water, noise, or other pollution standards or implementation plans”); § 1712(c)(9) (BLM land use plans “shall be consistent with State and local plans to the maximum extent [found] consistent with Federal law and the purposes of this Act.”). *See also Granite Rock*, 480 U.S. at 585.

BLM first promulgated its mining regulations in 1980, with substantial revisions in 2000 and 2001. From the first regulations in 1980, BLM has recognized the authority of local and state governments to regulate mining operations on federal land:

Nothing in this subpart shall be construed to effect a preemption of State laws and regulations relating to the conduct of operations or reclamation on Federal lands under the mining law.

43 C.F.R. § 3809.3-1 (regulations prior to January 20, 2001). The 2000 revisions confirmed the authority of state and local governments to regulate federal lands.<sup>3</sup> Specifically, the new rule stated that:

If State laws or regulations conflict with this subpart regarding operations on public lands, you [the operator] must follow the requirements of this subpart. **However, there is no conflict if the State law or regulation requires a higher standard of protection for public lands than this subpart.**

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<sup>3</sup> 65 Fed. Reg. 69998, 70008-70009 (Nov. 21, 2000). On unrelated issues, these regulations were amended on October 30, 2001. 66 Fed. Reg. 54834 (2001). The revisions, importantly, did not change the Interior Department’s position regarding state and local authority.

43 C.F.R. § 3809.3 (emphasis added).

The preamble to the revised regulations confirmed that local regulation may be more protective than federal review. “One purpose of subpart 3809 is to establish a minimum level of protection for public lands....States may continue to assert jurisdiction over mining operations on the public lands.” 65 Fed. Reg. at 70009. The preamble also stated that:

there are also certain situations where the State law or regulations may provide a higher standard of protection than subpart 3809, such as the restriction on cyanide-leaching based operations approved by voters in Montana. In this situation, the State law or regulation will operate on public lands. **BLM believes that this is consistent with FLPMA, the mining laws, and the decision in the *Granite Rock* case.”**

Id. (emphasis added).<sup>4</sup>

#### **D. A VRUD Designation Complies with Federal Law**

Based on the above-detailed laws and court decisions, it is clear that Wyoming’s designation of a VRUD area is not pre-empted by federal mining or public land laws. Under Wyoming law, the state can deny a mining proposal if:

The proposed mining operation would irreparably harm, destroy, or materially impair any area that has been designated by the council a rare or uncommon area and having particular historical, archeological, wildlife, surface geological, botanical or scenic value.

WRS §35-11-406(m)(iv). Under this provision, each mining proposal will be judged on a case-by-case basis to determine whether it can be conducted in a manner consistent with the purposes for which the VRUD area was designated. This type of “reasonable state regulation” of mining is the type of regulation affirmed in the Wyoming and federal court decisions discussed above.

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<sup>4</sup> The Montana restriction discussed by the BLM was a ballot initiative passed by Montana voters in 1998. The initiative prohibited the State from approving any new (or expanded) open-pit mining operations utilizing cyanide ore-processing reagents. The new law would also prohibit such mining on federal lands due to the State of Montana’s dual role in mine permitting (along with the federal land management agencies).

Importantly, this does not represent the type of categorical “ban on mining” that one court has said is pre-empted. See South Dakota Mining Assoc., 155 F.3d 1005 (8<sup>th</sup> Cir. 1998). Here, it is entirely possible that certain types of mining may be conducted in a VRUD area, depending on the specific location, environmental controls, mitigation measures, etc. These types of controls, and the analysis of the project’s impacts on federal land, would be reviewed under state and federal permitting processes, including those under the National Environmental Policy Act (NEPA), 42 U.S.C. § 4321 *et seq.*

At a minimum, a “facial” challenge to the VRUD designation (i.e., an up-front challenge to the VRUD designation prior to the submittal of any mining proposal to the state) would clearly fail under Granite Rock. This is because, until an actual site-specific mining proposal was submitted, it would be impossible to know whether, and to what extent, the VRUD designation would interfere with the mining operation. In other words, the simple fact of a VRUD designation does not categorically prohibit mining and thus is not pre-empted.

Thus, any challenge to the VRUD designation would have to wait until the state actually denied a mining permit. Even then, the permit denial would be upheld if it was reasonably based on the protection of Wyoming’s environment or public health – state authority upheld by the courts and the federal land management agencies. See Oil Dri Corporation of Nevada v. Washoe County, CV-02-02196 (Dec. 30, 2004)(Nevada state court rejecting mining company argument that county denial of mining project on federal land, that had been approved by BLM, was pre-empted by federal mining law).

## **CONCLUSION**

Wyoming's designation of a VRUD area would not be pre-empted by federal mining or public land law. Further, in the event that a mining claimant may eventually propose mining on federal lands, Wyoming's decision to place conditions on the operation, or deny a specific permit application in a VRUD area, would not be pre-empted, as long as the state's action was based on reasonable application of its regulations designed to protect the environment, public health, or general welfare.

# A Scenario-Based Assessment to Inform Sustainable Ponderosa Pine Timber Harvest on the Black Hills National Forest

Russell T. Graham, Mike A. Battaglia, and Theresa B. Jain



## Abstract

Since 2000, the Black Hills National Forest (BHNF) has experienced several disturbances that have reduced standing live sawtimber volume which will affect future harvest levels. To evaluate options concerning the future timber management program, we conducted a quantitative analysis to determine how mortality from these disturbances and potential growth rates will impact short-, mid-, and long-term sustainable sawtimber harvest levels of ponderosa pine (*Pinus ponderosa* var. *scopulorum* Dougl. ex Laws.). In 2019, there was 5,995,428 CCF (hundreds of cubic feet) standing live ponderosa pine sawtimber within the suitable timberlands. The current harvest level in the BHNF Forest Plan of 181,000 CCF/yr is not a sustainable option. Over the next several decades, if mortality rates stay below 1.04%, harvest levels of 72,400 and 90,500 CCF/yr appear to be sustainable if all suitable timberlands are available for harvest. History shows that allowing the forest to recover after large disturbances provides opportunities to adjust future harvest levels. Also, tending of young forests can promote recovery and produce sawtimber volume more quickly.

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**Keywords:** ponderosa pine growth and mortality, disturbance, growth and yield, scenario planning

**Cover:** Upper left: Ponderosa pine advanced regeneration beneath an overstory that was killed by mountain pine beetle. (Photo by Russell Graham, Rocky Mountain Research Station, USDA Forest Service)

Upper right: An even-aged ponderosa pine stand that was not impacted by mountain pine beetle. Stands with this density are still susceptible to mountain pine beetle and limit successful establishment of ponderosa pine seedlings. These dense stands provide opportunities for future harvests. (Photo by Mike Battaglia, Rocky Mountain Research Station, USDA Forest Service)

Middle: A landscape view of the Black Hills looking north from Flag Mountain Lookout, Mystic Ranger District in 2014 showing the widespread impact of mountain pine beetle mortality (orange/brown areas) in dense forests. Forested stands managed at lower densities demonstrated lower mountain pine beetle mortality (Taylor Timber Sale). (Photo by Blaine Cook, Black Hills National Forest, USDA Forest Service)

Bottom left: A harvest operation in a ponderosa pine stand on the Black Hills Experimental Forest. (Photo by Russell Graham, Rocky Mountain Research Station, USDA Forest Service)

Bottom right: Ponderosa pine timber being processed at the Spearfish Forest Products, Inc mill in Spearfish, SD. (Photo by Mike Battaglia, Rocky Mountain Research Station, USDA Forest Service)

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Each of the authors has had a unique familiarity with the Black Hills. Russell Graham grew up in Sundance, Wyoming, and his first job for the Forest Service was on the Bear Lodge Ranger District. Russell also supported the Forest Service with his continued research on the Black Hills producing several notable publications on goshawks, long-term studies of thinning in ponderosa pine, and mountain pine beetle dynamics. Mike Battaglia's Ph.D. work was within the Black Hills; he is currently the Scientist-in-Charge of the Black Hills Experimental Forest and continues to have an active partnership with the Black Hills National Forest. During the bark beetle infestation, Theresa Jain implemented the free selection silvicultural system on the Black Hills Experimental Forest and worked with Northern Hills Ranger District staff during sale preparation. Because of this connection to the Black Hills, we were honored to be approached by the USFS Rocky Mountain Region and Black Hills National Forest to prepare this report.

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## Executive Summary

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Since 2000, the Black Hills National Forest (BHNF) has experienced several disturbances that have reduced standing live sawtimber volume which will affect future harvest levels. We conducted a quantitative analysis to determine how mortality from these disturbances and potential growth rates will impact short-, mid-, and long-term sustainable sawtimber harvest levels of ponderosa pine (*Pinus ponderosa* var. *scopulorum* Dougl. ex Laws.) on the BHNF. More specifically, we estimated: (1) a sustainable timber harvest now and into the future, (2) how current harvest levels compare to alternative future harvests, and (3) the standing live sawtimber inventory volume needed to sustain the current Forest Plan sawtimber allowable sale quantity (ASQ) of 181,000 CCF/yr (hundreds of cubic feet). To provide plausible volume growth and mortality estimates, we: (1) evaluated disturbance related mortality in ponderosa pine forests within the Black Hills and across the Interior West using past Forest Inventory and Analysis (FIA) resource bulletins and (2) considered potential future climate and its influence on disturbance and potential mortality. From these assessments, 60 scenarios were developed and used to inform future potential changes (5, 20, and 80 years) in standing live sawtimber volume by varying degrees of mortality rates, growth rates, and harvest levels.

In 2019, the USDA Forest Service Northern Research Station Forest Inventory and Analysis (NRS-FIA) estimated that there were 5,995,428 CCF standing live ponderosa pine sawtimber within the suitable timberlands of the BHNF. The current harvest level in the BHNF Forest Plan of 181,000 CCF/yr is not a sustainable option. Sustaining harvest levels of 181,000 CCF/yr with mortality rates of 0.26% would require standing live sawtimber volumes of 7,327,950 to 8,743,950 CCF, depending on growth rate evaluated. If mortality rates are 0.60% to 1.04%, standing live ponderosa pine sawtimber volumes would require 8,497,670 to 14,031,000 CCF, respectively. Over the next several decades, if mortality rates stay below 1.04%, harvest levels of 72,400 and 90,500 CCF/yr appear to be sustainable if all suitable timberlands are available for harvest. These estimates provide a range of outcomes on the potential to sustain ponderosa pine sawtimber harvests over 5, 20, and 80 years; however, monitoring is crucial to obtain realized mortality and growth rates so harvest levels can be adjusted over time. History shows that allowing the forest to recover after large disturbances provides opportunities to adjust future harvest levels. Also, tending of young forests can promote recovery and produce sawtimber volume more quickly. It is important to understand that the scenario estimates we reported assume that all the estimated standing live ponderosa pine sawtimber volume within the suitable timberlands is available for harvest and does not include other resources that are identified in the 2007 Black Hills National Forest Land and Resource Management Plan Phase II Amendment.

# Introduction

## The Setting

Located on the eastern edge of the Rocky Mountains, the Black Hills, Bear Lodge, and Elk Mountains make up the Black Hills region, which are isolated mountain ranges surrounded by the Great Plains of the United States. Over two-thirds of the Black Hills are in southwestern South Dakota, while the neighboring Bear Lodge Mountains and remaining areas are in northeastern Wyoming. These mountains, collectively referred to as the “Black Hills,” have a total land base of about 6,000 square miles: about 125 miles from north to south and about 60 miles from east to west (fig. 1). Across this large area, elevations range from 3,800 feet to 7,244 feet with distinct geomorphologic features that influence soils, site productivity, and vegetation. Although nearly 1.5 million acres of the area are dominated by ponderosa pine (*Pinus ponderosa* var. *scopulorum* Dougl. ex Laws.) forests (fig. 2), white spruce (*Picea glauca* (Moench) Voss), quaking aspen (*Populus tremuloides* Michx.), along with isolated lodgepole pine (*Pinus contorta* Douglas ex Loudon var. *latifolia* (Engelm.) and limber pine (*Pinus flexilis* James) (Shepperd and Battaglia 2002; Walters et al. 2013) are present.

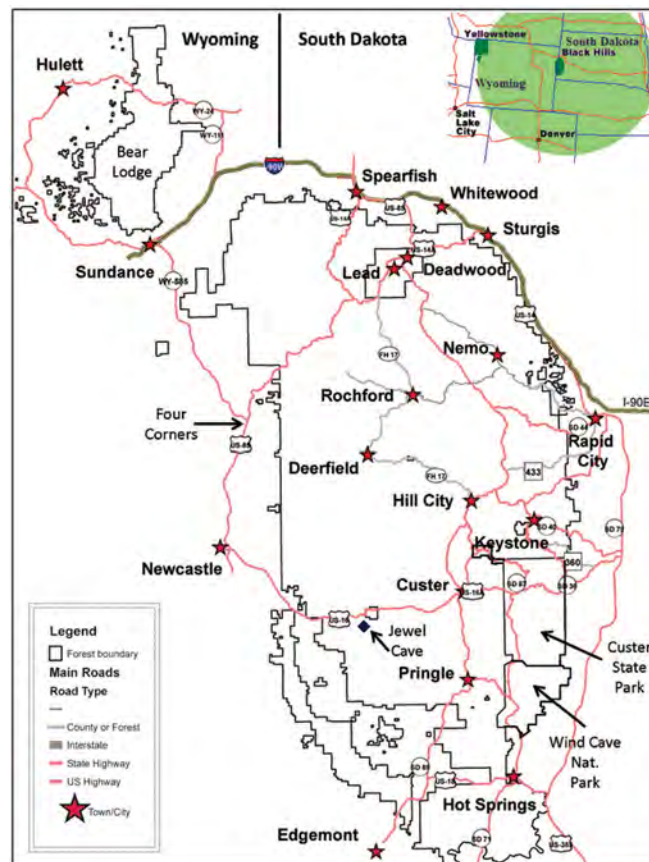


**Figure 1**—The Black Hills National Forest (BHNF) is approximately 1.2 million acres and is located in northeastern Wyoming and western South Dakota. This isolated mountain range is surrounded by the Great Plains and is dominated by ponderosa pine. The area is a popular destination for tourists due to the proximity of Custer State Park and several National Parks and Monuments.



**Figure 2**—A landscape dominated by dense ponderosa pine forests. USDA Forest Service photo by Mike Battaglia.

The Black Hills has a continental climate, with cold winters and hot summers. Although precipitation patterns differ along elevational and latitudinal gradients, in general, northern locations and higher elevations receive more precipitation than southern locations and lower elevations (Shepperd and Battaglia 2002). While precipitation falls year-round, most of the moisture occurs from March to August (Western Regional Climate Center 2020). Abundant ponderosa pine seed crops occur every 2 to 5 years that coincide with summer moisture leading to prolific seedling establishment (fig. 3).



**Figure 3**—Prolific ponderosa pine regeneration typically observed across the Black Hills. USDA Forest Service photo by Mike Battaglia.

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This region has a well-developed road system and gentle topography that is well-suited for mechanized and efficient timber harvesting. Typical site index (base age 100) within the Black Hills ranges from 36 to 75 feet (Myers and Van Deusen 1960a). These forests produce high quality ponderosa pine lumber, geographically have access to midwestern U.S. lumber markets, and have sustained a viable timber industry for over 100 years (Boldt and Van Deusen 1974; Freeman 2015; Shepperd and Battaglia 2002).

This area is often referred to as the “Beautiful Black Hills” because of its geographic diversity, canyons, and unique rock formations that are interwoven within a scenic forest. The Black Hills region is home to the Black Hills National Forest (BHNF), Mount Rushmore National Memorial, Devils Tower National Monument, Custer State Park, Crazy Horse Memorial, Wind Cave National Park, Jewel Cave National Monument, Spearfish Canyon Scenic Byway, and the George S. Mickelson 108-mile biking and hiking trail. With so many places to experience the outdoors, these isolated mountains are a popular tourist destination that supports a strong and vibrant local economy (Stubbles 1992). The Black Hills and surrounding prairie are also a popular hunting destination where state residents and nonresidents alike are drawn to hunt elk (*Cervus elaphus nelson*), white-tailed deer (*Odocoileus virginianus dakotensis*), mule deer (*Odocoileus hemionus*), pronghorn antelope (*Antilocapra americana*), turkeys (*Meleagris gallopavo merriami*), and other small and large game animals.

Disturbances are major determinants of forest structural diversity and composition within the Black Hills (Shepperd and Battaglia 2002). Weather (e.g., wind, hail, tornados, and snow), wildfire, insects, parasites, pathogens, and animals individually and in combination kill trees, create openings, and promote vegetative diversity (Lundquist 1995). Of these disturbances, insects, wildfire, and weather have been the most noticeable causes of tree mortality (Brown et al. 2008; Graves 1899; Ludlow 1875; Negrón et al. 2008; Shepperd and Battaglia 2002). The forests of the Black Hills have experienced cyclic mountain pine beetle (*Dendroctonus ponderosae*; MPB) epidemics (fig. 4), impacting different locations with various amounts of severity (fig. 5). In addition to MPB, frequent wildfires also burned the forests of the Black Hills (fig. 6); these wildfires are ecologically important in perpetuating regeneration and contributing to the development and disturbance resilience of ponderosa pine forests (Fiedler and Arno 2015). Before European settlement, average wildfire return interval ranged from 10 to 31 years, depending on elevation (Brown and Sieg 1996; Brown and Sieg 1999; Brown et al. 2008; Hunter et al. 2007). However, with the onset of fire exclusion, logging, and grazing in the early 1900s, fire frequencies decreased resulting in an increase in forest density and contiguous multistoried stands (Brown and Cook 2006; Grafe and Horsted 2002; Hunter et al. 2007).

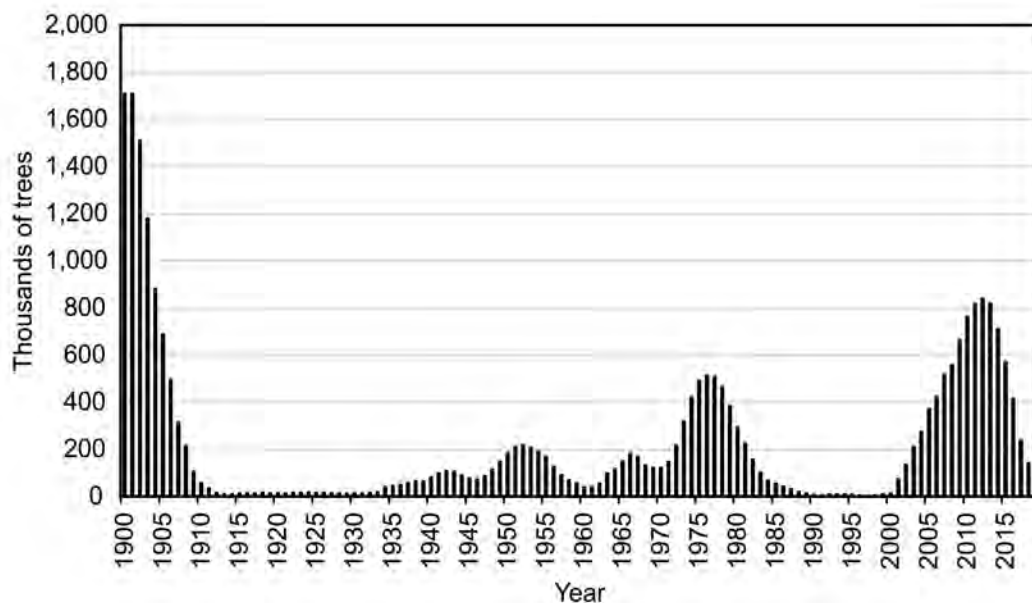


**Figure 4**—Within the forests of the Black Hills, there has been a continuous endemic and several epidemics of mountain pine beetles over the last 129 years (see Graham et al. 2016, fig. 31). From 2000 through 2017, over 8,000,000 trees were estimated to have been killed. Values reported are the 5-year moving average.

At the beginning of the 21st century, standing live ponderosa pine volume was at its highest levels in recorded time. These high volumes provided forested stand and landscape conditions that were classified at moderate to high hazard for MPB and wildfire (USDA FS 2013). In addition, results from long-term and recent studies across the BHNF showed that current high stand densities were susceptible to MPB and needed to be lowered across the landscape (Graham et al. 2016; Negrón et al. 2008; Negrón et al. 2017; Schmid et al. 2007). During this same time period, the BHNF started to experience an MPB epidemic (fig. 5) and several large mixed severity wildfires (fig. 6). Within the wildfire perimeters, areas with low stand densities burned less severely (Lentile et al. 2006). This local information combined with the incorporation of reducing surface fuel loads, increasing height to live crown, decreasing crown density, and maintaining large fire-resistant trees (Agee and Skinner 2005) provided additional science-based guidance for forest management that would help reduce MPB and wildfire hazard.

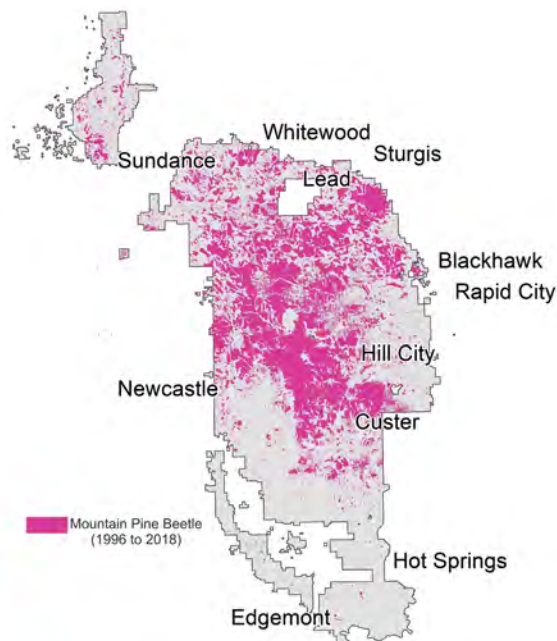


**Figure 5**—The most recent (i.e., 1998) MPB epidemic started with many isolated areas of endemic MPB populations throughout the Black Hills. As the endemic populations increased in numbers, the MPB spread throughout the central and northern Black Hills. Notably, the MPB infestation was less in Wyoming portions of the Black Hills and Bear Lodge Mountains (see Graham et al. 2016, figs. 65–69, for details on the extent and impact of mountain pine beetles in the Black Hills). This disturbance can have a substantial impact on post-disturbance recovery.

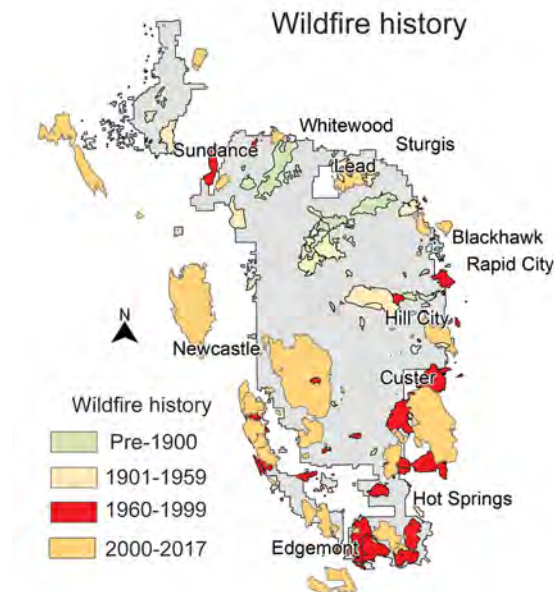


**Figure 6**—Spatial representation of wildfires in the Black Hills since the late 1800s (USDA FS 2020c). Wildfires in the Black Hills have been increasing since 2000, with more acres burned between the years 2000 to 2017 than from 1960 to 1999.

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In response to the increased MPB and wildfire activity, the USDA Forest Service (USFS) adjusted its timber sale program to reduce forest susceptibility to these disturbances (Thom et al. 2020). Based on USFS timber volume sold records, from 1997 to 2011, an average of 154,543 CCF/yr (hundreds of cubic feet) of sawtimber was sold (file on record at BHNF). In 2010, a collaborative approach including local, state, and federal agencies, conservation/natural resource districts, private industry, landowners, and citizens was formed to create the Black Hills Regional Mountain Pine Beetle Strategy (Thom et al. 2020). This strategy coordinated efforts across all lands and provided education and monetary resources to shift and coordinate management strategies to reduce MPB mortality (Thom et al. 2020). Through this collaborative effort, the BHNF developed the landscape-level Mountain Pine Beetle Response Project (USDA FS 2012a) to lower forest density through mechanical harvest to reduce tree mortality. This approach led to landscape-level treatments that lowered stand densities to minimize MPB mortality and reduce wildfire hazard (USDA FS 2012b). Between 2012 and 2017, approximately 188,000 acres of ponderosa pine sawtimber was commercially harvested across all land ownerships, with the majority of the acres treated occurring on National Forest lands (Thom et al. 2020). Based on USFS timber volume sold records, from 2012 to 2017, an average of 193,107 CCF/yr of sawtimber was sold (file on record at BHNF). While sawtimber harvest volumes were increasing, most treated stands were adjacent to MPB infested stands rather than in the infested stands themselves (fig. 7); the combination of MPB and harvesting of green trees contributed to the reduction of the standing live sawtimber volume on the BHNF.



**Figure 7**—Mountain pine beetle impacted ponderosa pine sawtimber that was not harvested. USDA Forest Service photo by Mike Battaglia.

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## Recognizing an Information Need

Land use and natural disturbances constitute the fabric of the Black Hills forests. This public land is administered and managed by the USFS BHNF. Over the past century, the BHNF maintained an active timber program that helped support mining, paper, and lumber industries (Freeman 2015). For much of the 1900s, harvesting was extensive, often with logs processed with portable mills that were moved to harvest areas. The Multiple Use—Sustained Yield Act of 1960 affirmed the USFS’s commitment to produce timber. The act required “the achievement and maintenance in perpetuity of a high level or regular periodic output of the various renewable resources of the national forests without impairment of the productivity of the land” (Multiple Use—Sustained Yield Act of 1960). As a result, timber harvesting began to increase in the 1960s on the BHNF

(Swanson 2012). Today, the USFS mission is to “sustain the health, diversity, and productivity of the Nation’s forests and grasslands to meet the needs of present and future generations” (USDA FS 2020a). For many people, this forested island in the Great Plains is a special place and balancing land use is at the forefront of actions by local to national stakeholders and land managers (Stubbles 1992; USDA FS 2016). The Black Hills are cherished, valued, and used by a wide range of stakeholders including tourists, miners, hunters, loggers, and ranchers. The Black Hills provide a sense of place for local to international citizens and are a sacred place for Native Americans. There is strong interest to develop management options that can maintain a vibrant and sustainable timber industry in the Black Hills while also supplying abundant scenery, wildlife and domestic animal habitat, and recreational opportunities.

Over the last two decades (2000–2020), multiple disturbances have changed the forest characteristics of the Black Hills (figs. 5 and 6). Recognizing these changes, in June 2017 the BHNF Leadership convened a working group to develop questions of interest on how these changes may impact the ability of the BHNF to provide forest products to the timber industry. These questions centered on developing a comprehensive understanding of the forests growing on BHNF suitable timberlands (Appendix A). This working group consisted of BHNF staff, industry representatives, and representatives from the South Dakota and Wyoming State Foresters’ offices. The working group and the leadership of the BHNF recognized an information need that required a rigorous inventory of the forest resources of the Black Hills and agreed to have the Forest Service’s Northern Research Station Forest Inventory and Analysis Program (NRS-FIA) provide the data for the assessment.

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Therefore, the working group agreed to assess the current trends in forest standing live volume, growth, and mortality of the BHNF using an FIA sampling design and data collection protocol. As a result, from 2017 through 2019, the NRS-FIA inventoried the forests of the BHNF. Rather than using the normal plot intensity of one plot for every 6,000 acres, they increased the number of plots to one for every 3,000 acres and measured them over a 3-year period. The working group agreed to have the NRS-FIA use data from this survey to address the following questions:

- What is the standing live volume estimate?
- What is the annual gross growth estimate?
- What is the annual net growth estimate?
- What is the net growth to removal ratio?
- What is the ability to produce an available sustained yield on the Forest (timberlands/suitable base) for the next decade and what is the methodology for producing this estimate?

Upon reviewing these questions, the leadership of the BHNF asked the USDA Rocky Mountain Research Station (RMRS) to form a team to address the following questions:

1. What impact does the current 2019 forest condition (i.e., standing volume, mortality, and growth) have on the out-year timber program of harvesting at current levels compared to other harvest level scenarios using probable growth and mortality estimates?
2. What is a sustainable timber harvest estimate for the BHNF using the 2019 NRS-FIA data assuming rational tree mortality and growth rates informed by those of the past?
3. What would be the standing inventory volume necessary using reasonable growth and mortality estimates to sustain a sawtimber allowable sale quantity (ASQ) of 181,000 CCF?

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To address the three questions, we needed estimates of volume growth and mortality rates (hereafter referred to as growth and mortality rates). We assessed past FIA resource bulletins and data to provide historical context and variability of standing live volume, growth and mortality rates, and harvest levels. We also evaluated the role that various disturbances contributed to mortality within the Black Hills and in ponderosa pine forests across the Interior West. Finally, we considered potential future climate to incorporate an element of uncertainty in mortality rates. These assessments, when combined, provided the framework to develop 60 scenarios to inform future potential changes in standing live sawtimber (> 9 inches diameter at breast height; d.b.h.) volume by varying degrees of mortality and growth rates and harvest levels. We report 5-year trends to address question 1 (above). We report 20-year and 80-year trends to address question 2. To determine the level of standing live sawtimber volume required to sustain 181,000 CCF/yr for each growth and mortality rate (question 3), we determined at what volume would net growth equal harvest level.

## Approach

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### Understanding Disturbance and Tree Mortality

Ponderosa pine mortality from pathogens, animals, insects, weather, and wildfire varies over space, time, and intensity in the Black Hills (Graham et al. 2016; Shepperd and Battaglia 2002). Although most historical mortality information is descriptive, these observations indicate that disturbances have always shaped the character of the Black Hills forests. For example, Ludlow (1875), when he accompanied General Custer to the Black Hills in 1874, observed large tracts of pines likely killed by insects and large fires burning in the prairie and forests that were either ignited by lightning or Native Americans. Graves (1899) described several expanses of ponderosa pine trees killed by insects and wildfire when he surveyed the Black Hills Forest Reserve. The Bureau of Entomology and Plant Quarantine provided intermittent reports on forest insect and disease conditions in the United States in the 1930s. Forest Service Research Stations and Forest Service Regional staffs in the 1950s (Ostmark and Wilford 1956; Wilford 1951) and Forest Health and Protection began providing similar information in the 1990s (Liebhold et al. 2016; O'Neil 1993).

#### ***Pathogens, Animal Damage, and Weather***

Ponderosa pine regenerates profusely in the Black Hills creating multistoried structures that contain numerous and often dense patches (e.g., thousands of trees per acre) of suppressed saplings (< 5 inches d.b.h.) and seedlings (< 4.5 ft tall), making them vulnerable to a wide range of mortality agents. Saplings are killed by root and stem pathogens (e.g., *Armillaria* spp., red rot [*Dichomitus squalens mellea*], western gall rust [*Peridermium harknessii*]), and needle cast (*Elytroderma deformans*). Similarly, animal damage can also contribute to ponderosa pine mortality such as mice (*Microtus* spp., *Peromyscus* spp.), cottontail (*Sylvilagus floridanus similis*) and jackrabbits (*Lepus townsendii*), which can girdle and kill seedlings. Deer (*Odocoileus* spp.), elk (*Cervus* spp.), cattle (*Bos* spp.), and sheep (*Ovis* spp.) also damage and kill ponderosa pine trees by trampling, rubbing, and browsing but the amount of trees killed does not appreciably modify stand structures (Boldt and Van Deusen 1974).

Weather, in the form of wind, snow, ice, tornados, and hail, intermittently damages and kills ponderosa pine trees throughout the Black Hills. These events can occur both singly and in concert with other endemic damaging agents. Straight-line winds kill individual trees yearly and tornados are known to kill small (e.g., 10 to 15 acres) patches to large (e.g., 7,000 acres) areas of trees occasionally. Also, large ( $\geq 1$  inch diameter) hail associated with thunderstorms can defoliate and damage sapling- to pole-sized (5 to 8.9 inches d.b.h.) trees (Boldt and Van Deusen 1974; Shepperd and Battaglia 2002). Damage from wind and snow can bend and break sapling-sized trees and break or topple

pole-sized trees (Collins and Green 1988; Johnson and Averill 1983; Lundquist 2007; Lundquist and Negrón 2000). As a result, weather and mortality caused by diseases and animals were the major contributors to tree mortality observed in the Black Hills during the 1980s through the 1990s (table 1).

**Table 1**—Volume mortality rates based on standing live volume of growing stock trees (> 5 inches d.b.h.), throughout the last several decades in the Black Hills region. Values of mortality category (rounded to 2 significant digits) are based on the proportion that each disturbance contributed to the overall total mortality rate. Values might not add up due to rounding.

| Year              | Mortality rate (%) | Insect (%) | Fire (%) | Disease (%) | Weather (%)  | Other (%) | Mortality (%) without insect included |
|-------------------|--------------------|------------|----------|-------------|--------------|-----------|---------------------------------------|
| 1962 <sup>a</sup> | 0.15               | 0.03       | 0.00     | 0.08        | Not reported | 0.03      | 0.12                                  |
| 1984 <sup>b</sup> | 0.26               | 0.03       | 0.03     | 0.00        | 0.17         | 0.03      | 0.23                                  |
| 1999 <sup>c</sup> | 0.27               | 0.03       | 0.03     | 0.03        | 0.19         | 0.00      | 0.24                                  |
| 2011 <sup>d</sup> | 1.24               | 0.80       | 0.13     | 0.00        | 0.27         | 0.04      | 0.44                                  |
| 2019 <sup>e</sup> | 3.07               | 2.60       | 0.20     | 0.05        | 0.20         | 0.02      | 0.47                                  |

<sup>a</sup>1962: Mortality and standing live volume based on softwoods across all land ownerships in South Dakota on suitable timberlands (data source: Choate and Spencer 1969).

<sup>b</sup>1984: Mortality and standing live volume based on ponderosa pine across all land ownerships in South Dakota on suitable timberlands (data source: Collins and Green 1988). Mortality by disease was 0.002).

<sup>c</sup>1999: Mortality and standing live volume based on ponderosa pine on the Black Hills National Forest (South Dakota and Wyoming) on suitable timberlands (data source: DeBlender 2002). Mortality by disease was 0.025 and fire was 0.025.

<sup>d</sup>2011: Mortality rate was based on ponderosa pine on the Black Hills National Forest in South Dakota on suitable timberlands. Walters et al. 2013 reported mortality of 1.04%, which included Wyoming and South Dakota; however, when FIA provided the values for 2011 by mortality category, it was only for South Dakota lands.

<sup>e</sup>2019: Mortality and standing live volume based on ponderosa pine on the Black Hills National Forest (South Dakota and Wyoming) on suitable timberlands (source: USDA FS 2021).

### Mountain Pine Beetle

The Black Hills have experienced MPB epidemics periodically somewhere on the Forest approximately every 20 years, with notable events in the early 1900s, the late 1960s to the early 1980s, and the most recent epidemic from 2000 through 2017 (fig. 4; Graham et al. 2016; Lessard et al. 1987; Thompson 1975). Ponderosa pine tree susceptibility to MPB is related to stand density and tree diameter (Graham et al. 2016; Negrón et al. 2008). Mountain pine beetles can attack pole-sized ponderosa pine trees but prefer sawtimber-sized trees (Graham et al. 2016; Negrón et al. 2008; Negrón et al. 2017; Schmid et al. 2007). From 1960 through 1999, it is estimated that MPB killed 5,733,550 ponderosa pine trees (Graham et al. 2016; Lessard et al. 1987). During this period, insect mortality contributed 0.03% to the total mortality rate (table 1). In the 1960s through mid-1970s, mortality caused by MPB was most evident in the northern Black Hills (Thompson 1975). By the mid-1970s, tree mortality from MPB was

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clearly evident along the Wyoming and South Dakota border, south and west of Spearfish, South Dakota, and within portions of the southern Bear Lodge Mountains, near Sundance, Wyoming (Fuller and Hostetler 1980; Gillman and Bailey 1977; James and Linnane 1979; Raimo and Sharon 1981). By the early 1980s, mortality caused by MPB decreased in the South Dakota Black Hills but mortality from MPB were observed in the Bear Lodge Mountains in Wyoming (Johnson and Averill 1983; Lessard and Fuller 1982; Lister and Hildebrand 1984). During that time, a major contribution to the high mortality rate of 4.19% reported for ponderosa pine by Green and Conner (1989) was caused by MPB. From 2000 to 2017, approximately 8,631,500 ponderosa pine were killed by MPB (Graham et al. 2016; Harris 2016, 2017, 2018) (fig. 4). This recent epidemic occurred within the central portions of the BHNH (fig. 5). Total insect mortality in 2011 accounted for 0.80% of the 1.24% annual tree mortality rate (table 1). In contrast, total insect mortality contributed 2.60% of the 3.07% mortality rate recorded in 2019, demonstrating the full impact of the 2000 through 2017 bark beetle epidemic. As of 2019, the MPB epidemic has subsided in the BHNH (Harris 2019).

## **Wildfires**

Prior to European settlement (circa 1875), wildfires burned in the forests of the Black Hills on average every 10 to 31 years depending on elevation (Brown and Sieg 1996; Brown and Sieg 1999; Brown et al. 2008; Hunter et al. 2007). While ponderosa pine is considered a fire-adapted species, seedling- and sapling-sized trees are still susceptible to low-intensity surface fires (Battaglia et al. 2009). Pole- and sawtimber-sized trees are also susceptible to wildfire if the fire is intense enough to scorch a substantial amount of the foliage, consume the foliage, and/or kill the cambium (Keyser et al. 2006). By the early 1900s, European settlement of the Black Hills and the rise of the gold mining industry resulted in the suppression of fires to protect the towns and timber (Freeman 2015). Fire suppression, along with timber harvesting activities, altered the structures of the forests by removing the large diameter tree component, increasing small tree densities, and decreasing the amount of open-canopied forests (Boldt and Van Deusen 1974; Brown and Cook 2006; Grafe and Horsted 2002; Shepperd and Battaglia 2002).

Wildfire ignitions are common within the Black Hills and have the potential to burn thousands of acres. For example, from 2000 to 2019, approximately 100 fires burned each year on public lands within the Black Hills, but most remained small and were suppressed (NIFC 2020). However, under conducive weather conditions, large wildfires can occur (fig. 6). From 1960 to 2019, across the Black Hills region, 547,449 acres burned, with over 75% of the burned area occurring in the last 20 years. Before 2000, wildfires burned 141,481 acres, averaging 3,628 acres per year. However, most of these fires were not extensive

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nor did they burn in areas where the FIA plots were located (Choate and Spencer 1969; Collins and Green 1988; DeBlander 2002; Green and Conner 1989). As a result, the contribution wildfire made to the total annual mortality from the 1960s through 1990s ranged from 0.00 to 0.03% (table 1). From 2000 through 2017, a total of 406,331 acres burned, averaging 22,574 acres burning per year with wildfire contributing 0.13% to 0.20% of the total annual tree mortality in the Black Hills (table 1). Included in that 406,331 acres was the 2000 Jasper Fire, which burned 83,500 acres in the south-central Black Hills. Although DeBlander (2002) commented that over 130,000 acres of the BHNH had been impacted by large fires, the mortality caused by these fires was not included in the report since the measurements were made before the wildfires. However, Walters et al. (2013) did report tree mortality from the Jasper fire as well as other wildfires. During the last 20 years, the increase in the extent and severity of wildfires burning the forests of the Black Hills in the 2000s and 2010s is reflected in the higher tree mortality rates (fig. 6; table 1).

### ***Mortality Trends Across the Interior West***

Recent mortality in ponderosa pine forests is not limited to the Black Hills region. FIA resource bulletins have reported increases in ponderosa pine mortality across the Interior West of the United States over the past few decades (Goeking 2015). Mortality rates ranged between 0.12 (Utah) to 1.30% (Montana) with an average mortality of 0.79% (table 2). Wildfires, followed by insects and disease, were the main contributor of mortality on a land area basis across the Interior West (DeRose et al. 2018; Goeking and Menlove 2017; Shaw et al. 2018; Thompson et al. 2017; Werstak et al. 2016; Witt et al. 2018, 2019). Several studies have reported that the number of wildfire events, along with the amount of acres burned, have increased across the western United States and Canada (Coop et al. 2020; Hanes et al. 2018; Parks and Abatzoglou 2020; Westerling 2016). In addition, increases in tree mortality due to increased regional warming and drought stress have been observed across unmanaged older forests in the western United States (van Mantgem et al. 2009).

**Table 2**—Volume gross growth and mortality rates for Interior West states from the 2000s to mid-2010s. Data is based on Forest Inventory Analysis annual forest inventory of ponderosa pine growing stock (> 5 inches d.b.h.) on national forest lands that were classified as timberland. The mortality rate is primarily a result of insects and fire across all ownerships.

| State          | Sampling period | Gross growth rate (%) | Mortality rate (%) | Source                   |
|----------------|-----------------|-----------------------|--------------------|--------------------------|
| Arizona        | 2001–2014       | 1.5                   | 0.90               | Shaw et al. 2018         |
| Colorado       | 2004–2013       | 1.4                   | 0.88               | Thompson et al. 2017     |
| Idaho          | 2006–2015       | 1.7                   | 1.22               | Witt et al. 2018         |
| Montana        | 2006–2015       | 1.7                   | 1.30               | Witt et al. 2019         |
| New Mexico     | 2008–2014       | 1.6                   | 0.73               | Goeking and Menlove 2017 |
| Utah           | 2003–2015       | 1.3                   | 0.12               | Werstak et al. 2016      |
| Wyoming        | 2011–2015       | 2.2                   | 0.36               | DeRose et al. 2018       |
| <b>Average</b> | —               | <b>1.63</b>           | <b>0.79</b>        | —                        |

## Changing Climate

Since the beginning of the 20th century, South Dakota has observed a 2 °F increase in average annual temperature (Frankson et al. 2017; Rice et al. 2018). Most of this temperature increase has taken place in the winter and spring months as well as nighttime temperatures throughout the year. By the middle of the 21<sup>st</sup> century, it is predicted that mean annual temperatures will exceed those of the past 100 years. Projected precipitation estimates are less certain, but current models suggest an increase in precipitation during the winter and spring months (Frankson et al. 2017). While precipitation is expected to increase during these cooler months, the increase in temperature would influence the moisture deficit during the summer months and increase the vulnerability to periodic drought. Future droughts that coincide with warmer temperatures, often referred to as “hot droughts,” are expected to happen as well. During these hot droughts, evapotranspiration demand increases while soil moisture and fuel moistures decreases (Frankson et al. 2017).

How might these climate change projections impact wildfire, MPB, and ponderosa pine mortality in the Black Hills region? Warmer temperatures throughout the year may result in earlier snowmelt and longer growing seasons. Moreover, higher temperatures in winter may shift snow to rain. These changes in growing season and precipitation type could result in fire seasons starting earlier and ending later, a situation that is being observed across the western United States (Coop et al. 2020; Rocca et al. 2014; Westerling 2016; Westerling et al. 2006). These changes may increase fire frequency (Rocca et al. 2014), increase wildfire extents (Parks and Abatzoglou 2020), and prolong fire seasons (Brown et al. 2004). These events may diminish regeneration and

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growing stock potential. For example, 20 years after the 2000 Jasper Fire, large areas of high burn severity still have limited or no ponderosa pine regeneration establishment (fig. 8; Keyser et al. 2008; Lentile et al. 2005; Lentile et al. 2006; Ziegler et al. 2017); similar occurrences are being observed across the western United States (Coop et al. 2020). Furthermore, in these high-severity burned areas, surface fuels are increasing from the dead and down trees (fig. 9a; Keyser et al. 2008) and a reburn in this area could result in adverse post-fire outcomes (fig. 9b; Coop et al. 2020; Stevens-Rumann et al. 2012). Mountain pine beetle impacted areas that have not burned also can produce a fire hazard due to their heavy fuels (fig. 10; Sieg et al. 2016). Warmer temperatures directly impact MPB population dynamics (Bentz et al. 2010). Mountain pine beetles are often in the larvae stage during the cold, winter months. While the larvae can cold harden to survive the cold winter temperatures, extreme cold temperatures can reduce MPB populations (Bentz and Mullins 1999). However, with warmer winter temperatures, MPB will not succumb to this mechanism of population control. These factors could lead to more frequent outbreaks. If these estimates come to fruition, then mortality rates could exceed the historically lower rates observed in the 20<sup>th</sup> century.



**Figure 8**—Many high-severity burned areas in the 2000 Jasper Fire footprint have still not revegetated with ponderosa pine seedlings after 20 years. Instead, these areas are dominated by graminoids, forbs, ponderosa pine snags, and downed woody debris. USDA Forest Service photo by Mike Battaglia.



**Figure 9**—(a) A high severity burned area in the 2000 Jasper fire footprint that has revegetated with ponderosa pine seedlings post-wildfire. Notice the abundant ponderosa pine seedlings surrounded by standing snags and downed woody debris. (b) This photograph is 1 year after the area reburned in a fire. Notice the high seedling mortality, reduction in ponderosa pine snags, and reduction of downed woody debris. Fires occurring in these types of fuel complexes are expected to result in high tree mortality and other adverse outcomes. USDA Forest Service photos by Mike Battaglia.



**Figure 10**—A typical fuel complex observed in mountain pine beetle impacted stands that were not harvested. Fires occurring in these types of fuel complexes are expected to result in high tree mortality and other adverse outcomes. USDA Forest Service photo by Mike Battaglia.

## Assessing Past FIA Reports

Since 1930, the FIA mission is to manage and update a comprehensive inventory and analysis of the present and future conditions of the renewable resources of the forest and rangelands of the United States (USDA FS 2018a). The FIA program and data collection protocol have evolved over the years. For example, data collected in the 20<sup>th</sup> century was based on periodic surveys on forested lands every 10 years, one state at a time, progressing from state to state until all forested land within each unit's region were inventoried (Frayer and Furnival 1999). The specific measurement years and protocols varied among states; therefore, each report provided the methods and definitions. Beginning in 2000, the FIA program implemented an annualized inventory, referred to as the “annual” inventory, which is nationally consistent with sampling across land ownerships and forest types spatially and temporarily unbiased (Goeking 2015). It is important to note that the periodic and annual inventory data are not directly comparable, but both provide good descriptions of forest resources (Goeking 2015). Since different inventory methodologies were used, values from the periodic (pre-2000s) and annualized (post-2000s) inventories may have discrepancies in broad-scale estimates. This doesn't negate the data from periodic inventories, since it is the best available information from that

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time, but it does suggest that users of this older data need to be careful in its interpretation and not use it to quantify trends. Instead, we used these data to provide context and identify mortality and gross growth rates to inform our scenario development. Jointly, the USDA RMRS Interior West (IW-FIA, Ogden, Utah) and the NRS-FIA (St. Paul, Minnesota) units were and are currently responsible for the BHNF inventories. Below is a list of the reports and the information we obtained from them to provide historical context of mortality and growth.

Using data collected from 1960 through 1962, within the boundaries of the BHNF and Custer National Forest (NF), Choate and Spencer (1969) described the forestland conditions of western South Dakota. Rather than establishing new random plots, they visited 137 locations that were established from 1953 through 1954. They used a nested rectangular plot design to describe growing stock ( $\geq 5.0$  inches d.b.h) reported in cubic feet for trees with a 1-foot stump to a 4-inch top. The estimates derived from this report are based on softwoods that included both ponderosa pine and white spruce. The amount of growing stock volume killed by fire, insects, disease, animals, weather, and suppression was estimated on each plot. Timber removals were approximated from timber and mill residue production of local wood processing plants.

Collins and Green (1988) described the forest resources collected from 1979 to 1983 of South Dakota west of the 103<sup>rd</sup> meridian. The area they included incorporated 90% of the forestlands of South Dakota, of which 58% are NFS lands (BHNF and Custer NF) and the remaining amounts on private and other public forest lands. It was not clear if this included lands withdrawn by statute or administrative regulation. They described metrics including mortality and growing stock volume ( $\geq 5$  inches d.b.h) on stands with at least 10% of trees in these size classes and had a 1-foot stump to 4-inch top diameter (outside bark). The estimates derived from this report are based on softwoods, which included both ponderosa pine and white spruce.

DeBlander (2002) described data collected in 1999 on BHNF forestlands in Wyoming and South Dakota. Phase one of the survey used grid points systematically located every  $\approx 0.6$  miles (1,000 meters) across all lands within the BHNF. A second sampling phase selected one of these plots every  $\approx 3$  miles (5,000 m) stratified by ownership and vegetation type. Two-hundred and five plots were sampled on the NFS lands; of these, 173 were forest, 22 were both forest and nonforest, and 10 were nonforest. In 1995, a mapped plot design was adopted by FIA nationwide that was used in this survey. At each location, four, 1/24<sup>th</sup> acre plots were used to describe growing stock ( $\geq 5.0$  inches d.b.h.) of trees that had a 1-foot stump to a 4.0-inch outside bark top. Tree mortality was estimated for both standing and down trees that died in the past 5 years. Estimates derived from this report are for ponderosa pine only. In addition, the

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estimates include values from all lands administered by the BHNF, including reserved lands, which made up 1% of the total land base.

Annualized inventory was reported by Walters et al. (2013). Volume estimates came from the 5-year (2007 to 2011) inventory period for the South Dakota portion of the BHNF, and the 2005 data collected in Wyoming. Under annualized inventories, growth, removals, and mortality (GRM) are estimated using two time periods. For South Dakota, these time periods were from 2002 to 2006 and 2007 to 2011. For Wyoming the time periods were 2000 and 2005. An annualized measurement scheme was conducted using remotely sensed data and data from one plot, consisting of 4-subplots, established every 6,000 acres. The four subplots are measured on a 5-year rotating basis. Estimates derived from this report are for ponderosa pine ( $\geq 5$  inches d.b.h.) only on BHNF nonreserved lands.

The 2019 (2017 to 2019) data were specific inventories requested by the BHNF from FIA to address changes in forest conditions observed most noticeably by recent MPB and wildfire activity (figs. 5 and 6). The data have been quality checked by NRS-FIA but have not been published (data on file). Data for these measurements cover both South Dakota and Wyoming portions of the BHNF. Tree growth, mortality, removals, and standing live volume for ponderosa pine trees  $> 5$  inches d.b.h. and sawtimber-sized trees ( $> 9$  inches d.b.h.) were described. Merchantable volume for trees  $> 5$  inches d.b.h. used a 4-inch top and sawtimber volumes were computed to a 7-inch top. Both merchantable volume classes used a 1-foot stump.

Values for the 2019 data came from three sources: (1) plots that were remeasured from previous FIA inventories that fell within the normal measurement cycle (panel base plots); (2) plots that were remeasured from previous FIA inventories but that were measured ahead of schedule (off-panel base plots); and (3) new plots that were installed in 2017 and 2018 field seasons to increase the sample size and spatial extent (one plot every 3,000 acres; 2X PLOTS). Data from panel base plots and off-panel base plots (table 3) were used to calculate GRM because these values require two separate measurements over a time period (Time 1 and Time 2). Typically, the time period between the two measurement periods is on a 5- to 10-year measurement cycle, depending on the state. However, the 2019 final inventory for the analysis used in this document includes repeat measurements that vary in time between measurements to facilitate the most-up-to-date estimates. For example, the 2019 GRM estimates include plots that were initially measured (Time 1) between 2011 and 2016 and remeasured (Time 2) between 2017 and 2019 for a total of 225 plots (table 3). Estimates of volume do not require two separate measurements over a time period. Therefore, the panel base plots, the panel off-base plots, and the 2X PLOTS contributed to estimates of volume for a total of 438 plots. Although

the 2X PLOTS that were established in 2017 and 2018 did not contribute to the GRM estimates, the BHNF has the option to remeasure these new plots to get additional GRM estimates to reduce sampling error in the future. These measurements would be useful to detect any additional mortality or the anticipated decline in mortality related to MPB.

**Table 3**—The number of plots measured for 2017 and 2019 evaluation for the off-panel base and panel base plots. Walter et al. 2013 reported growth, removals, and mortality measured prior to 2012. The 2019 evaluation includes plots remeasured from 2011 through 2016 for growth, removals, and mortality.

| Time 2<br>Year and plots<br>remeasured | Time 1<br>Plot establishment year |      |      |      |      |      |      |      |      |      |      |      |       |  |
|----------------------------------------|-----------------------------------|------|------|------|------|------|------|------|------|------|------|------|-------|--|
|                                        | 2005                              | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total |  |
| Before 2012*                           | 20                                | 3    | 38   | 45   | 40   | 37   | 38   |      |      |      |      |      | 221   |  |
| 2017 evaluation                        |                                   |      |      |      |      |      |      |      |      |      |      |      |       |  |
| 2011                                   | 20                                | 3    | —    | —    | —    | —    | —    | —    | —    | —    | —    | —    | 23    |  |
| 2012                                   | —                                 | —    | 38   | —    | —    | —    | —    | —    | —    | —    | —    | —    | 38    |  |
| 2013                                   | —                                 | —    | —    | 45   | —    | —    | —    | —    | —    | —    | —    | —    | 45    |  |
| 2014                                   | —                                 | —    | —    | —    | 29   | —    | —    | —    | —    | —    | —    | —    | 29    |  |
| 2015                                   | —                                 | —    | —    | —    | 11   | 17   | 2    | —    | —    | —    | —    | —    | 30    |  |
| 2016                                   | —                                 | —    | —    | —    | —    | 20   | 7    | —    | —    | —    | —    | —    | 27    |  |
| 2017                                   | —                                 | —    | —    | —    | —    | —    | 29   | —    | —    | —    | —    | —    | 29    |  |
| Total                                  | 20                                | 3    | 38   | 45   | 40   | 37   | 38   | —    | —    | —    | —    | —    | 221   |  |
| Established plots<br>before 2017       | —                                 | —    | —    | —    | —    | —    | 56   | 38   | 45   | 29   | 30   | 27   | 225   |  |
| 2019 evaluation                        |                                   |      |      |      |      |      |      |      |      |      |      |      |       |  |
| 2017                                   | —                                 | —    | —    | —    | —    | —    | 29   | —    | —    | —    | —    | —    | 29    |  |
| 2018                                   | —                                 | —    | —    | —    | —    | —    | 15   | 20   | —    | —    | —    | —    | 35    |  |
| 2019                                   | —                                 | —    | —    | —    | —    | —    | 12   | 18   | 45   | 29   | 30   | 27   | 161   |  |
| Total                                  | —                                 | —    | —    | —    | —    | —    | 56   | 38   | 45   | 29   | 30   | 27   | 225   |  |

\*Reported by Walters et al. 2013.

It should be noted that the 2017 evaluation presented in this document was summarized and presented to the stakeholder group in 2018 to provide preliminary results and progress; however, these data were not the complete data set until the 2019 evaluation data was added to be used for the final analysis.

As shown by the previous reports, BHNF FIA data from 1962 through the present covered a wide variety of areas, used various sampling methods, presented different forest metrics, and assessed different time frames.

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These data provide context that can be used in helping to understand how the forests of the Black Hills have changed and provide insights of how they may change and be managed in the future.

## **Growth, Mortality, Harvests, and Standing Live Tree Inventory Over Time**

Standing live tree inventory changes through time because of tree growth, mortality, and harvest between measurement periods. Gross growth is defined as the annual increase in tree volume in the absence of mortality and harvest. Gross growth includes accretion plus gross ingrowth (see Box 1 for detailed definitions and calculations), net growth is gross growth minus mortality, and net change is net growth minus harvest (Bechtold and Patterson 2005).

The FIA resource bulletins provided some challenges in interpretation. Choate and Spencer (1969) and Collins and Green (1988) only reported acreage of South Dakota and their estimates include ponderosa pine and white spruce together as softwoods. DeBlander (2002) and Walters et al. (2013) reported ponderosa pine and white spruce separately for the entire BHNF, which includes acreage in South Dakota and Wyoming. The FIA estimates prior to the year 2000 used periodic inventory to gather inventory data that include resource bulletins by Choate and Spencer (1969), Collins and Green (1988), and DeBlander (2002). The years when data were collected were not at regular intervals through time. The older resource bulletins reported volume in cubic feet for growing stock (> 5 inches d.b.h). However, when sawtimber-sized trees (> 9 inches d.b.h.) were reported separately, the data were in board feet. The 2017 and 2019 data were reported in both board feet and cubic feet.

Even with these identified nuances among the resource bulletins, they do provide general estimates of standing live volume, growth, and mortality on the Black Hills for growing stock > 5 inches d.b.h. (table 4; fig. 11). Over the past 60 years, gross growth, based on the percent of the standing live inventory, ranged between 2.33% and 2.74%. While mortality rates from the 1960s to 1990s were 0.16% and 0.27%, mortality rates started to increase in the 2000s, with values of 1.04% in 2011, 2.72% in 2017, and 3.07% in 2019. From 1962 to 1999, net growth, as a percentage of standing live volume, was positive with rates of 2.20% to 2.57%, which reflected the high gross growth and low mortality rates of those measurement periods. Although the 2011 measurement period still showed a positive gross growth of 2.66%, it coincided with a higher mortality rate of 1.04%, resulting in a decline in net growth to 1.62% (table 4). By 2017, gross growth was 2.74%, but mortality was 2.72%, resulting in a 0.02% net growth. In the most recent 2019 measurements, gross growth had decreased to 2.33% while mortality increased to 3.07%, resulting in a net growth of -0.75% (table 4).

### Box 1—Gross Growth, Net Growth, and Net Change

For reporting growth and change, the individual components are usually combined as follows, and they are expressed either in terms of growing-stock or all live volume (Bechtold and Patterson 2005):

**Gross ingrowth** =  $I+R$ , *where:*

$I$  = Ingrowth; includes the volume of trees at the time that they grow across the minimum d.b.h. threshold between time  $t$  and time  $t+1$ . Estimate is based on the size of trees at the d.b.h. threshold, which is 1.0 inches for all live trees and 5.0 inches for growing-stock trees.

$R$  = Reversion; includes volume of trees on and that reverse from a nonforest land use to a forest land use (land that reverses from any source to timberland).

**Accretion** =  $G_S+G_I+G_R+G_M+G_C+G_D$ , *where:*

$G_S$  = Survivor growth is the growth on trees tallied at time of initial inventory ( $t$ ) that survive until terminal inventory ( $t+1$ ).

$G_I$  = Growth on ingrowth.

$G_R$  = Reversion growth is the growth of reversion trees from midpoint of measurement interval to time  $t+1$ .

$G_M$  = Mortality growth is the growth of trees that died from natural causes between time  $t$  and the midpoint of the measurement interval. Tree size at the midpoint is modeled from tree size at time  $t$ . This term also includes the subsequent growth on ingrowth trees that achieve the minimum diameter threshold prior to mortality.

$G_C$  = Cut growth is the growth of cut trees between time  $t$  and midpoint of the measurement interval. Includes the ingrowth trees that achieve the minimum diameter threshold prior to being cut.

$G_D$  = Diversion growth is the growth of diversion trees from time  $t$  to the midpoint of the measurement interval. Tree size at the midpoint is modeled from tree size at time  $t$ .

**Gross growth** = gross ingrowth + accretion

**Mortality** =  $M$ , *where:*

$M$  = Mortality is the volume of trees that dies from natural causes between time  $t$  and time  $t+1$ .

**Removals** =  $C+D$ , *where:*

$C$  = Cut (Harvest) is the volume of trees cut between time  $t$  and time  $t+1$ .

$D$  = Diversion is the volume of trees on land diverted from forest to nonforest or land diverted to reserved forest land and other forest land.

**Net growth** = gross growth – mortality

**Net change** = net growth – removals

**Table 4**—Merchantable volume of ponderosa pine trees (> 5 inches d.b.h.), in CCF, on suitable timberland of the Black Hills National Forest. See Box 1 for a description of gross growth as described by FIA.

| Date                                   | Average annual volume (CCF) |           |            |                      |            | Standing live inventory (CCF) |
|----------------------------------------|-----------------------------|-----------|------------|----------------------|------------|-------------------------------|
|                                        | Gross growth                | Mortality | Net growth | Harvest <sup>a</sup> | Net change |                               |
| 1962 <sup>b</sup>                      | 213,010                     | 12,180    | 200,830    | 109,780              | 91,050     | 7,810,000                     |
| 1984 <sup>c</sup>                      | 339,540                     | 34,910    | 301,660    | 199,540              | 102,120    | 13,449,000                    |
| 1999 <sup>d</sup>                      | 380,000                     | 42,120    | 337,880    | 204,628              | 133,252    | 15,353,000                    |
| 2011 <sup>e</sup>                      | 358,170                     | 140,460   | 217,710    | 246,630              | -28,920    | 13,477,960                    |
| 2017 <sup>f</sup>                      | 247,768                     | 246,122   | 1,646      | 261,721              | -260,075   | 9,050,031                     |
| 2019 <sup>f</sup>                      | 185,049                     | 244,703   | -59,654    | 183,592              | -244,804   | 7,958,314                     |
| Average annual volume (% of inventory) |                             |           |            |                      |            |                               |
| 1962 <sup>b</sup>                      | 2.73                        | 0.16      | 2.57       | 1.41                 | 1.17       | —                             |
| 1984 <sup>c</sup>                      | 2.52                        | 0.26      | 2.24       | 1.48                 | 0.78       | —                             |
| 1999 <sup>d</sup>                      | 2.48                        | 0.27      | 2.20       | 1.33                 | 0.87       | —                             |
| 2011 <sup>e</sup>                      | 2.66                        | 1.04      | 1.62       | 1.83                 | -0.21      | —                             |
| 2017 <sup>f</sup>                      | 2.74                        | 2.72      | 0.02       | 2.89                 | -2.87      | —                             |
| 2019 <sup>f</sup>                      | 2.33                        | 3.07      | -0.75      | 2.31                 | -3.08      | —                             |

<sup>a</sup>To ensure consistency in calculations, FIA estimates of harvest levels were reported in the table. The United States Forest Service utilizes a series of systems: Timber Information Manager (TIM) and Forest Products Financial System (FPFS) for a more accurate record of sold and cut volume (<https://www.fs.fed.us/forestmanagement/products/cut-sold/index.shtml>). Note: Sawtimber utilization standards for FIA estimates use a 7 inch top and current utilization on the BHNH use a 6 inch top.

<sup>b</sup>Estimates are for softwoods on timberlands (commercial lands) within the Black Hills and Custer National Forest portions of South Dakota only. Softwoods include ponderosa pine and white spruce (Choate and Spencer 1969). Area of commercial forest land estimated for the National Forest was 957,000 acres, but it was not apparent how many acres were classified as suitable timberland.

<sup>c</sup>Estimates are for softwoods on timberlands within the Black Hills and Custer National Forest portions of South Dakota only. Softwoods include ponderosa pine and white spruce. Area of timberland for the national forest was 952,500 acres, but it was not clear if timberlands included lands withdrawn by statute or administrative regulation or which were classified as suitable timberland (Collins and Green 1988).

<sup>d</sup>Estimates are for ponderosa pine on forest land within the Black Hills National Forest including South Dakota and Wyoming. These estimates included values from all forest lands administered by the Black Hills National Forest, including reserved lands, which make up 1% of the total land base. Area of total forest lands for the National Forest was 1,150,627 acres, but it was not clear which lands were classified as suitable timberland (DeBlander 2002).

<sup>e</sup>Estimates are for ponderosa pine on timberlands within the Black Hills National Forest including South Dakota and Wyoming. Area of timberlands estimated for the National Forest was 1,135,200 acres, but it was not clear which lands were classified as suitable timberland (Walters et al. 2013).

<sup>f</sup>Estimates are for ponderosa pine on timberlands within the Black Hills National Forest including South Dakota and Wyoming. Area of total timberland was 1,062,776 acres, of which 765,734 were classified as suitable timberland.

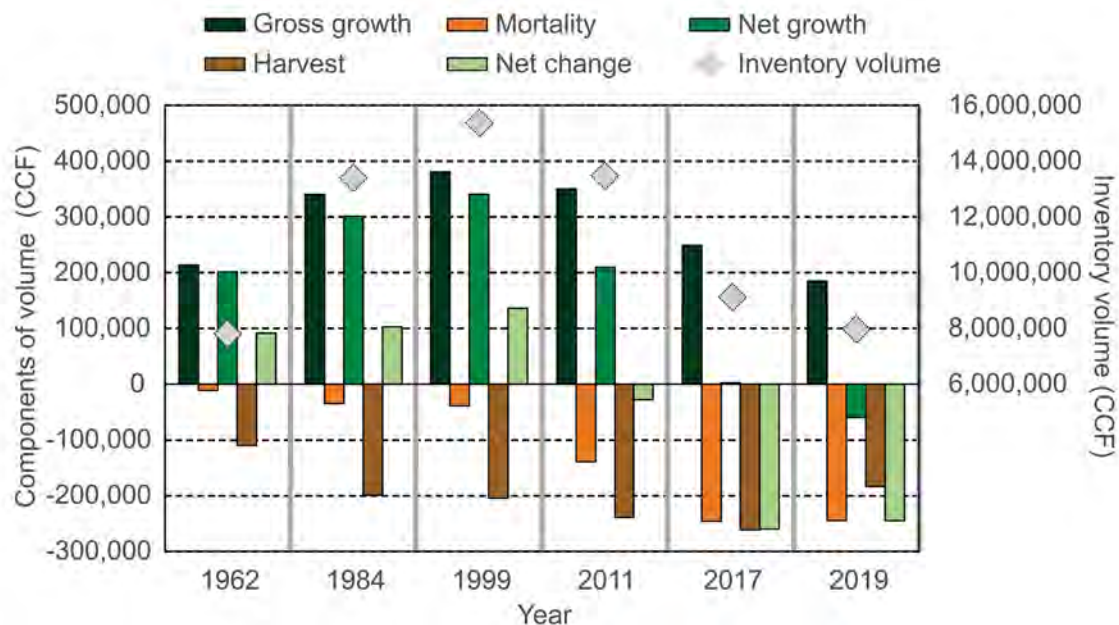


**Figure 11**—Gross growth, mortality, net growth, harvest, and standing inventory for trees > 5 inches d.b.h. (table 4) for several measurement periods from 1962 to 2019.

Direct comparisons of absolute values of standing live volume of 1962 and 1984 to later values are complicated by the measurement methodology and geographic region measured. However, an assessment of how harvest levels impacted net change to standing live inventory is still valid within each measurement period. For the past 60 years, timber harvesting of growing stock > 5 inches d.b.h. in the Black Hills has ranged from 1.33% to 2.89% of standing live volume (table 4). From the 1960s to 1980s, positive net growth exceeded the harvest amount, resulting in a positive net change of 0.78% to 1.17% and a subsequent increase in standing live volume, from 7,810,000 to 13,449,000 CCF within the South Dakota acres (table 4; fig. 11). In 1999, harvest levels were 1.33% of standing live inventory, resulting in a positive net change of 0.87% and a standing live volume of 15,353,000 CCF across the entire BHNF. The 2011 survey (Walters et al. 2013) demonstrated the influence of wildfires and MPB and their influence on net growth and net change (net growth minus harvest). While net growth was still positive (albeit lower than the previous decades), harvest levels concurrently increased (table 4; fig. 11), resulting in a negative net change (-0.21%) to standing live inventory. In 2017 and 2019, while mortality was at the highest levels and net growth was at its lowest levels in decades, harvesting exceeded net growth and resulted in net change of -2.87% and -3.08%, respectively, and a substantial decrease in merchantable standing live volume to 7,958,314 CCF of trees  $\geq$  5 inches d.b.h across the BHNF (table 4; fig. 11).

Examination of the merchantable sawtimber (> 9 inches d.b.h.) shows a similar pattern as merchantable volume of > 5 inches d.b.h. Ponderosa pine tree data from 2017 and 2019 demonstrated high levels of mortality and harvests contributing to a decrease in standing live volume (table 5). In 2017, gross growth exceeded mortality, resulting in a net growth of 44,215 CCF. However, the harvest removal of 206,411 CCF resulted in a net change of -162,196 CCF in standing live tree volume. In 2019, gross growth declined while the amount of mortality increased, resulting in a net growth of -27,715 CCF. While harvest did decrease to 153,534 CCF, this still led to a net change of -182,558 CCF and a further decline in standing live sawtimber volume of ponderosa pine to 5,995,428 CCF (table 5).

**Table 5**—Merchantable ponderosa pine sawtimber volume (> 9 inches d.b.h., 7-inch top, and 1-foot stump) in CCF and rates on suitable timberland in the Black Hills National Forest.<sup>a,b</sup>

| Date                                   | Average annual volume (CCF) |           |            |         |            | Standing live inventory (CCF) |
|----------------------------------------|-----------------------------|-----------|------------|---------|------------|-------------------------------|
|                                        | Gross growth                | Mortality | Net growth | Harvest | Net change |                               |
| 2017                                   | 215,371                     | 171,156   | 44,215     | 206,411 | -162,196   | 6,893,367                     |
| 2019                                   | 150,694                     | 178,409   | -27,715    | 153,534 | -182,558   | 5,995,428                     |
| Average annual volume (% of inventory) |                             |           |            |         |            |                               |
| 2017                                   | 3.12                        | 2.48      | 0.64       | 2.99    | -2.35      | —                             |
| 2019                                   | 2.51                        | 2.98      | -0.46      | 2.56    | -3.04      | —                             |

<sup>a</sup>Sampling errors for the 2019 sawtimber means represent 68 percent confidence interval.

- Average annual growth: 150,694 CCF ± 8.0%
- Average annual mortality: 178,409 CCF ± 22.4%
- Inventory volume: 5,995,428 CCF ± 5.5%

<sup>b</sup>Note: Sawtimber utilization standards for FIA estimates use a 7 inch top and current utilization standards on the BHNH use a 6 inch top.

## Scenario Development

To address the questions related to the future timber program for the BHNF, 60 scenarios were developed that were based on and put in context with the 1962 through 2019 FIA data (tables 4, 5, and 6). The assumptions for future tree growth and mortality rates were informed by using Forest Survey (precursor to FIA) and FIA data from the 1960s through 2019 for timberlands in the Black Hills (tables 1, 4, 5). In addition, we used fire history and cyclic MPB epidemics on the Black Hills and other ponderosa pine forests throughout the western United States to inform our mortality estimates. There is an element of uncertainty associated with future mortality rates, particularly if local climate begins to shift influencing disturbance and growth; therefore, we evaluated a range of mortality rates.

**Table 6**—Sixty scenarios were evaluated by applying four levels of harvest, five mortality rates, and three rates of gross growth.

| Mortality (%)      |        | Harvest (CCF) |         |         |  |
|--------------------|--------|---------------|---------|---------|--|
| 2.33% Gross Growth |        |               |         |         |  |
| 0.26               | 72,400 | 90,500        | 126,700 | 181,000 |  |
| 0.60               | 72,400 | 90,500        | 126,700 | 181,000 |  |
| 1.04               | 72,400 | 90,500        | 126,700 | 181,000 |  |
| 1.52               | 72,400 | 90,500        | 126,700 | 181,000 |  |
| 2.00               | 72,400 | 90,500        | 126,700 | 181,000 |  |
| 2.54% Gross Growth |        |               |         |         |  |
| 0.26               | 72,400 | 90,500        | 126,700 | 181,000 |  |
| 0.60               | 72,400 | 90,500        | 126,700 | 181,000 |  |
| 1.04               | 72,400 | 90,500        | 126,700 | 181,000 |  |
| 1.52               | 72,400 | 90,500        | 126,700 | 181,000 |  |
| 2.00               | 72,400 | 90,500        | 126,700 | 181,000 |  |
| 2.73% Gross Growth |        |               |         |         |  |
| 0.26               | 72,400 | 90,500        | 126,700 | 181,000 |  |
| 0.60               | 72,400 | 90,500        | 126,700 | 181,000 |  |
| 1.04               | 72,400 | 90,500        | 126,700 | 181,000 |  |
| 1.52               | 72,400 | 90,500        | 126,700 | 181,000 |  |
| 2.00               | 72,400 | 90,500        | 126,700 | 181,000 |  |

All scenarios were for ponderosa pine sawtimber (trees > 9 inches d.b.h.) growing on suitable timberlands as defined by FIA (Appendix A). The BHNF Forest Plan constraints such as slope steepness, wildlife, recreation, grazing, or other values were not considered in the scenarios. All scenarios started with

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the NRS-FIA 2019 ponderosa pine standing live sawtimber volume estimate of 5,995,428 ( $\pm$  646,307; 95% CI) CCF (table 5). Numerous combinations of annual growth rates, annual mortality rates, and harvest levels could have been modeled. However, three growth rates and five mortality rates that were reflected in the 1962 through 2019 FIA data were chosen. These ranges of growth and mortality rates were combined with four harvest levels to produce 60 short-term (5 and 20 years) and long-term (80 years) scenarios (table 6). These 60 scenarios showed how combinations of mortality and growth rates along with harvest levels would impact the suitable timberlands of the BHNF.

## Gross Growth Rates

The growth rates were the average annual gross growth as a percentage of the standing live volume for merchantable ponderosa pine trees > 5 inches d.b.h. (table 4). Growth rates for the > 9 inches d.b.h. were not used due to the lack of historical data. There is an element of uncertainty associated with how fire, MPB, and weather (wind and drought) will influence growth rates. Furthermore, forest growth across the Black Hills is variable, especially when comparing the southern Hills to the northern Hills and Bear Lodge Mountains of Wyoming (fig. 1). Therefore, we included a range of growth rates to account for this uncertainty. An average growth rate of 2.54% was derived from the 1962, 1984, 1999, 2011, and 2019 values (table 4). The 2017 value was excluded since it was included in the 2019 calculation. The average gross growth rate was bracketed with the minimum gross growth rate of 2.33% that was reported in 2019 and the maximum gross growth rate of 2.73% reported in 1962 (table 4). By using observed low and high growth rates from the 1960s through 2019 and a mean value in the scenarios, the variation in forest growth over the entire Black Hills region and the uncertainty of a future climate was represented (table 6).

## Mortality Rates

Over the past 60 years, MPB, wildfire, and other causes of tree mortality rates ranged from 0.16% to 3.07% (table 4). A range of mortality rates used in the scenarios reflected those occurring in the past. An annual mortality rate of 0.26% was chosen to reflect both minimal MPB- and wildfire-induced mortality that occurred over multiple decades as shown in the 1984 and 1999 surveys by FIA (table 1). For a moderate amount of MPB- and wildfire-caused tree mortality, a rate of 1.04% was chosen, which was the mortality rate reported in 2011 (table 4). To reflect a mortality rate between the low (0.26%) and moderate (1.04%) values, the mean of reported values between 0.16% and 1.04% (table 4) was calculated (0.60%) (table 6). While a mortality rate of 3.07% was observed in the 2019 FIA measurement period, this rate occurred during high MPB and wildfire activity and is highly unlikely to occur for an extended length of time.

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Instead, we set 2.0% as the maximum mortality rate based on the average of the reported rate of 1.04% and the maximum reported rate of 3.07% (table 4). The medium to high mortality rate of 1.52% was calculated by averaging the medium and high mortality rates. These chosen mortality rates reflect those that have been reported across the western United States over the past several decades (table 2; DeRose et al. 2018; Goeking and Menlove 2017; Thompson et al. 2017; Shaw et al. 2018; Werstak et al. 2016; Witt et al. 2018; Witt et al. 2019; van Mantgem et al. 2009). Furthermore, mortality caused by wildfire and MPB has been historically cyclic; but as we progress through time, there is uncertainty associated with climate-disturbance interactions. Therefore, by evaluating a range of mortality rates, we can better represent these different disturbance cycles. In total, five mortality rates (0.26, 0.60, 1.04, 1.52, and 2.00%) were used in the scenarios (table 6).

## Harvest Levels

An exploration of sustainable harvest amounts using different growth and mortality rates was performed to determine the amount of growing stock necessary to sustain the current BHNF Forest Plan ASQ of 181,000 CCF of sawtimber (table 6). However, because of declining standing live tree volume, we assumed that harvest levels would not be able to increase but rather there may be a need to decrease harvest levels to identify a reasonable sustainable harvest of sawtimber for the short- and long-term. For this reason, three additional harvest levels were examined by reducing the maximum sawtimber harvest level by 30% (126,700 CCF), 50% (90,500 CCF), and 60% (72,400 CCF).

## Scenario Outcomes

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The objectives of this report were to address questions of future sustainable sawtimber harvest levels given the current vegetative conditions on the BHNF. NRS-FIA estimates for 2019 demonstrated that current net growth and net change are negative, indicating that current harvest levels when combined with mortality exceeded gross growth. Therefore, to ensure a sustainable harvest, the priority is to identify the combined harvest and mortality rates that allow the forest to produce positive net growth and net change.

Our first challenge was how to define “sustainable harvest.” There are three terms in the Society of American Foresters’ Dictionary of Forestry (Deal 2018) that define sustainable forest management, sustained yield, and long-term sustained yield (Box 2). In addition, the 2012 Planning Rule now directs the U.S. Forest Service to use the sustained yield limit when revising Forest Resource Management Plans (USDA FS 2015). We used the definitions of these terms to provide context for how we evaluated our scenarios. First, while there is not a specific value or threshold, a key component of sustained yield management implies a balance between increment and cutting. Currently, net growth (gross growth minus mortality) and net change (net growth minus cutting or harvest) are not in balance with growth, because mortality and harvest combined exceeded gross growth (fig. 11). Our first assumption was that a sustainable harvest level must (1) initially allow for positive net growth by accounting for mortality caused by disturbance and (2) harvest levels cannot exceed net growth but can be equal to net growth. Our second assumption was that if we wanted to return to harvest levels more in line with past harvest levels, a period of recovery to the standing live volume may be necessary; and to accomplish this, net growth must exceed harvest, at least in the short term. Our third assumption was that although mortality levels are likely to decline due to the end of the MPB epidemic, other disturbances such as wildfire, weather related disturbances, and harvesting will continue to impact net growth and net change in standing live volume. This provides unique challenges, because a recovery period is needed for net growth and net change to become positive for standing live inventory to increase to levels that allow for sustainable harvests while also considering other resources. Our results from our scenario exercise are organized by the three questions we were asked to address.

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## **Box 2 - Sustainable Forest Management, Sustained Yield, Long-Term Sustained Yield, and Sustained Yield Limit**

“Sustainable forest management” is a concept that continues to evolve and has several definitions. The Dictionary of Forestry (Deal 2018) definition contains two components. The first is “the practice of meeting the forest resource needs and values of the present without compromising the similar capability of future generations.” The second component is “the stewardship and use of forests and forest lands in a way, and at a rate, that maintains their biodiversity, productivity, and regeneration capacity, vitality, and potential to fulfill, now and in the future, relevant ecological, economic, and social functions at local, national, and global levels, and that does not cause damage to other ecosystems.”

Criteria for sustainable forestry (Deal 2018) include “(a) conservation of biological diversity, (b) maintenance of productive capacity of forest ecosystems, (c) maintenance of forest ecosystem health and vitality, (d) conservation and maintenance of soil and water resources, (e) maintenance of forest contributions to global carbon cycles, (f) maintenance and enhancement of long-term multiple socioeconomic benefits to meet the needs of societies, and (g) a legal institutional, and economic framework for forest conservation and sustainable management.”

Sustained yield is defined (Deal 2018) as the “yield that a forest can produce continuously at a given intensity of management” and sustained-yield management “implies continuous production so planned as to achieve, at the earliest practical time, a balance between increment and cutting.”

Long-term sustained yield (Deal 2018) is the “highest uniform wood yield that may be sustained under a specific management intensity consistent with multiple-use objectives on lands being managed for timber production.”

The 2012 Planning Rule now directs the U.S. Forest Service to use the sustained yield limit when revising Forest Resource Management Plans. “Sustained yield limit (SYL) is the amount of timber, meeting applicable utilization standards, “which can be removed from [a] forest annually in perpetuity on a sustained-yield basis” (NFMA at section 11, 16 USC 1611; 36 CFR 219.11(d)(6)). It is the volume that could be produced in perpetuity on lands that may be suitable for timber production. Calculation of the limit includes volume from lands that may be deemed not suitable for timber production after further analysis during the planning process. The calculation of the SYL is not limited by land management plan desired conditions, other plan components, or the planning unit’s fiscal capability and organizational capacity. The SYL is not a target but is a limitation on harvest, except when the plan allows for a departure” (USDA FS 2015).

***What impact does the current 2019 forest condition (i.e., standing volume, mortality, and growth) have on the out-year timber program of harvesting at current levels compared to other harvest level scenarios using probable growth and mortality estimates?***

***Harvest Level of 181,000 CCF/yr: Current BHNF Forest Plan***

Standing live sawtimber volume decreased in all 15 scenarios with a harvest level of 181,000 CCF/yr, regardless of growth and mortality rates (table 7; figs. 12 and 13; Appendix B). In all cases, harvest levels exceeded net growth resulting in a decrease in standing live sawtimber volume. Depending on mortality and growth rates used, average standing live sawtimber volume could decrease between -172,897 ( $\pm$  83,861; 95% CI) and -811,413 ( $\pm$  10,735; 95% CI) CCF within 5 years (table 7). Within 20 years, a decline of -838,215 ( $\pm$  406,560; 95% CI) to -3,327,413 ( $\pm$  44,021; 95% CI) CCF is predicted (fig. 12).

**Table 7**—The change in ponderosa pine average standing live sawtimber volume (CCF) after 5 years under various volume growth and mortality rates and harvest levels. Starting volume was 5,995,428  $\pm$  646,307 CCF (95% confidence interval). Values in bold represent scenarios that decrease standing live volume. Values with an “\*” represent values that are not significantly different from zero (95% confidence interval). Values presented are based on a range of volume gross growth and mortality rates for ponderosa pine on the Black Hills National Forest.

| Harvest level<br>(CCF/yr)           | Mortality rate  |                 |                 |                 |                 |
|-------------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|                                     | 0.26%           | 0.60%           | 1.04%           | 1.52%           | 2.0%            |
| -----Gross growth rate = 2.33%----- |                 |                 |                 |                 |                 |
| 181,000                             | <b>-296,496</b> | <b>-399,998</b> | <b>-531,840</b> | <b>-672,999</b> | <b>-811,413</b> |
| 126,700                             | -13,521*        | <b>-118,940</b> | <b>-253,254</b> | <b>-397,065</b> | <b>-538,115</b> |
| 90,500                              | 175,129         | 68,432          | <b>-67,514</b>  | <b>-213,109</b> | <b>-355,916</b> |
| 72,400                              | 269,454         | 162,118         | 25,351*         | <b>-121,131</b> | <b>-264,817</b> |
| -----Gross growth rate = 2.54%----- |                 |                 |                 |                 |                 |
| 181,000                             | <b>-231,855</b> | <b>-336,239</b> | <b>-469,209</b> | <b>-611,583</b> | <b>-751,192</b> |
| 126,700                             | 52,311*         | <b>-53,998*</b> | <b>-189,441</b> | <b>-334,487</b> | <b>-476,744</b> |
| 90,500                              | 241,755         | 134,162         | -2,929*         | <b>-149,757</b> | <b>-293,779</b> |
| 72,400                              | 336,477         | 228,243         | 90,327          | <b>-57,392</b>  | <b>-202,296</b> |
| -----Gross growth rate = 2.73%----- |                 |                 |                 |                 |                 |
| 181,000                             | <b>-172,897</b> | <b>-278,083</b> | <b>-412,081</b> | <b>-672,999</b> | <b>-696,258</b> |
| 126,700                             | 112,350         | 5,232*          | <b>-131,248</b> | <b>-277,409</b> | <b>-420,765</b> |
| 90,500                              | 302,515         | 194,108         | 55,974*         | <b>-91,975</b>  | <b>-237,103</b> |
| 72,400                              | 397,598         | 288,546         | 149,585         | 741*            | <b>-145,272</b> |

### Harvest Level of 126,700 CCF/yr: 30% Reduction in Sawtimber Harvest

Standing live sawtimber volume was sustainable for 5 of the 15 scenarios with a harvest level of 126,700 CCF/yr (table 7; figs. 12 and 13; Appendix B). Net growth exceeded harvest levels only when growth rates exceeded 2.73% and mortality rates were  $\leq 0.26\%$  (table 7; figs. 12 and 13; Appendix B) resulting in an increase in average standing live sawtimber volume of 112,350 ( $\pm 83,861$ ; 95% CI) CCF. Harvest levels did not exceed net growth (i.e. change in volume was not significantly different from zero) in 4 of the 15 scenarios (designated with an asterisk in table 7). Within 20 years, on average, up to 544,679 ( $\pm 406,561$ ; 95% CI) CCF could be added to the standing live sawtimber volume (fig. 12) depending on mortality and growth rates.

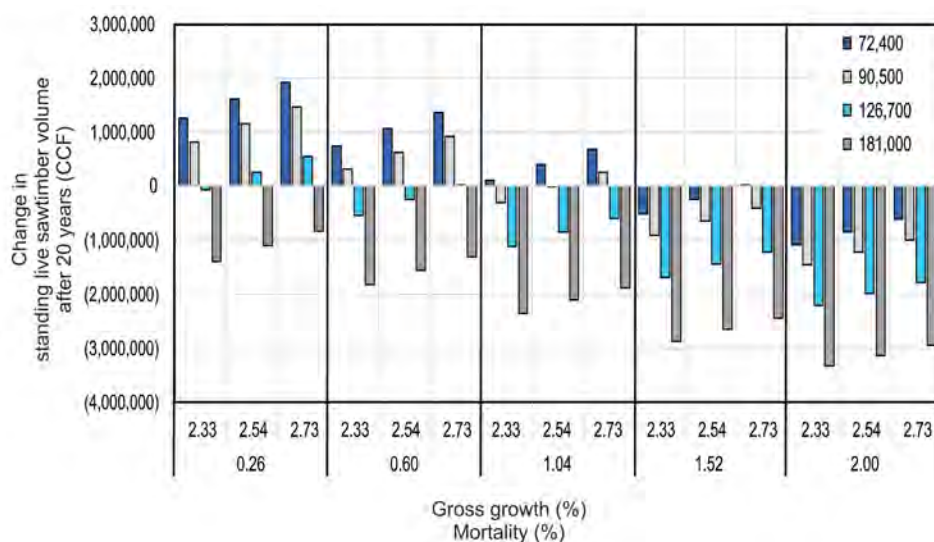


**Figure 12**—Twenty-year change in average standing live sawtimber volume for 60 evaluated scenarios. Scenarios are reported by gross growth rate (2.33%, 2.54%, 2.73%) and harvest level (181,000 CCF/yr, 126,700 CCF/yr, 90,500 CCF/yr, and 72,400 CCF/yr) for each of the five mortality rates (0.26%, 0.60%, 1.04%, 1.52%, and 2.0%).

Standing live sawtimber volume decreased in 10 of the 15 scenarios with a harvest level of 126,700 CCF/yr (table 7; figs. 12 and 13; Appendix B). In those 10 scenarios, harvest levels of 126,700 CCF still exceeded net growth, resulting in a reduction in standing live sawtimber volume. All scenarios with mortality rates  $\geq 1.04\%$  and those at the lower growth rate of 2.33% and mortality rates  $\geq 0.60\%$  predicted a decline in volume. Within 5 years, depending on mortality and growth rates used, an average decline of -118,940 ( $\pm 57,874$ ; 95% CI) to -538,115 ( $\pm 10,735$ ; 95% CI) CCF was predicted (table 7). Within 20 years, an average decline of -543,564 ( $\pm 264,486$ ; 95% CI) to -2,206,683 ( $\pm 44,021$ ; 95% CI) CCF was predicted (fig. 12).

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### Harvest Level of 90,500 CCF/yr: 50% Reduction in Sawtimber Harvest

Standing live sawtimber volume was sustainable in 8 of the 15 scenarios with a harvest level of 90,500 CCF/yr (table 7; figs. 12 and 13; Appendix B). Net growth exceeded harvest levels when growth rates were 2.33% and 2.54% and mortality rates were  $\leq 0.60\%$  (table 7; figs. 12 and 13) or when growth rates exceeded 2.73% and mortality rates were  $\leq 1.04\%$  (table 7; figs. 12 and 13), resulting in an increase in standing live sawtimber volume. Harvest levels did not exceed net growth when the growth rate was 2.54% and the mortality rate was 1.04%. Depending on mortality and growth rates evaluated, within 5 years, 55,974 ( $\pm 56,490$ ; 95% CI) to 302,515 ( $\pm 83,861$ ; 95% CI) CCF could be added to the average standing live sawtimber volume (table 7). Within 20 years, 254,998 ( $\pm 257,351$ ; 95% CI) to 1,466,608 ( $\pm 406,560$ ; 95% CI) CCF could be added to the average standing live sawtimber volume (fig. 12).

Standing live sawtimber volume decreased in 7 of the 15 scenarios with a harvest level of 90,500 CCF/yr (table 7; figs. 12 and 13; Appendix B). In those seven scenarios, harvest levels of 90,500 CCF still exceeded net growth, resulting in a reduction in standing live sawtimber volume. Most scenarios with growth rates of 2.33% and 2.54% and mortality rates  $> 1.04\%$  and growth rates of 2.73% with mortality rates  $\geq 1.52\%$  predicted a decline in volume. Within 5 years, depending on the scenario, a decline of -91,975 ( $\pm 40,060$ ; 95% CI) to -355,916 ( $\pm 10,735$ ; 95% CI) CCF in average standing live sawtimber was predicted (table 7). Within 20 years, an average decline of -403,542 ( $\pm 175,761$ ; 95% CI) to -1,459,530 ( $\pm 44,021$ ; 95% CI) CCF was predicted (fig. 12).

### Harvest Level of 72,400 CCF/yr: 60% Reduction in Sawtimber Harvest

Standing live sawtimber volume was sustainable in 10 of the 15 scenarios with a harvest level of 72,400 CCF/yr (table 7; figs. 12 and 13; Appendix B). Net growth exceeded harvest levels in 8 scenarios, when growth rates were 2.33% and mortality rates  $\leq 0.60$  and growth rates were 2.54% or 2.73% and mortality rates were  $\leq 1.04\%$  (table 7; figs. 12 and 13; Appendix B), resulting in an increase in average standing live sawtimber volume. Harvest levels did not exceed net growth when growth rate was 2.33% and mortality rate was 1.04% or growth rate was 2.73% and mortality was 1.52%. Depending on the growth and mortality rates used, within 5 years, 741 ( $\pm 40,059$ ; 95% CI) to 397,598 ( $\pm 83,861$ ; 95% CI) CCF could be added to the average standing live sawtimber volume (table 7). Within 20 years, 3,252 ( $\pm 175,761$ ; 95% CI) to 1,927,573 ( $\pm 406,561$ ; 95% CI) CCF could be added to the average standing live sawtimber volume (fig. 12).

Standing live sawtimber volume decreased in 5 of the 15 scenarios with a harvest level of 72,400 CCF/yr (table 7; figs. 12 and 13; Appendix B). In those five scenarios, harvest levels of 72,400 CCF still exceeded net growth, resulting in a



**Figure 14**—The use of prescribed fire can aid in the reduction in ponderosa pine seedling density. This prescribed fire resulted in a mosaic of living and dead ponderosa pine seedlings with limited damage to the overstory. USDA Forest Service photo by Mike Battaglia.

Tending of nonmerchantable ponderosa pine can help accelerate the production of sawtimber. While thinning will not increase the productivity of a site, which is inherently controlled by climate and soils, these management actions can distribute the growth to fewer stems and reduce the time to grow sawtimber. The importance of tending even-aged stands early in their development has been demonstrated by several research studies within the Black Hills region (Graham et al. 2019; Myers 1958). In 1931, a thinning study was initiated in stagnated stands that were 28, 40, and 55 years old with d.b.h. ranges of 1.0 to 5.1 inches (Myers 1958). In these stands, a substantial increase in diameter and volume growth was reported compared to the dense unthinned areas (Myers 1958). In 1961, a long-term thinning study to examine tree growth response across a range of growing stock levels was installed on the Black Hills Experimental Forest in dense 65-year-old sapling and pole-sized stands with initial diameters of 2 to 8 inches d.b.h. (Graham et al. 2019; Myers 1967). After 48 years, this long-term study demonstrated that ponderosa pine trees in treated stands increased in both diameter and merchantable volumes compared to untreated stands (fig. 15). Depending on the initial density reduction and starting diameters (sapling- vs. pole-sized trees), tree diameters ranged from 9 to 18 inches d.b.h. (fig. 15a-f), compared to 8 inches d.b.h. in the dense untreated stands (fig. 15g). Both studies demonstrate that tending to the desired stand density early in stand development would yield larger diameter trees and volume outputs much sooner. Furthermore, Graham et al. (2019)

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noted that several precommercial thinnings over the course of the 48-year study to maintain the density treatments did not produce commercial material at the time of thinning. Therefore, Graham et al. (2019) suggested that one precommercial thinning to the desired tree density and basal area for a future stand of 10-inch d.b.h. trees (table 1 in Myers 1967) would produce diameters and volumes that would produce sawtimber-sized material in an even-aged silvicultural system.

The desire to maintain an active timber industry while managing for a resilient and sustainable landscape will require management options that help mitigate the potential for high mortality rates through density management. While the high levels of standing live ponderosa pine volumes in the 1980s to 2000s provided the ability to sustainably harvest over 150,000 CCF/yr, the last 20 years have demonstrated that maintaining such volumes can lead to high tree mortality. Furthermore, as a changing climate manifests its impacts in the Black Hills region, adaptation strategies to limit mortality and enhance forest resiliency are warranted. Competition for moisture in the semi-arid Black Hills ponderosa pine forests is likely to increase, especially in higher density stands and during periods of severe drought (Bottero et al. 2017; Gleason et al. 2017). Stands grown at lower stand densities were shown to sustain growth and recover from drought quicker than higher stand densities in the Black Hills Experimental Forest long-term thinning plots (Bottero et al. 2017). Stand density management can reduce tree drought stress and result in reduced tree mortality levels (Graham et al. 2016; Negrón et al. 2008; Schmid et al. 2007), especially if applied across the landscape (Negrón et al. 2017). Furthermore, a reduction in stand density can reduce fire severity during wildfires (Lentile et al. 2006) and aid in the ability to use prescribed fire as a maintenance tool (Battaglia et al. 2008).

Both mechanical thinning and prescribed fire are warranted to produce a resilient landscape that results in a heterogeneous mix of BHNf forest structural stages and densities, while also producing timber products. Much of the ponderosa pine research in the Black Hills has focused on the volume and resiliency outcomes of even-aged silvicultural systems. The limited research in multi-aged ponderosa pine stands in the Black Hills have shown that mean wood production efficiency was not different from those observed in even-aged stands (Ex and Smith 2013; O'Hara and Nagel 2006); however, more research is needed to understand the tradeoffs of multi-aged silviculture (Ex and Smith 2013; Jain et al. 2014; Palik et al. 2020). Depending on the frequency of management activities and the number and juxtaposition of trees left, a wide variety of stand structures, tree sizes, and timber volumes can be produced while also increasing resiliency to disturbances (Battaglia et al. 2008; Ex and Smith 2013; Graham et al. 2019; Jain et al. 2014; Negrón et al. 2008; Negrón et al. 2017).

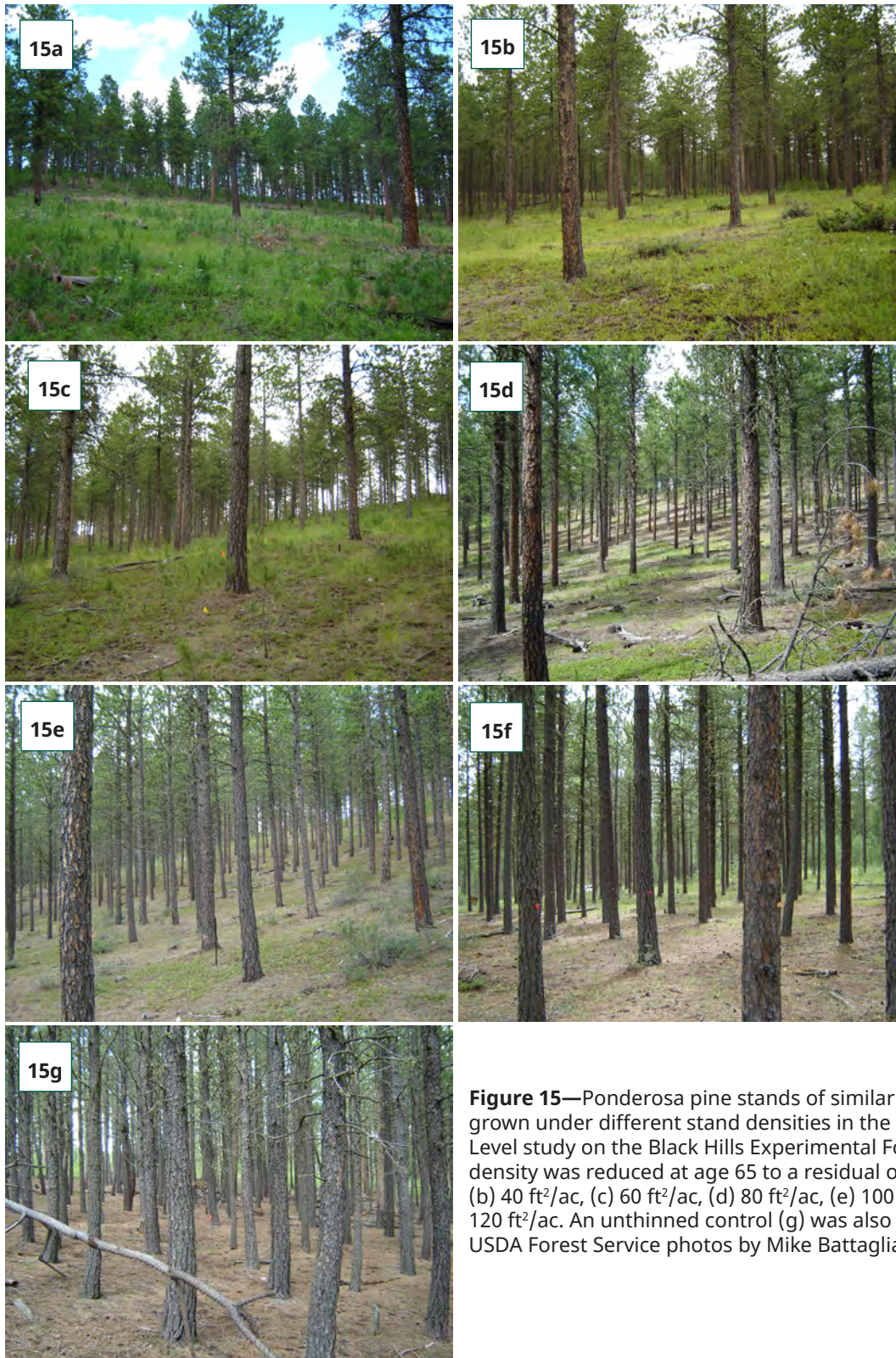


**Figure 15**—Ponderosa pine stands of similar age that were grown under different stand densities in the Growing Stock Level study on the Black Hills Experimental Forest. Stand density was reduced at age 65 to a residual of (a) 20 ft<sup>2</sup>/ac, (b) 40 ft<sup>2</sup>/ac, (c) 60 ft<sup>2</sup>/ac, (d) 80 ft<sup>2</sup>/ac, (e) 100 ft<sup>2</sup>/ac, and (f) 120 ft<sup>2</sup>/ac. An unthinned control (g) was also established. USDA Forest Service photos by Mike Battaglia.

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A diversity of silvicultural systems could be applied on the BHNF depending on the management objectives. Shepperd and Battaglia (2002) discuss different regeneration methods including even-aged, uneven-aged, and hybrid silvicultural systems with their benefits and applicability on the BHNF. Strict even-aged systems include clearcuts, shelterwoods, and seed tree regeneration methods. Uneven-aged systems included individual tree and group selection. Hybrid systems are not strictly even-aged or uneven-aged but rather they create and maintain two to three storied stands comprised of trees of two or three distinct age classes. In addition, the entire BHNF does not need to only focus on one silvicultural system, but possibly a diversity of silvicultural systems may be applied across the entire Forest. There are nuances associated with each of these methods and each method needs to be placed within the context of the disturbances and management objectives.

## Conclusion

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Over the past two decades, multiple disturbances have changed the landscape of the Black Hills. There is strong interest in developing management options to maintain a sustainable timber industry while honoring the USFS mission of “sustaining the health, diversity, and productivity of the Nation’s forests and grasslands to meet the needs of present and future generations” (USDA 2020a). Our analysis suggested that the current standing live sawtimber volume does not support the current harvest level of 181,000 CCF/yr identified in the BHNF Plan. This creates unique challenges, because some time is needed for net growth and net change to become positive for standing live inventory to increase to levels that allow for sustainable harvests while also considering other resources. Furthermore, consideration of future climate and disturbances are needed to account for potential increases in mortality. Taking these factors into consideration, our results indicated that sawtimber harvest levels of 72,400 to 90,500 CCF/yr appear to meet sustainability when only the available timber resource within the suitable timberlands is considered without including other resource needs.

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## Appendix A: Land Area

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The Black Hills National Forest administers approximately 1.2 million acres across western South Dakota and northeastern Wyoming of which approximately 1.1 million acres are considered forested. However, not all that land is considered available and suitable for timber production. Lands administered by the Black Hills National Forest are categorized in several different ways and within these categorizations different management activities are approved (USDA FS 2005). Within the Forest Plan, management areas are defined by the management practices allowed and the types of resource and use opportunities that are offered to the public. Lands are also classified by suitability for timber production (i.e., suitable timber base or suitable timberlands), which is used to determine the allowable sale quantity (ASQ) of timber. Suitability is determined through an analysis of the economic and environmental factors.

Total lands within the Black Hills National Forest are separated by non-Forest Service lands embedded within the National Forest boundary, non-forested lands, and administratively withdrawn lands. Some of these management areas are administratively withdrawn from the suitable timberlands such as wilderness and research natural areas. Other areas are withdrawn from the suitable timberlands due to unstable soils, accessibility, and areas that cannot be restocked within 5 years. The remaining forested lands are categorized as tentatively suitable timberlands. Tentatively suitable timberlands are then partitioned based on other classifications. For example, management areas defined in the Forest Plan that emphasize other objectives (i.e. wildlife habitat, late-successional landscapes, riparian, Spearfish Canyon and developed recreation sites) are removed from the suitable timberlands. In addition, areas that are not commercially viable due to low productivity, steep slopes, and accessibility are also removed from the suitable timberlands. While timber harvesting may be allowed in these management areas to meet specific recreational, wildlife, or forest structural objectives and reduce susceptibility to insects, the volume from these activities do not contribute to the ASQ.

Direct comparison of acreage from the Black Hills National Forest and FIA is challenging due to differences in how area is calculated, sampling intensity, timing of inventory, and classification protocols (USDA FS 2020b). Of the 1.2 million acres that the Black Hills National Forest administers, approximately 865,890 acres are identified as suitable and available for timber harvest in the Forest Plan Phase II Amendment (USDA FS 2005, Appendix G-3). The suitable and available acres have decreased since then due to expansion of wilderness, land exchanges, and designation of a research natural area. The 2015 FS Veg layer indicated 824,240 acres were in the Black Hills National Forest suitable timberlands.

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For this analysis, the USDA Forest Service, Forest Inventory and Analysis Program (USDA FS 2021) identified and analyzed 765,734 acres of suitable timberland: the subset of the suitable and available acres that are forestland that is producing or is capable of producing 20 cubic feet per acre per year of industrial wood in natural stands and not withdrawn from timber utilization by statute or administrative regulation. The difference here is predominately due to non-forested areas which were included within the Black Hills National Forest suitable timberlands but that do not meet the FIA definition of timberland (USDA FS 2020b).

## Appendix B: Expanded Graphs From Figure 13

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To facilitate a closer look at the long-term outcomes of the different scenarios shown in figure 13, we have separated the figures by growth rate.

## Growth Rate 2.33%

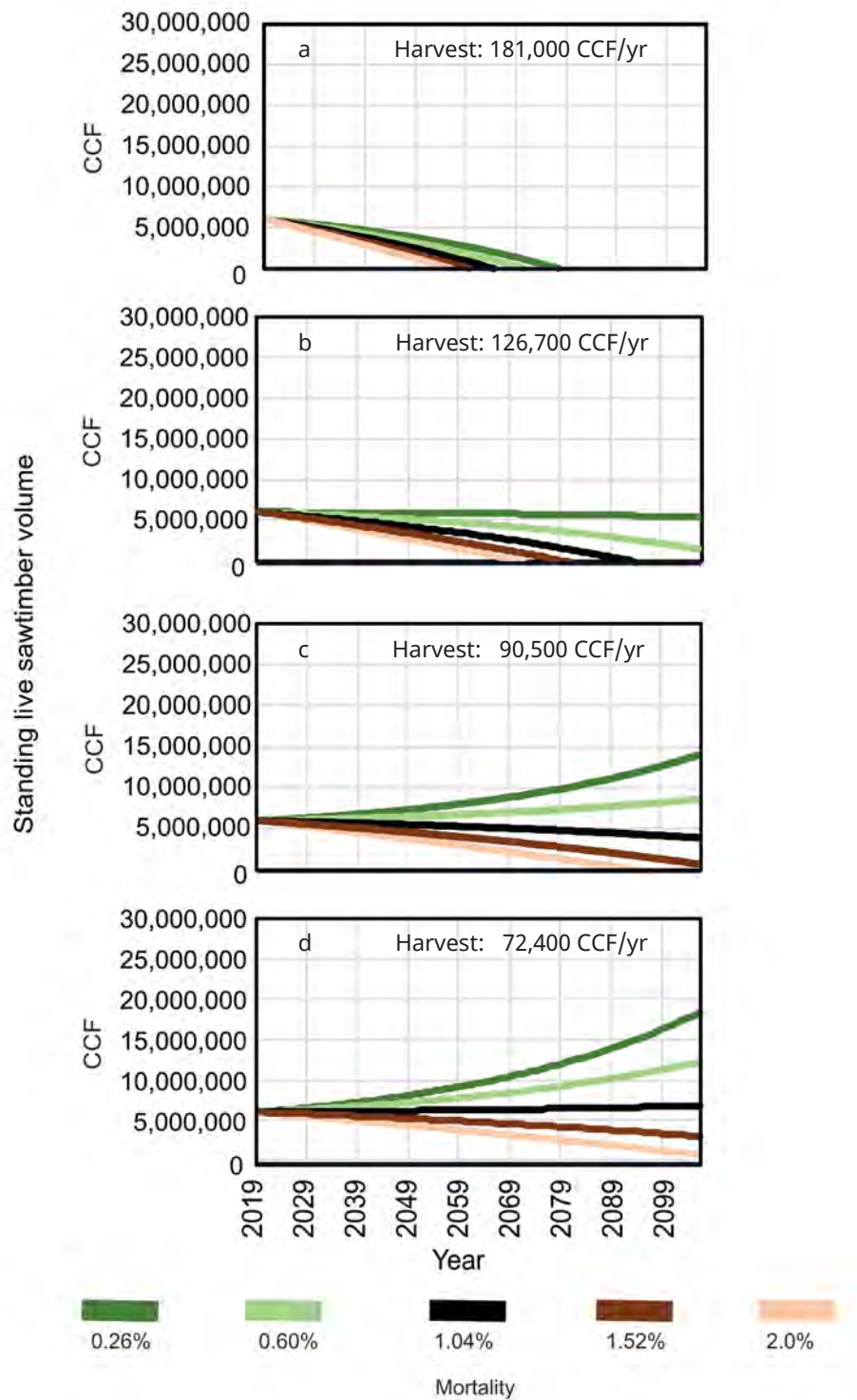


**Figure B.1**—Long-term (80 years) outcomes when growth rates are 2.33% and harvest levels are (a) 181,000 CCF/yr, (b) 126,700 CCF/yr, (c) 90,500 CCF/yr, and (d) 72,400 CCF/yr using five mortality rates.

## Growth Rate 2.54%

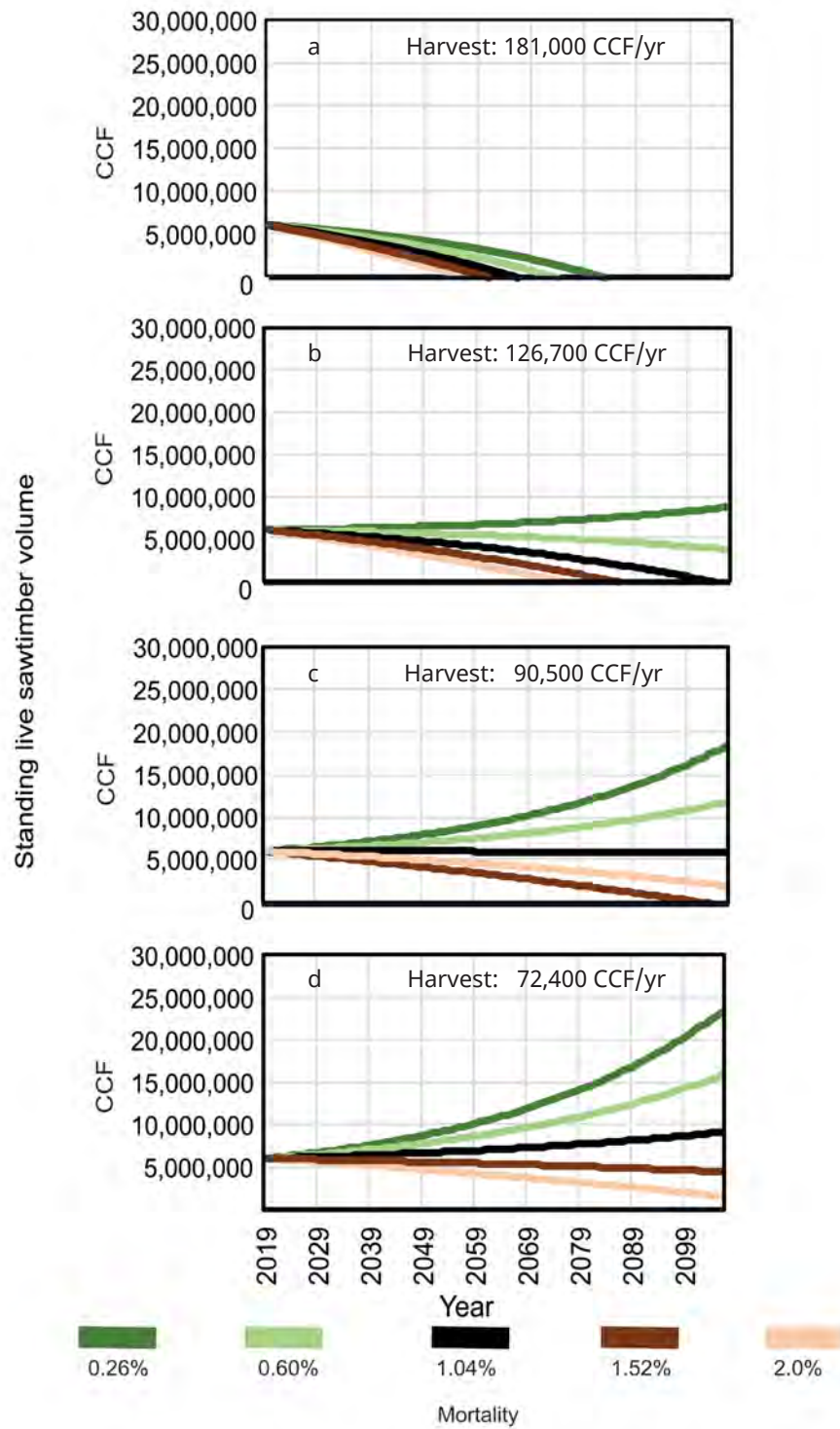


**Figure B.2**—Long-term (80 years) outcomes when growth rates are 2.54% and harvest levels are (a) 181,000 CCF/yr, (b) 126,700 CCF/yr, (c) 90,500 CCF/yr, and (d) 72,400 CCF/yr using five mortality rates.

## Growth Rate 2.73%

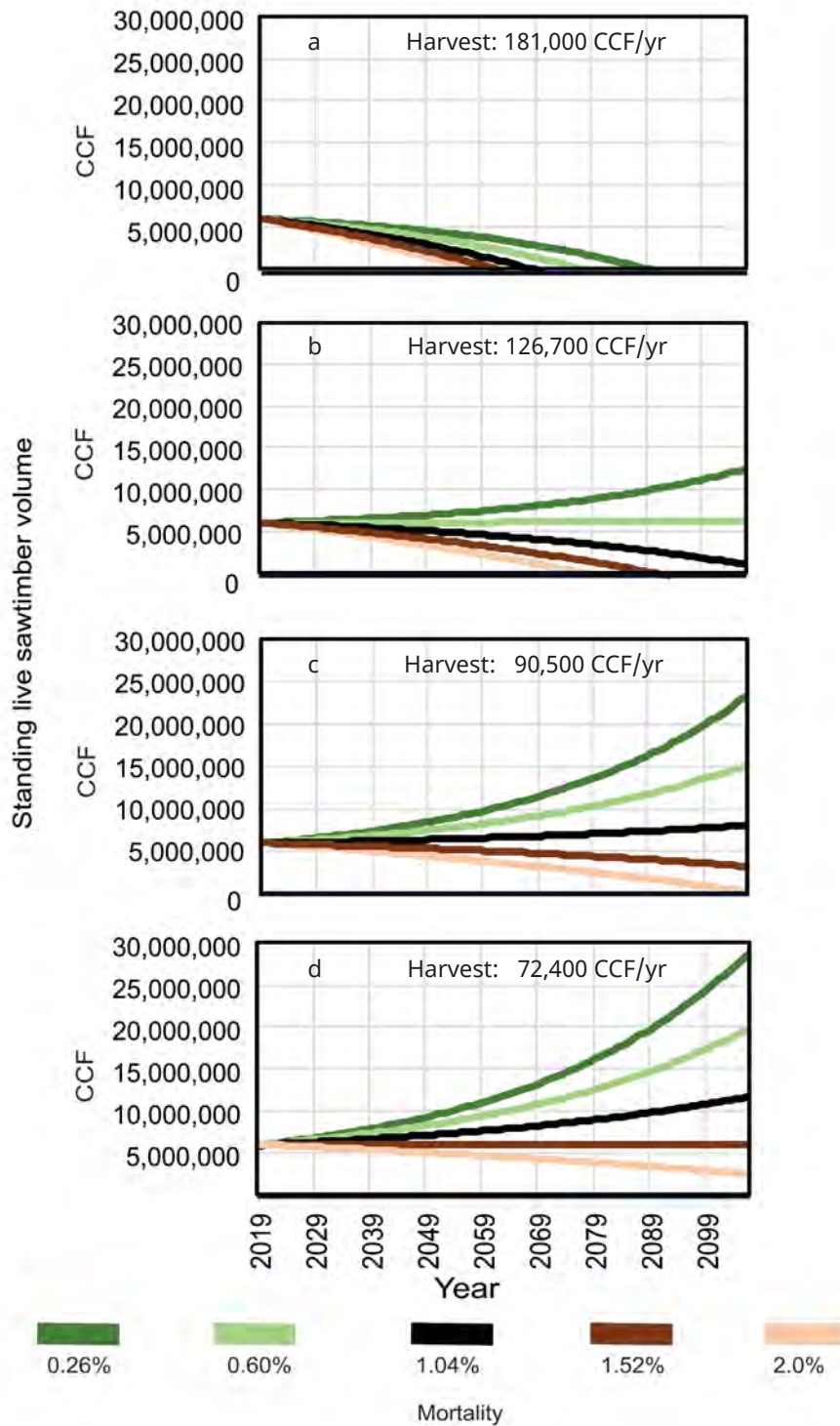


**Figure B.3**—Long-term (80 years) outcomes when growth rates are 2.73% and harvest levels are (a) 181,000 CCF/yr, (b) 126,700 CCF/yr, (c) 90,500 CCF/yr, (d) 72,400 CCF/yr using five mortality rates.

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February 16, 2021

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**RE: Request for Meeting to Discuss Unsustainable Logging  
on the Black Hills National Forest**

Dear Regional Forester Angel and Deputy Regional Forester Buchanan,

For the past decade, Forest Service data has demonstrated that timber sales on the Black Hills National Forest are exceeding the sustainable level of harvest, in violation of laws and Forest Service policy. We request a meeting with you as soon as possible to discuss this critical problem, and to learn how the Forest Service intends to bring logging levels on the Forest into compliance with law and sound management policies.

Since the time the Black Hills National Forest (BHNF) Land Resource Management Plan was finalized in 1997, conditions there have changed significantly due to over-harvesting, beetle epidemics, and fires. The outdated Forest Plan and its Allowable Sale Quantity are no longer valid.

The agency has known for some time that the Black Hills timber program is not being managed for long-term sustained yield. Ten months ago, the draft General Technical Report (GTR): *Timber Growth and Yield on the Black Hills National Forest: A Changing Forest* was released. The Abstract for this Report states:

“To meet the current allowable sale quantity (ASQ) of 181,000 CCF as described in the BHNF Plan, a standing live sawtimber volume of approximately 12 million CCF would be required. However, current standing live sawtimber volume is approximately 5.9 million CCF.”

In other words, due to past over-harvesting and other factors, there are not enough trees left on the Forest to meet the forest plan’s ASQ. And the GTR did not even account for many constraints that would preclude harvesting of the 5.9 million CCF of standing trees it did identify.

This finding did not come as a surprise to the agency. Indeed, a study released back in 2013, entitled *Forests of the Black Hills National Forest 2011 Resource Bulletin NRS-83*, provided information that mortality and harvest levels were exceeding the growth on the Forest. The bulletin calculated the net growth-to-removals ratio of ponderosa pine growing stock on timberland. Any number below 1.0 means timber removal outpaced forest growth, indicating an

unsustainable harvest level. The 2011 Bulletin — based on data that is now a decade old — showed that the net growth-to-removals ratio of ponderosa pine was 0.88 and was unsustainable at that point. Subsequent to that Bulletin, and prior to the release of the draft GTR, the Forest Service Forest Inventory and Analysis group (FIA) produced reports titled Forests of South Dakota in 2013, 2014, 2015, 2016 and 2017 that showed the net growth-to-removals ratio was below 1.0 and steadily decreasing, meaning harvest levels were moving farther from sustained-yield, not in the direction required by law.

The reports for 2018 and 2019 failed to provide net growth to removal ratios. However, the 2018 report stated the following: “In 2018, the average annual mortality of net volume was 60.2 million cubic feet per year. This was almost equivalent to the average annual gross growth volume on forest land (60.8 million cubic feet per year). This results in a net growth estimate of 0.6 million cubic feet per year. So, according to the 2018 inventory, mortality is consuming nearly all accumulated gross growth on live trees. When removals [i.e., timber sales] are factored in, the result is a negative net change in the remaining live-tree inventory volume.” In addition, the 2018 report stated the annual change was minus 22 million cubic feet and the average annual net growth was minus 10,140 thousand cubic feet. This clearly indicates the inventory of the Forest was in a depletion condition, with timber sales responsible for the deficit.

The report for 2019 contained even more alarming results: the annual net change was minus 29 million cubic feet. Despite all the information indicating the Forest timber program was in an unsustainable situation, the high annual timber targets continued and no adjustments were made.

In September 2020, the Black Hills Supervisor’s Office gave a recommendation (exhibited below) to the Black Hills National Forest Advisory Board timber sustainability working group that 62,250 ccf would be a sustainable sales volume. And yet, despite that and all the aforementioned information indicating ongoing unsustainable logging levels, your office set a target of 181,000 ccf (175,000 ponderosa pine + 6,000 CCF spruce), nearly three times the level recommended by the Forest. This level is plainly not sustainable long-term and ignores nearly a decade of the agency’s own data.

Federal law and Forest Service policy mandate that logging occur in a sustainable manner on each National Forest. The Black Hills National Forest’s excessive logging levels violate these mandates, casting aside responsible stewardship and putting recreational, wildlife, and most other values of the forest in jeopardy. As timber sales target large trees and ignore dense, young stands, the Forest’s approach is contributing to increasing wildfire risk and beetle epidemics in the future. A continuation of non-sustainable logging will result in a crash of the local timber industry and permanent loss of jobs. This will have long-term consequences not only for local communities; it will also irreparably harm this Forest’s unique flora and fauna.

To comply with law and science, the Forest Service must promptly rescale the Black Hills timber program to ensure that all on-going and future logging will only occur at sustainable levels. The Forest Service should also revise the outdated forest plan as soon as possible. We believe that delays in these actions, including holdups in the release of the final GTR, have been going on too long, and we are concerned this may be deliberate. We therefore request the FY21 sales volume

be adjusted downward immediately to reflect the reality that conditions have changed significantly on this Forest.

We also request a meeting (via video conference) to discuss the Forest Service's data, and how the Rocky Mountain Regional Office can ensure that the Black Hills National Forest will meet its obligations to ensure that logging outputs do not exceed levels that can be sustained in perpetuity — in harmony with all other uses of the Forest — without impairment of the productivity of the land. 16 U.S.C. § 531. In addition, we are requesting a list of steps your office is taking to resolve this urgent problem, along with a timetable for implementation.

Please contact Ted Zukoski: [tzukoski@biologicaldiversity.org](mailto:tzukoski@biologicaldiversity.org) (303) 641-3149 or Bob Burns: [robert.burns.sd@gmail.com](mailto:robert.burns.sd@gmail.com) (605) 390-6037 to schedule the meeting.

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RECOMMENDATIONS TO THE NATIONAL FOREST ADVISORY BOARD TIMBER  
SUSTAINABILITY PROPOSAL  
Black Hills National Forest

September 9, 2020

SUMMARY

Recommendations and supporting rationale are presented in response to the National Forest Advisory Board sustainability working group proposal presented at the September 3, 2020 meeting.

Recommendations:

1. **Sustained yield calculations:** Apply 5,995,428 CCF in Year 1. Apply 163,682 CCF for the Year 1 actual timber program level.
2. **Sustainability:** Consider mortality and gross growth rates that are realistic for long time periods.
3. **Mortality Rates:** Select a mortality rate within the range of 0.5% - 1.0%.
4. **Gross Growth Rates:** Select a gross growth rate within the range of 2.51% and 2.88%.
5. **Net Annual Growth:**
  - Adjust net annual growth for volume that occurs in structural stages (SS) that are not available for harvest per the forest plan structural stage distribution.
  - Adjust volume based on treatment options (intermediate - thinning vs. regeneration treatments) that are consistent with the forest plan structural stage distribution.
  - Growth into the SS 4 classes will increase available net annual growth. This should be evaluated for a 20 year period to be consistent with land and resource management planning (Forest Plan revision).

These recommendations are based on the best available information and are subject to revision upon review of new information including the final version of Timber Growth and Yield in the Black Hills National Forest: A Changing Forest (Graham et al. 2020), new inventory data, or additional supplemental information for existing inventory data by the Forest Inventory and Analysis (FIA), Northern Research Station.

DISCUSSION

**1. Standing Inventory** (Ponderosa pine sawtimber in the suitable timber base)

*Recommendation: Sustained Yield Calculations should apply 5,995,428 CCF in year 1 (2019). Apply the final sawtimber harvest of 163,682 CCF, actual ponderosa pine sold.*

Calculating the standing inventory for ponderosa pine sawtimber by applying FIA CCF/acre factors by structural stage to the total area in Management Areas 4.1, 5.1, 5.4, 5.43, and 5.6 (FSVeg) is not valid. The total area (870,829 acres) for these Management Areas includes 106,089 acres classified as unsuitable for timber harvest. The standing inventory on unsuitable acres is not included in sustained yield calculations.

## **2. How to Apply Sustainability**

*Recommendation: Consider mortality and gross growth rates that are realistic for long time periods.*

Sustained yield calculations incorporate growth and mortality rates that are realistic for an entire rotation (the period between regeneration establishment and final removal). The intent of these calculations is to estimate the sustainable volume that could be removed in perpetuity. Consider rates that account for disturbance cycles such as bark beetle endemic and epidemic levels and trends in forest conditions that would affect gross growth rates such as changes to landscape scale relative density and structural stage distributions. A recommendation based on long term cycles and trends will avoid harvesting a disproportionate amount of the total volume during the initial years of the next forest plan, i.e. "front loading".

## **3. Mortality Rates (MR)**

*Recommendation: Select a mortality rate within the range of 0.5% - 1.0%.*

A MR of 0.4% does not account for the trend of increasing weather and wildfire related mortality rates in available inventory data (see Mortality Rate by Cause Summary, Black Hills National Forest, August 3, 2020).

It is reasonable to assume that future mortality, due to weather and fire only, will be greater than 0.40% (0.44%, 2011 FIA inventory, SD only, and 0.47%, 2017-2019 FIA augmented Inventory) and fall within 0.5% and 1.0%. MR doubling periods for pinus species in the interior west were estimated to be 29 years by van Mantgem et al. (2009). Future increases in insect related mortality should also be considered.

Graham et al. (Timber Growth and Yield in the Black Hills Nation Forest: A Changing Forest, Draft 1, March 2020) consider a mortality rate estimate of 1.04% conservative and representative of a long-term mortality trend of trees killed in the Black Hills.

## **3. Gross Growth Rate (GGR)**

*Recommendation: Select a gross growth rate within the range of 2.5% and 2.88%.*

This range is consistent with the recommendation by Graham et al. and recent and historical inventories for which GGRs for sawtimber can be derived. Recent and historical inventories were assessed by timberland and not the forest suitable base for consistency.

Graham et al. recommended a 2.5% GGR (from the 2017-2019 FIA augmented inventory):

"we found no mathematically way to justify a gross growth rate to use in our scenarios. Therefore we felt an annual growth rate of 2.5% would readily reflect what may occur in the future and is well exemplified in the FIA data."

The 2.88% (See Table 1) represents the highest GGR for ponderosa pine sawtimber on national forest timberlands that can be derived from FIA data. The GGRs of 3.19% (softwoods) observed by Collins and Green (1988) and the 2.33% for ponderosa pine (FIA augmented inventory 2017-2019) were considered outliers.

A GGR closer to the upper end of this range may be warranted due to the predominantly open condition of the forest (low relative density in the area classified as structural stage 4A). Similar to mortality rates, GGRs applied to sustain yield calculations should be realistic for long time periods.

The higher rate of 3.06% in the September 3 NFAB Recommendation is not consistent with the latest findings by the Northern Research Station, Forest Inventory & Analysis (FIA Responses to "Review of the Black Hills National Forest 2017-2019 Augmented FIA Inventory Results" Report, September 2, 2020, responses to Concerns 10, 13 & 14, pages 7-8, 9-11):

- There is no pronounced relationship between mean annual increment and re-measurement period upon comparison of 3-9 years re-measurement periods.
- The gross growth rate derived from the 2017-2019 augmented FIA inventory of 2.51% is based on different sample points, different stratifications than GGRs derived from the recent public 2019 FIA data.
- A 3% rate computed from on-line public data is based on older observations and ignored the "augmented" data set.

#### **4. Net Annual Growth**

*Recommendations:*

1. *Adjust net annual growth for volume that occurs in structural stages that are not available for harvest per the forest plan structural stage distribution.*
2. *Adjust volume based on treatment options (intermediate - thinning vs. regeneration treatments) that are consistent with the forest plan structural stage distribution.*

(The forest can produce these calculations per various mortality and gross growth rate scenarios upon request)

The current land management and resource direction for the Black Hills National Forest, the 1997 Phase Revision Phase II Amendment (USDA Forest Service 2005), was completed under the 1982 Planning Rule. The next forest plan revision effort will be guided by the 2012 planning rule. Both planning rules require that considerations such as management direction, desired future conditions, and fiscal capacity be considered during the development of sustainable timber programs but at different stages in the process.

The net annual growth scenarios presented in Graham et al. (2020) represent sustained yield calculations for ponderosa pine sawtimber in the suitable timber base (lands classified as suitable and available for timber production) that do not incorporate management direction and desired conditions. Addition steps are required to determine sustainable program levels that do factor in forest plan desired conditions and other plan direction, similar to how the PTSQ and PWSQ are estimated under the 2012 planning rule.

#### Available - Unavailable Volume

Annual Net Growth (ANG = gross growth – mortality) in structural stages (SS) that are not available for harvest per Forest Plan direction must be subtracted from projected timber sale program quantities. For example:

- SS 4A - ANG in standing inventory in the total area that meets the 25% LMRP objective is reserved and not available for inclusion in annual timber program levels.

- SS 4B - the total area equal to or less than the 25% LMRP objective may be treated but only through silvicultural treatments that maintain the existing SS (minimum canopy closure of 40%). The total SS 4B area is currently deficit (19.8%).
- SS 4C - the current surplus of 5% may be considered for harvest that changes the existing SS but would require direction that supersedes the Black Hills Resilient Landscapes (BHRL) Record of Decision. This surplus has been reserved for growth into SS 5 - Old Growth. Stands classified as SS 4C may be treated but only through silvicultural treatments that maintain the existing SS. Silvicultural treatments that maintain a canopy closure of 70% would be thinnings from below that remove a limited amount of standing inventory.
- SS 4B & SS4C - Fuels reduction treatments authorized by the BHRL decision would not occur on a substantial footprint that would alter timber program calculations in a meaningful scale.

The NFAB Timber Sustainability Recommendation presented on September 3, 2020, does not adjust net annual growth per the forest plan SS objectives. This recommendation incorporates a MR of 0.40% and a GGR of 3.06%. Following attainment of forest plan SS objectives in classes 3 and 4, available ANG would be significantly less than proposed program levels. This scenario does not reserve 5% for growth into SS 5 in any SS class.

| SS | Forest Plan Obj. | Acres after Time | %    | Proposed CCF/Year, Years 8-10 | Comments                                                                                        | Available CCF/Year |
|----|------------------|------------------|------|-------------------------------|-------------------------------------------------------------------------------------------------|--------------------|
| 1  | 5%               | 71,563           | 8%   | 4,000                         | Uneconomical for commercial timber sales                                                        | 0                  |
| 2  | 5%               | 50,785           | 6%   | 5,500                         | Uneconomical for commercial timber sales                                                        | 0                  |
| 3a | 10%              | 87,083           | 10%  | 10,000                        | Limited sawtimber, marginal for commercial timber sales                                         | 10,000             |
| 3b | 15%              | 130,624          | 15%  | 5,500                         | Limited sawtimber, marginal for commercial timber sales                                         | 5,500              |
| 3c | 5%               | 43,541           | 5%   | 6,000                         | Limited sawtimber, marginal for commercial timber sales                                         | 6,000              |
| 4a | 25%              | 217,707          | 25%  | 48,000                        | Growth is on reserved trees, SS4C area is at forest plan objective level                        | 0                  |
| 4b | 25%              | 217,016          | 25%  | 67,000                        | Treatments can't modify structure stage. Only 50% of annual net growth is available for harvest | 33,500             |
| 4c | 5%               | 43,541           | 5%   | 29,000                        | Treatments can't modify structure stage. Only 25% of annual net growth is available for harvest | 7,250              |
| 5  | 5%               | 4,804            | 1%   | 175,000                       |                                                                                                 | 0                  |
|    |                  | 866,664          | 100% |                               |                                                                                                 | 62,250             |

#### Growth into SS4 from SS3

*Recommendation: Growth into the SS 4 classes will increase available net annual growth. This should be evaluated for a 20 year period to be consistent with land and resource management planning (Forest Plan revision).*

(The forest can produce these calculations per various mortality and gross growth rate scenarios upon request)

- Growth into SS4 classes should be calculated separately from sustained yield calculations.
- During a 20 year period only trees in the 6.0 - 8.9 inches dbh would grow into the sawtimber size class.
- Available volume in new surplus SS4A would be in small sawtimber size classes only.

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Table 1a. Gross growth rates for timberlands on national forest lands in South Dakota.

| Report / Inventory             | Area          | Size Class | Species        | Units | Gross Growth | Net Growth | Mortality | Inventory | Gross Growth Rate | Sources                   |
|--------------------------------|---------------|------------|----------------|-------|--------------|------------|-----------|-----------|-------------------|---------------------------|
| 1 - Choate & Spencer Jr., 1969 | Timber - land | Saw        | Soft-woods     | MBF   | 72,460       | 67,986     | 4,474     | 2,687,000 | 2.70%             | Tables 11, 19, 21         |
| 2 - Collins and Green, 1988    | Timber - land | Saw        | Soft-woods     | MBF   | 149,796      | 134,378    | 15,418    | 4,690,700 | 3.19%             | Tables 10, 14, 15         |
| 3 – Delander, 2002             | n/a           |            |                |       |              |            |           |           |                   |                           |
| 4 - Walters et al. 2011        | n/a           |            |                |       |              |            |           |           |                   |                           |
| USDA FIA 2011                  | Timber - land | Saw        | Ponderosa Pine | CCF   | 247,903      |            |           | 8,599,015 | 2.88%             | Validator output - NRS    |
| USDA FIA 2019                  | Timber - land | Saw        | Ponderosa Pine | CCF   | 195,822      |            |           | 6,828,769 | 2.87%             | Validator output - Public |
| USDA FIA 2019                  | Timber - land | Saw        | Ponderosa Pine | CCF   | 151,479      |            |           | 6,510,552 | 2.33%             | Validator - custom, BKNF  |

Table 1b. Available sampling intensity and sampling errors related to gross growth rates for timberlands on national forest lands in South Dakota.

| Report / Inventory                      | # Plots - Inventory | Sampling Error - Inventory, 68% Confidence Interval | # Plots - Growth | Sampling Error - Growth, 68% Confidence Interval |
|-----------------------------------------|---------------------|-----------------------------------------------------|------------------|--------------------------------------------------|
| 1 - Choate & Spencer Jr., 1969          | Unavailable         |                                                     |                  |                                                  |
| 2 - Collins and Green, 1988             | Unavailable         |                                                     |                  |                                                  |
| 3 – Delander, 2002                      | Unavailable         |                                                     |                  |                                                  |
| 4 - Walters et al. 2011                 | Unavailable         |                                                     |                  |                                                  |
| USDA Forest Inventory and Analysis 2011 | 153                 | 6.37%                                               | 155              | 7.46%                                            |
| USDA Forest Inventory and Analysis 2019 | 287                 | 5.33%                                               | 152              | 7.72%                                            |
| USDA Forest Inventory and Analysis 2019 | 290                 | 5.81%                                               | 152              | 9.42%                                            |

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May 17, 2021

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**Re: Follow-up on May 5, 2021 Meeting Concerning Black Hills National Forest**

Regional Forester Beum and Ms. Sloan:

Thank you for meeting via video conference May 6 to discuss our concerns regarding management of the Black Hills National Forest in light of best available science showing that current levels of logging on the Forest are unsustainable. We want to summarize our concerns and provide you with additional information you requested during the meeting.

**The Forest Service Must Act Immediately to Reduce Logging Levels.** In March, the Rocky Mountain Research Station issued its final report, GTR-422, concluding unequivocally that maintaining current logging levels on the Black Hills National Forest (BHNF) “is not a sustainable option.” GTR-422 at ii. This best available science requires an urgent response because logging levels set by the current Forest Plan are not only destructive but illegal under the National Forest Management Act (NFMA).

We appreciate the Forest Service’s commitment to initiating a (long overdue) forest plan revision, and look forward to engaging in that process when it begins this summer. Such revisions, however, can take years to complete; some plan revisions commenced a decade ago are still not final. Continuing with status quo logging levels on the Black Hills during planning would only deepen the deficit of mature trees, prejudicing forest values and future harvest levels, and violating NFMA. The first rule of holes is when you find yourself in one, stop digging.

Given the dire situation, we urge the Forest Service to act as quickly as possible to reduce logging levels on the Black Hills. Despite the issuance of the draft GTR in March 2020, which reached the same conclusion as the final, the Region in late 2020 approved logging levels for fiscal year 2021 of 181,000 hundred cubic feet (CCF), a level that best available science makes clear is not sustainable. While the final GTR states that “harvest levels of 72,400 and 90,500 CCF/yr appear to be sustainable if all suitable timberlands are available for harvest” (GTR-422 at ii), those levels are based on a false assumption that inflates the potential sustainable logging level. Not all mature trees on suitable lands are available for harvest because the current forest plan’s standards and guidelines limit logging on such lands to protect wildlife, meet objectives for vegetation structural stage distributions, provide protections for riparian areas and plant and wildlife habitat, etc. In light of this best available science, the Forest Service must promptly reduce logging levels to well below those recommended by the GTR as sustainable, ensuring that the annual timber sale volume addresses the need to comply with Forest Plan protections, and provides a cushion to ensure that the forest can increase growth and recover.

In limiting logging to a sustainable level, we request that the Forest Service make transparent those factors it relies upon so the public can understand how the agency concluded that the new level is indeed sustainable. We understand from our meeting that the Forest Service is considering whether and how to reduce logging levels, but that the agency is not prepared to say whether or when it will take any action. Again, we urge the Forest Service to reduce logging to sustainable levels as swiftly as possible.

**The Forest Service Must Act Promptly to Comply with NEPA for Timber Sales.** NEPA regulations require that agencies “shall” prepare supplements to final EISs “if a major Federal action remains to occur, and ... [t]here are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts.” 40 C.F.R. § 1502.9(d)(1) (2020). Forest Service directives echo this mandate. *See* Forest Service Handbook 1909.15, Ch. 18.

On the Black Hills, the Forest Service this year continues to approve timber sales pursuant to decisions based on prior NEPA analysis, including the 2018 Black Hills Resilient Landscapes (BHRL) project decision and the 2012 Mountain Pine Beetle Response project decision. The need to reduce logging levels consistent with the data and recommendations of GTR-422 represents significant new information that is highly relevant to each project’s environmental impacts. It has bearing on whether and how these projects can be sustainably implemented. The Forest Service therefore must prepare supplement NEPA analyses so that the agency and the public can understand whether these projects can continue in light of the new information, and if so, how the projects should be modified. We intend to provide more detailed discussion of this issue shortly.

We understand from our conversation with you that the Forest Service is reviewing this issue but has no timeline for a decision.

**The Forest Service Must Ensure Robust Disclosure and Accountability.** Because unsustainable logging has already damaged the forest, and additional logging has the potential to cause more damage, it is critical that the Forest Service understand and disclose the volume and impacts of proposed and ongoing timber sales. As the GTR stated: “Continuous monitoring and flexibility to adjust harvest levels based on realized mortality rates is crucial if long-term timber sustainability is to continue.” GTR-422 at 38.

In recent years, however, the Forest Service has failed to publish any required monitoring data. We thus request that the Forest Service:

- Publish at the beginning of each fiscal year, or as close to the start of each fiscal year as possible, a schedule of timber sales proposed for that year, including the volume, location, and NEPA compliance document on which the Forest intends to rely. More than seven months into FY 2021, the Black Hills National Forest has still failed to share such a schedule.
- Resume the completion and publication of five-year and annual Forest Plan monitoring reports. The most recent “annual” report available on the Black Hills [webpage](#) was prepared for fiscal years 2013 and 2014; the most recent five-year report covers the years

between 2007 and 2012. The Black Hills NF has failed to complete monitoring at the time it matters most.

- Resume the completion and publication of annual monitoring reports for the Mountain Pine Beetle Response Project, as required by that project’s [Record of Decision](#) (at pages 7, 20, 26). While the Black Hills NF continues to implement the project, the last published annual monitoring report covers fiscal years 2016-2017. See Mountain Pine Beetle Response [project page](#) at the “Post-Decision” tab.
- Begin annual monitoring, and resume collaborative monitoring, required by the BHRL Record of Decision. The [BHRL ROD](#) (at page 20) stated that “[t]he BHNF will prepare an annual project monitoring report” concerning the project, and publish that report online. No such report is available on the BHRL project page, though project implementation began three years ago. Further, the Forest should comply with directives from the Regional Forester’s office concerning collaborative monitoring for the BHRL project. This monitoring information was supposed to “help inform the need for any future project modifications.” Response to BHRL Objectors, May 30, 2018. See also [BHRL ROD](#) at page 5 (noting that Objection Decision required the Black Hills NF to “[a]dd an element of collaborative multiparty monitoring to the decision”). To our knowledge, the Black Hills NF has had only one meeting in the field to engage the interested public in such monitoring.

Further, the Black Hills NF appears to be having difficulty finding volume to meet the unsustainable timber target without damaging other values of this forest. We have found examples where timber sale design does not comport with the actions the environmental analysis evaluated and the Forest approved, in apparent violation of NEPA.

For example, the [Shack timber sale](#) on the Mystic Ranger District, for which bidding closes on May 26, relies on EISs for the Pactola Project Area (completed 2011) and the BHRL project EIS, completed in 2018. The sale includes:

- a unit analyzed in the [Pactola Project Area](#) specified as requiring helicopter/cable logging has been laid out and advertised as an adverse skid unit, which will result in a significant increase in harm to soils and vegetation, and increase the potential for the spread of noxious weeds.
- temporary road construction in units where such construction was not disclosed in either relevant NEPA document.
- commercial thinning and overstory removal in stands analyzed for pre-commercial thinning in the Pactola Project Area EIS and not marked as potential treatment areas or wildland urban interface in the BHRL EIS.

We provide, attached, additional examples involving four timber sales to be sold *in the next 2-3 weeks* that contain hundreds of acres within units where cutting was never analyzed or authorized, or that approve treatments differing from those disclosed, in the relevant NEPA document.

The Forest Service must commit to ensuring accountability to the public and honoring NEPA. We request that the Forest Service halt these specific sales until the agency investigates these potential NEPA violations, and either drops the non-conforming units or prepares supplemental NEPA analysis with opportunities for public review and comment. The agency should also review each of these sales to determine whether they should be postponed or modified to comport with the new information about non-sustainable timber harvesting on the BHNF.

**The Forest Service Must Prevent the Irretrievable Commitment of Resources While it Revises the Forest Plan.** It is critical that the Forest Service not irreversibly commit resources by allowing unsustainable logging during forest plan revision. Aggressive and unsustainable logging levels could result in irretrievable commitment of resources, such as the extirpation of a species due to lost habitat. For example, the genetically distinct subspecies of black-backed woodpecker that lives only in the Black Hills requires large patches of very high snag basal area, with several dozen or more large snags per acre. If dense, mature stands are targeted by commercial thinning or shelterwood cutting projects, the basal area can become too low to provide suitable habitat even if most of the trees in such stands are killed by fire or mountain pine beetle.

Further, excessive logging could so alter Forest conditions that alternatives the public may recommend or the Forest Service consider initially would be rendered unfeasible during the time it takes to revise the plan. For example, Forest Service direction governing recreational opportunity spectrum (ROS) classes of Semi Primitive Non-Motorized or Semi Primitive Motorized, requires areas to meet criteria regarding size, remoteness, and limited evidence of human-caused disturbance. Damage from unsustainable logging and the road construction during forest plan revision could make areas ineligible for such ROS designations.

We urge the Forest Service to ensure that it identifies and monitors forest resources at risk from logging over the next few years, and protects those resources going forward to preserve the opportunity to plan for them.

**The Forest Service Must Undertake Government-to-Government Consultation with Impacted Indian Tribes.** The Black Hills National Forest is the traditional homeland of the Lakota (Sioux) people. Congress purported to eject the Sioux tribes from the Black Hills through the Indian Appropriations Act of 1876, an act which the Supreme Court has held amounted to an unconstitutional taking of Tribal land. *See United States v. Sioux Nation of Indians*, 448 U.S. 371 (1980) (concluding that Congress had improperly taken the Black Hills without just compensation).

The excessive and damaging logging on the Black Hills National Forest is of particular concern to the Oglala Sioux Tribe. We therefore urge the Forest Service to take special care to undertake its responsibilities to engage in government-to-government consultation with the Oglala Sioux Tribe (and other impacted Tribes) concerning not only the Forest Plan revision but any interim measures addressing unsustainable logging of the Forest.

**The Forest Service Should Consider Adopting Recommendations in the Sustainability Study.** The agency's creation of a non-sustainable timber program on the BHNH is now resulting in job losses in the timber industry, and the longer the agency delays bringing the harvest to a sustainable level, the greater the number of jobs that will be lost over the long-term.

The GTR notes that there is an overabundance of dense, young stands of dog-hair ponderosa pine in some areas, and that these "[e]xcessively dense stands decrease individual tree growth rate, preventing them from reaching a merchantable tree size." GTR-422 at 40. Such dense stands are also at risk of wildfire that could kill most of the stand. The GTR suggests that prescribed fire, mastication, and thinning of smaller ponderosa pine can reduce tree density and increase resilience to wildfire. While such treatments may not produce sawtimber immediately, they can aid forest growth over the long-term, with a chance to reverse the current deficit on the Forest. Such a result would be good news for the forest, for wildlife (if due care is exercised to protect sensitive and rare wildlife), and for the logging industry over the long term. If the Black Hills National Forest continues to focus on saw timber, this will result in greater overall job losses without providing alternate forestry employment opportunities for the people qualified in this field who could be re-tasked to complete some of the needed pre-commercial thinning in pine understory or younger stands.

**Invitation to Site Visit.** This beloved landscape deserves better management than it has had in the past. The next few years will be critical to ensuring that the Forest recovers from over-logging. This is why it is so critical for the Forest Service to act now – before a Forest Plan revision is complete – to reduce logging to sustainable levels.

To help you get a better feel for the Forest, we invite you and other relevant Rocky Mountain Region staff to join us on the Black Hills. We'd like to show you the consequences of past logging as well as areas that deserve protection from unsustainable logging. If you'd like to arrange a field visit with us, please contact Mary Zimmerman or Dave Mertz, whose contact information is below.

Again, thank you for your time. We look forward to working with you to ensure improved management for the Black Hills.

Sincerely,

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June 16, 2021

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**Re: The Forest Service Must Undertake Supplemental Environmental Review of the Black Hills Resilient Landscapes Project and Cease Implementation of the Mountain Pine Beetle Response Project.**

Supervisor Tomac:

The National Environmental Policy Act (NEPA) requires the U.S. Forest Service to undertake supplemental environmental analysis when an agency changes its action or when significant new information about an ongoing action's environmental effects comes to light.

General Technical Report GTR-422 prepared by the Forest Service's Rocky Mountain Research Station concluded unequivocally that maintaining current logging levels on the Black Hills National Forest Plan "is not a sustainable option." This represents significant new information concerning the volume of timber that can be legally harvested from the BHNF on a sustainable basis.

The law thus requires that the Black Hills National Forest prepare such supplemental analysis for two of its major ongoing actions: the Black Hills Resilient Landscapes (BHRL) and Mountain Pine Beetle Response (MPBR) projects (although, as discussed below, it appears no legal basis remains to implement the latter project). The same supplementation obligations also apply to all other pending logging projects on the forests. We therefore formally request that the Forest Service prepare the required supplemental analyses as soon as possible to ensure that all pending timber harvesting on the BHNF complies with the law and does not contribute to additional unsustainable logging.

Further, our review of timber sales implemented under the BHRL decision revealed the Forest Service has regularly sold timber outside areas analyzed and authorized as potential Commercial Treatment Areas, in violation of the BHRL decision. Because this conduct effectively modifies the BHRL decision and poses impacts that were not properly studied and disclosed in the original NEPA documentation, the agency must reevaluate all pending harvesting authorized under BHRL and suspend logging found to be outside of areas authorized for potential commercial harvesting under the original decision.

Finally, the MPBR project was authorized under Section 102(a)(4) of the Healthy Forest Restoration Act to respond to a beetle epidemic. However, the epidemic ended in 2016. Therefore the Forest Service should not, and legally cannot, approve future sales under the project. At the very least, the Forest Service must offer a valid legal basis explaining how it can continue to authorize sales under the MPBR analysis and Section 102(a)(4) of HFRA. If the agency can provide such a basis, and if it intends to continue to offer sales pursuant to the MPBR

project, it should prepare supplemental NEPA analysis and authorization, given that the original project purpose and need of responding to the beetle epidemic no longer applies.

We understand that the Forest Service is considering whether and how to address the significant new information in GTR-422 via a supplemental NEPA analysis. We write to underscore that a supplemental analysis is necessary and required by law, and to urge the Forest Service to undertake a full supplemental EIS with opportunities for public involvement and comment, and Tribal consultation, whatever the scope of future activities under BHRL, MPBR, or other projects.

The Forest Service is charged with managing the Black Hills NF for, and on behalf of, the American people. The agency's decisions to log outside of potential Commercial Treatment Areas at BHRL, and to continue logging under the MPBR decision long after the beetle epidemic has ended, would appear to ignore the agency's own decisions and commitments to the public. Admitting the agency's errors, and disclosing the consequences of those errors via supplemental NEPA analysis, would represent an important step towards restoring public trust in the Forest Service.

#### **I. New Information Reveals the BHNF Timber Program is Not Sustainable.**

In February 2020, the Rocky Mountain Research Station issued a draft report concerning the sustainability of the Black Hills NF timber program under the existing Forest Plan. The draft study concluded that the "current live ponderosa pine sawtimber volume of 5,995,428 CCF will not support an ASQ of 181,000 CCF as identified in the BHNF Plan." Forest Service Rocky Mountain Research Station, Timber Growth and Yield in the Black Hills National Forest (Feb. 2020) at 27, available at

<https://www.fs.usda.gov/rmrs/sites/default/files/documents/1.%20Review%20Draft%20Black%20Hills%20Timber%20Growth%20and%20Yield.pdf> (last viewed June 16, 2021).

In September 2020, and based on the draft report, the Black Hills Supervisor's Office provided a recommendation to the Black Hills National Forest Advisory Board timber sustainability working group that 62,250 CCF could be sustainably logged in the coming year. Black Hills NF, Recommendations to the National Forest Advisory Board, Timber Sustainability Proposal (Sep. 9, 2020).<sup>1</sup> The Rocky Mountain Regional Office declined to heed the draft report and the Black Hills NF's recommendations, setting a logging target for 2021 at an unsustainable 181,000 CCF (175,000 CCF ponderosa pine + 6,000 CCF spruce), nearly three times the level recommended by the Supervisor's Office to ensure sustained yield.

In March 2021, the Rocky Mountain Research Station issued its final general technical report (GTR), entitled "A Scenario-Based Assessment to Inform Sustainable Ponderosa Pine Timber Harvest on the Black Hills National Forest." See RMRS-GTR-422, [https://www.fs.fed.us/rm/pubs\\_series/rmrs/gtr/rmrs\\_gtr422.pdf](https://www.fs.fed.us/rm/pubs_series/rmrs/gtr/rmrs_gtr422.pdf) (last viewed June 16, 2021). The report's abstract summarizes the results:

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<sup>1</sup> We note that September 2020 report assumed higher tree growth rates and lower mortality rates than the final GTR found credible.

Since 2000, the Black Hills National Forest (BHNF) has experienced several disturbances that have reduced standing live sawtimber volume which will affect future harvest levels. To evaluate options concerning the future timber management program, we conducted a quantitative analysis to determine how mortality from these disturbances and potential growth rates will impact short-, mid-, and long-term sustainable sawtimber harvest levels of ponderosa pine .... In 2019, there was 5,995,428 CCF (hundreds of cubic feet) standing live ponderosa pine sawtimber within the suitable timberlands. *The current harvest level in the BHNF Forest Plan of 181,000 CCF/yr is not a sustainable option.* Over the next several decades, if mortality rates stay below 1.04%, harvest levels of 72,400 and 90,500 CCF/yr appear to be sustainable *if all suitable timberlands are available for harvest.* History shows that allowing the forest to recover after large disturbances provides opportunities to adjust future harvest levels. Also, tending of young forests can promote recovery and produce sawtimber volume more quickly.

GTR-422 at ii (emphasis added).

This study represents the best science on the maximum logging level the BHNF could sustain if the Forest were treated solely as a tree farm, that is, assuming “all suitable timberlands are available for harvest.” *Id.*; *see also id.* at 38 (same). Because many trees in the “suitable” timber base cannot be logged due to Forest Plan mandates for other resource needs, such as measures necessary to protect soils, watersheds, wildlife habitat, structural stage diversity, and visual quality, the GTR admittedly overestimates the volume of timber that can sustainably be logged. *See, e.g.*, GTR-422 at 38 (acknowledging that a significant deficit in several forest structural stages means that the “standing live sawtimber volume estimate of approximately 5.9 million cubic feet is not fully available for harvest.”).

## **II. NEPA Obligates the Forest Service to Supplement NEPA Analyses in Response to Significant New Information and Changes in the Proposed Action.**

Current NEPA regulations, revised in 2020, state that agencies “shall” prepare supplements to draft or final EISs

if a major Federal action remains to occur, and:

- (i) The agency makes substantial changes to the proposed action that are relevant to environmental concerns; or
- (ii) There are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts.

40 C.F.R. § 1502.9(d)(1) (2020). This provision is similar to that in the 1978 CEQ regulations, although it adds the language “if a major Federal action remains to occur.” That verbiage comports with federal courts’ interpretation of this provision.

The Supreme Court has long ruled that agencies must evaluate the need to prepare supplemental NEPA documents on the grounds that “[i]t would be incongruous with [NEPA’s] approach to environmental protection, and with the Act’s manifest concern with preventing uninformed

action, for the blinders to adverse environmental effects, once unequivocally removed, to be restored prior to the completion of agency action simply because the relevant proposal has received initial approval.” *Marsh v. Oregon Natural Resources Council*, 490 U.S. 360, 371 (1989).

Federal courts interpreted the 1978 regulations to apply to environmental assessments (EAs) as well as EISs. For example, the Ninth Circuit has stated that “NEPA requires supplementation of any NEPA analysis in response to ‘significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts.’” *Tri-Valley CAREs v. United States DOE*, 671 F.3d 1113, 1130 (9th Cir. 2012). District courts have followed this reasoning. See *Wildlands v. United States Forest Serv.*, 791 F. Supp. 2d 979, 993 (D. Or. 2011) (“[A] supplemental EA is required when there are ‘significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts.’ 40 C.F.R. §1502.9(c).”).

In line with this court precedent, the Forest Service NEPA Handbook 1909.15 applies the NEPA duty to prepare supplement documentation in light of new information to EISs and EAs. The Handbook requires that the Forest Service:

Review the environmental documentation of actions that are awaiting implementation and those of ongoing programs or projects at least every 3 to 5 years to determine if the environmental analysis and documentation should be corrected, supplemented, or revised.

Forest Service Handbook 1909.15, Ch. 18.03 (June 22, 2012), available at [https://www.fs.fed.us/im/directives/fsh/1909.15/wo\\_1909.15\\_10\\_Environmental%20Analysis.doc](https://www.fs.fed.us/im/directives/fsh/1909.15/wo_1909.15_10_Environmental%20Analysis.doc) (last viewed June 16, 2021).

Agency guidance sets out the steps that the Forest Service must take in evaluating new information, including, an interdisciplinary team review and the preparation of a supplemental information report (SIR) to evaluate the significance of the new information.

If new information or changed circumstances relating to the environmental impacts of a proposed action come to the attention of the responsible official after a decision has been made and prior to completion of the approved program or project, the responsible official must review the information carefully to determine its importance.

If, after an interdisciplinary review and consideration of new information within the context of the overall program or project, the responsible official determines that a correction, supplement, or revision to an environmental document is not necessary, implementation should continue.

Document the results of the interdisciplinary review in the appropriate program or project file. This documentation is sometimes called a supplemental information report (SIR) and should conclude with whether or not a correction, supplement, or revision is needed, and if not, the reasons why.

A SIR is not a NEPA document and therefore cannot be used to fulfill the requirements for a revised or supplemental EA or EIS. A SIR cannot repair deficiencies in the original environmental analysis or documentation, nor can it change a decision.

*Id.*, Ch. 18.1. “If the responsible official determines, based on evaluations described in section 18.1 [the SIR], that a supplement to or revision of an EIS is appropriate, issue a notice of intent to supplement or revise an EIS.” *Id.*, Ch. 18.2. The agency must also “[r]evise an EA if the interdisciplinary review of new information or changed circumstances indicates that changes in the EA are needed to address environmental concerns that have a bearing on the action or its impacts.” *Id.*, Ch. 18.4.

### **III. The Forest Service Must Prepare a Supplemental EIS for the Black Hills Resilient Landscapes Project.**

#### **Overview of the Black Hills Resilient Landscapes Project**

In July 2018, following preparation of an EIS, the Black Hills National Forest Supervisor approved the Black Hills Resilient Landscape (BHRL) project. See Final Record of Decision, Black Hills Resilient Landscapes Project (July 2018) (“BHRL ROD”), available at [https://www.fs.usda.gov/nfs/11558/www/nepa/103904\\_FSPLT3\\_4389333.pdf](https://www.fs.usda.gov/nfs/11558/www/nepa/103904_FSPLT3_4389333.pdf) (last viewed June 16, 2021). The agency’s stated purposes for the project were “to reduce hazards, move forest structure and composition toward objectives, and increase resilience to disturbance.” Final Environmental Impact Statement, Black Hills Resilient Landscapes Project (July 2018) (“BHRL Final EIS”) at 1, available at [https://www.fs.usda.gov/nfs/11558/www/nepa/103904\\_FSPLT3\\_4276956.pdf](https://www.fs.usda.gov/nfs/11558/www/nepa/103904_FSPLT3_4276956.pdf) (last viewed June 16, 2021). The Final EIS also states that “The Proposed Action would contribute toward achievement of Forest Plan goal 3 (‘Provide for sustained commodity uses in an environmentally acceptable manner’).” BHRL Final EIS at 65.

Among other things, the BHRL project approved the logging of 67.8 million cubic feet (678,000 CCF) of sawtimber. BHRL ROD at 12. The Final EIS assumed that this logging would occur over a period of up to 10 years, thus averaging at least 67,800 CCF per year. BHRL Final EIS at 174 (“Proposed activities would occur over the course of up to 10 years”); see also *id.* at 85, 98, 136, 203 (repeatedly noting that the year 2038 would be “10 years after [2028,] the probable completion of proposed activities”).

The ROD assumed that “the average annual long-term sustained yield” for the Black Hills NF is about 242,000 CCF, which purportedly “represents the maximum, biologically sustainable harvest level possible through perpetuity while considering the basic requirements in NFMA regulations. The average annual ASQ is set at 18.1 million cubic feet of sawtimber (181,000 ccf),” citing the Forest Plan. BHRL ROD at 12.

The ROD states that concerns about the deficit of standing inventory on the forest are unwarranted because that inventory will have no impact on the sustainability of continued logging:

the standing forest inventory is not relevant to the long-term sustained yield, especially in context of forest rotation ages. The long-term sustained yield *should not change substantially over time*, assuming no major changes in factors that affect biologic productivity, such as climate, soil conditions, etc.

BHRL ROD at 12 (emphasis added).

The BHRL ROD then dismisses as new information a 2018 Forest Service report concluding volume loss outpaced growth on the Forest on two grounds. First, the ROD asserted that the information is not new. “[T]he fact that timber harvest combined with volume loss due to mortality is exceeding growth is not new information. The agency was well aware that the spatial and temporal extent of the bark beetle epidemic combined with vegetation management activities would outpace growth.” BHRL ROD at 12.

Second, the ROD asserted that new information concerning forest loss outpacing growth on the forest demonstrated the need for more logging, assuming net growth outpaces loss.

[The 2018 report] suggests that *the trend toward negative net growth will likely reverse* as mountain pine beetle activity decreases, resulting in decreased mortality, and reinforces the purpose and need for the project to increase ecosystem resilience to insect infestation and other natural disturbances.

BHRL ROD at 13 (emphasis added).

The BHRL project’s Final EIS identifies and specifically defines 300,000 acres of “potential commercial treatment areas” (potential CTAs) within which certain types of treatments can occur. For example, the project approves “overstory removal” on up to 185,210 acres within PCTAs. BHRL Final EIS at 26 (“Overstory removal would occur on up to 185,210 acres within a defined 300,000-acre area (Figure 8);” Figure 8 displays “Potential Commercial Treatment Areas.”). Patch clearcuts would be limited to 2,000 acres within potential CTAs. *Id.* at 28. Commercial harvest via “uneven-aged management” would only occur within potential CTAs. *Id.* at 34. The EIS is based on these types of logging occurring within those areas and not outside them. The Rocky Mountain Region’s response to objections emphasized this point.

Proposed activities would occur on up to a maximum number of acres *within a larger, defined area*. These defined areas are displayed on maps (FEIS pp. 20, 22, 27, for example). During project implementation, Forest Service resource program managers and specialists would determine the most appropriate locations for activities *within the defined areas*. This determination would be based on site visits, priority needs, and desired spatial distribution of conditions across the project area, each management area, and individual watersheds (FEIS p. 17).

J. Buchanan, Rocky Mountain Region, Response to Norbeck Society Objection (May 30, 2018) at 3 (emphasis added), available at <https://data.ecosystem-management.org/objections/displayDoc.php?doc=V1dwS1MyTldjRmhVYWtKb1ZucHNNVmt6Y0hwTlZUVnhWVlJDVDFwNk1Eaz0=> (last viewed June 16, 2021). The FEIS maps of the “defined areas” display “Potential Fuel Treatment Areas,” “Potential Prescribed Fire Areas,” and “Potential Commercial Treatment Areas.” BHRL Final EIS at 20, 22, and 27.

The BHRL Record of Decision also declared that the agency’s “site-specific” analysis was limited to actions occurring within the “defined area” depicted on maps in the Final EIS.

My decision to select the Proposed Action, as modified, is a *site-specific one* (see *defined-area maps* and descriptions in FEIS chapter 2 and detailed maps available on the project web site). The selected alternative also includes flexibility to define treatment locations *within the defined areas*. The analysis of effects is based on site-specific data (see Information Sources sections in chapter 3 of the FEIS) and relevant, often locally conducted research and monitoring.

BHRL ROD at 4 (emphasis added).

The Black Hills National Forest has been implementing this project since 2018, and continues to implement it. For example, the Black Hills NF’s “Draft FY20 Schedule” indicated that 14 of the 21 timber sales that the Forest Service had sold or intended to sell that year relied on the BHRL EIS. Spreadsheet, Black Hills National Forest FY20 Schedule, attached as Ex. 1 (provided to Prairie Hills Audubon Society by Black Hills NF, July 2020). Many of these previously sold sales likely continue to be implemented. Four timber sales on which bidding was due to close during the eight-day period between May 24 and June 1, 2021 include the Shack sale, which relies in part on the BHRL EIS, and the Viper, Charlie SBA, and Mustang SBA sales, each of which relies solely on the BHRL EIS.

The Black Hills NF must prepare a supplemental environmental impact statement for the BHRL project, because both requirements of NEPA regulations are met: (1) there is major Federal action yet to occur; (2) there is “significant new ... information relevant to environmental concerns and bearing on the proposed action or its impact”, namely the GTR and revelations that the BBNF has been authorizing commercial harvesting outside the potential commercial treatment areas studied in the EIS and approved in the ROD.

### **The Need for a BHRL Supplemental EIS to Address the Sustained-Yield Problem**

The Forest Service anticipated the BHRL project would not be complete until 2028. BHRL Final EIS at 68. The Forest Service has not yet marked, designed, or sold all of the units contemplated under the project. The absence of a contract for contemplated actions demonstrates that there is major federal action yet to occur – namely, signing the contract.

In addition, some of the BHRL sales that are already under contract have not been completed. Because Forest Service regulations and standard logging contract provisions permit the agency to modify or terminate such a contract in order to, among other things, “prevent environmental degradation or resource damage,” there remains major federal action to occur *even under contracts already signed but for which logging has not yet been completed*. See 36 C.F.R. § 223.113 (“Timber sale contract, permits, and other such instruments may be modified to prevent environmental damage”); 36 C.F.R. § 223.116(a)(5) (Timber contract may be canceled when the Forest Service determines “that operations thereunder would result in serious environmental degradation or resource damage”).

Federal courts have repeatedly ruled that federal action has yet to occur, and thus that the Forest Service must evaluate significant new information, even after the Forest Service has signed a

logging contract. *Sierra Club v. Bosworth*, 465 F. Supp. 2d 931 (N.D. Cal. 2006) (rejecting argument that existence of a contract meant there was no federal action to occur); *Or. Natural Res. Council Action v. United States Forest Service*, 445 F. Supp. 2d 1211 (D. Or. 2006) (same); *Klamath-Siskiyou Wildlands Center v. United States Forest Service*, 2008 U.S. Dist. LEXIS 2645, 2008 WL 87762 (D. Or. Mar. 31, 2008) (same). Federal courts have also entered injunctions halting cutting on timber sales under contract where the plaintiff alleged that the agency failed to consider new information that arose after the contract was signed. *Greater Gila Biodiversity Project v. U.S. Forest Service*, 926 F. Supp. 914 (D. Ariz. 1994) (enjoining logging where contract itself approved five times more logging than proposed in NEPA review); *Cascadia Wildland. v. U.S. Forest Service*, 791 F. Supp. 2d 979, 984-94 (D. Or. 2011) (enjoining logging under contract after new information concerned rare species came to light in the intervening years between issuance of the agency decision and project implementation).

GTR-422 also constitutes significant new information concerning the BHRL project's impacts. The BHRL Final EIS anticipated that the contractors would remove an average of *at least* 67,800 CCF of timber per year. This is close to the 72,400-90,500 CCF level that the GTR considered sustainable, assuming (erroneously) that all suitable timber lands were available for harvest. Thus the true, legally sustainable timber harvest is less than 72,400 CCF/year. The BHRL Final EIS's disclosure of the project's impacts, and the duration of those impacts across the Forest, is based on false assumptions about how much timber can be sustainably logged and at what rate. Even if the Forest Service believed the BHRL sales collectively would not exceed a sustainable harvest level, there are other sales which, combined with the BHRL sales are resulting in non-sustainable harvest levels. For this reason, the agency must closely examine the cumulative effects of all recent, ongoing and planned timber harvesting on sustained yield.

GTR-422 further constitutes significant new information concerning the BHRL project because the Record of Decision was based on a number of false assumptions that the GTR exposed. The BHRL ROD, at 12, assumed that sustainable logging was not an issue because "[t]he long-term sustained yield *should not change substantially over time.*" Emphasis added. The GTR demonstrates this assumption was incorrect.

Even without factoring in restrictions on logging from Forest Plan standards and guidelines, the general requirement that logging only remove trees that have reached the "culmination of mean annual increment" (CMAI), structural stage objectives and other resource protection requirements, the GTR reveals the sustainable harvest level may be less than half the allowable sale quantity set in the Forest Plan. The GTR reveals the Black Hills inventory of trees has been reduced by more than 60% over the last two decades – from more than 15 million CCF in 1999 to just under 6 million CCF today. GTR-422 at 24 (Table 4); *id.* at ii. Any action that authorizes logging of ponderosa pine trees before they have reached their culmination of mean annual increment (CMAI) – defined as "[t]he point at which a tree or stand achieves its greatest average growth," BHNH Forest Plan at G-15 – will lengthen the time it will take for the Forest to increase and grow its inventory to overcome its massive deficit of standing trees. Intentionally cutting trees prior to CMAI will thus exacerbate the Forest's growth and inventory issues. The BHRL project permits contractors to remove trees before they reach CMAI in at least two situations. See BHRL Final EIS at 66. New information concerning the collapse of the forest inventory requires the Forest Service to revisit any use of CMAI exceptions in the BHRL project.

The BHRL ROD was also based on an assumption that “the trend toward negative net growth will likely reverse as mountain pine beetle activity decreases.” BHRL ROD at 13. The GTR demonstrates this assumption was also erroneous. Data contained in the GTR shows that the standing inventory of live trees in CCF continued to fall after the beetle epidemic ended. *See* GTR at 24, Table 4 (showing the standing live inventory (in CCF) of timber on the Black Hills continuing to drop precipitously in 2017 and 2019). Note that the level of harvest in 2019 (the first full year in which BHRL was implemented) amounted to more than 99% of all gross growth on the forest; and that was before accounting for natural mortality which caused net growth to be strongly negative. *See id.*

The GTR further shows that the BHRL project is unlikely to meet at least part of the project’s purpose and need. The BHRL Final EIS, at 1, stated that the project aims to “increase resilience to disturbance.” A logging project that, by itself, will occur at levels likely to drive the forest further from sustainability cannot “increase resilience.” Likewise, the Black Hills NF is unlikely to be able to move towards structural stage objectives with the BHRL project when Forest continues to log some of the largest remaining trees with other projects (including the Mountain Pine Beetle Project, as discussed below).

The GTR also indicates that the BHRL project will fail to meet another project goal – as well as a Forest Plan provision – namely that the project and the Plan will “[p]rovide for sustained commodity uses in an environmentally acceptable manner.” BHRL Final EIS at 65 (quoting Forest Plan goal 3). *See also* BHNF Forest Plan (2006) at I-12; *id.* at I-13 (“In keeping with this direction, the Black Hills National Forest will be managed to emphasize long-term sustainable production of commodities for economies, communities and people in an environmentally acceptable manner”). But the GTR shows that the logging levels predicted to occur under BHRL would likely exceed sustainable levels, violating both the project goal and the forest plan.

The GTR further recommends a variety of potential management changes that may be necessary to address the overharvesting and growth deficit GTR-422 at 39-44. The GTR alone appears to have been sufficient to provoke the Forest Service to announce that it will begin a Forest Plan revision to modify management of the entire forest. It would make little sense for the Forest Service to conclude the entire management scheme on the Black Hills must change but that the massive, multi-year BHRL timber sale program that may outlive the current, admittedly outdated plan must continue without any additional analysis or modification.

In sum, the GTR provides significant new information relevant to environmental concerns and bearing on the BHRL project and its impacts. The Forest Service therefore must prepare a supplemental EIS on the BHRL project.

### **Non-Compliant / Unanalyzed Harvesting Authorized under the BHRL Decision**

The Forest Service has apparently authorized, and continues to authorize, commercial harvesting under the BHRL ROD without ensuring the cutting is confined to potential Commercial Treatment Areas (CTAs). For example, we provided an analysis last month to the BHNF and the Rocky Mountain Region demonstrating that four timber sales for which bidding was to close late May and early June appeared to approve outside of areas analyzed and approved for logging under the BHRL project. *See* Analysis of current timber sales on the Black Hill National Forest

and their relationship to poor public accountability and overlogging (May 12, 2021), attached as Ex. 2. We understand from Regional Office staff that the Forest Service has put those four sales on hold pending review of the information we provided to determine whether to modify the projects to comply with the BHRL analysis and ROD or to prepare supplemental NEPA analysis. We appreciate the Forest Service's actions.

Additional analysis of a sampling of timber sales sold by the Black Hills NF in 2018, 2019, and 2020 revealed numerous sales with cutting units falling entirely or partially outside of potential CTAs. See Additional analysis of timber sales from the Black Hills Resilient Landscapes Project (BHRL) on the Black Hill National Forest (June 2021), attached as Ex. 3. Our analysis shows cutting units covering more than 5,000 acres are either partially or completely outside potential CTAs identified in the BHRL Final EIS.

Such commercial harvesting was *never analyzed or approved for logging by the BHRL EIS*, which, as noted above, limited logging to "defined areas" and purported to undertake a "site-specific" analysis of logging within those defined areas. We do not know the reasons for this never-analyzed logging. It may represent the fact the Black Hills NF has sought out additional timber volume to satisfy demand for wood products over and above what could be found within potential CTAs. If so, it would exacerbate the same unsustainable logging identified by the GTR. It may represent that the BHRL EIS's "site specific" analysis failed to accurately determine the nature of forests stands within the potential CTAs. Whatever the reason, this conduct directly conflicts with the Black Hills NF's analysis and decision, in violation of law.

The Forest Service may argue the BHRL ROD gives the agency discretion to conduct treatments outside of the potential CTAs identified and studied in the BHRL EIS, but such an interpretation is at odds with the language of the BHRL Final EIS, the Region's objection decisions, and the ROD. Further, if that position were correct — if the BHRL ROD allowed commercial harvesting anywhere within the project boundaries — there would have been no need to name any areas "potential Commercial Treatment Areas" because *every* area would be subject to potential commercial treatment. Members of the public who reviewed the EIS and ROD were led to believe by the Forest Service's words that commercial harvesting would only occur within potential Commercial Treatment Areas. We therefore urge the agency to evaluate all ongoing, pending, and proposed commercial harvesting under BHRL to ensure all such harvesting is restricted to the CTAs approved in the ROD. Should the agency desire to authorize cutting outside the BHRL CTAs, it will, through preparation of a supplemental EIS, have the option to evaluate the impacts, consider alternatives and decide whether such harvesting should be approved in light of the sustained yield requirements and other legal obligations to protect forest resources.

The Black Hills NF must also disclose the impacts of the never-analyzed logging outside potential CTAs from *completed* BHRL sales because that logging resulted in a project that differs substantially from the activities analyzed in the BHRL EIS and authorized under the ROD. The information is also necessary to understand the cumulative impacts of the unauthorized BHRL logging in addition to that authorized by the project. The Forest Service's failure to implement the BHRL project as proposed is further new information requiring preparation of supplemental NEPA analysis because it has resulted in environmental impacts

never analyzed by the agency, or it represents a “substantial change[] to the proposed action that [is] relevant to environmental concerns.” 40 C.F.R. § 1502.9(d)(1).

#### **IV. The Forest Service Must Cease Approving Sales under the Mountain Pine Beetle Response Project (MPBR).**

In December 2012, following the preparation of an environmental impact statement, the Black Hills National Forest Supervisor approved the Mountain Pine Beetle Response Project. Record of Decision, Mountain Pine Beetle Response Project (Dec. 2012) (“MPBR ROD”), available at [https://www.fs.usda.gov/nfs/11558/www/nepa/81228\\_FSPLT2\\_291923.pdf](https://www.fs.usda.gov/nfs/11558/www/nepa/81228_FSPLT2_291923.pdf) (last viewed June 16, 2021). The ROD selected modified Alternative C, which proposed to cut more than a one million CCF of sawtimber in five to seven years, or about 140,000 CCF-200,000 CCF per year. MPBR ROD at 14; *see also id.* at 10, 13. The project’s purposes included the need to “reduce the threat to ecosystem components, including forest resources, from the *existing* insect and disease (mountain pine beetle) *epidemic* and help protect local communities and resources from large scale, severe wildfire.” *Id.* at 5 (emphasis added).

The Forest Service prepared the MPBR EIS under the authority of the Healthy Forests Restoration Act (HFRA). The HFRA permits the Forest Service to expedite hazardous fuel reductions via limited NEPA compliance on specific types of National Forest land, including Federal land on which ... the existence of an epidemic of disease or insects, ... poses a significant threat to an ecosystem component, or forest or rangeland resource, on the Federal land or adjacent non-Federal land.” 16 U.S.C. § 6512(a)(4); *see also* MPBR FEIS at 24 (citing same). HFRA’s provisions permit the Forest Service to eliminate from review reasonable alternatives that NEPA would otherwise require review, and require a shortened period for the public to file objections, and provide for limited judicial review. *See* 16 U.S.C. §§ 6514(c) & (d) (authorizing Forest Service to limit consideration of alternatives to action, no action, and one other); *id.* § 6515 (mandating the Forest Service establish a pre-decisional administrative review process for HFRA projects); *id.* § 6516 (limiting judicial review); 36 C.F.R. § 218.32(a) (setting 30-day period for filing of objections, shorter than the 45-day period established in 36 C.F.R. § 218.26(a) for non-HFRA projects).

When it invoked the HFRA’s authority for the Mountain Pine Beetle Response project, the Forest Service explained:

The MPBR Project is an authorized hazardous fuel reduction project under Section 102(a)(4) of the Healthy Forests Restoration Act of 2003. The area qualifies under section 102(a)(4) because there is an ***existing*** mountain pine beetle ***epidemic*** occurring within and adjacent to the project area which ***poses a significant risk*** to resource values on National Forest and private lands (see Determination of Insect Epidemic letter in Appendix D).

MPBR Final EIS at 24 (emphasis added). *See also* C. Bobzien, Determination of an Insect Epidemic in the MPB Response Project (Aug. 22, 2011), in MPBR Final EIS, Appx. D at 2 (“I conclude that there is a mountain pine beetle epidemic in the MPB Response Project area that meets Section 102(a)(4) of HFRA.... Therefore, I support using the authority provided in the

Healthy Forests Restoration Act to address this epidemic in the Mountain Pine Beetle Response Project.”). The Forest Service explained the purpose of the project as follows:

The focus of the actions proposed would treat **recently infested** MPB trees on portions of approximately 242,000 acres of ‘High Risk ’stands on National Forest System lands in South Dakota and Wyoming **to reduce and slow the spread of MPB to reduce the threat to ecosystem components**, including forest resources, from the **existing** insect and disease (mountain pine beetle) **epidemic** and reduce the potential for severe large-scale wildfire.

MPBR Final EIS at iv (emphasis added).

The MPBR Record of Decision further made clear that the project could avail itself of the HFRA’s provision if an epidemic was ongoing: “The Forest Service interprets Title I, Sec. 102(a)(4) as authorizing treatments when two conditions exist: 1) there is an epidemic on federal land, and 2) the epidemic poses a significant threat to an ecosystem component or forest or rangeland resource on federal land.”

Pursuant to the HFRA, the Forest Service declined to consider numerous alternatives, limiting those considered in full to no action, the proposed action, and one other alternative. *See* MPBR Final EIS at 46-48. “The FEIS disclosed seven alternatives that were considered, but eliminated from detail study per the HFRA.” Pine Beetle ROD at 28, *citing* 16 U.S.C. § 6514(c)(1)(C). The Forest Service also limited the objection period to 30 days. Pine Beetle ROD at 7.

As of October 2017, the last date by which the Forest Service published data in a monitoring report, the Forest Service states that the agency had sold about 263,000 CCF as part of the project. Black Hills NF, Mountain Pine Beetle Response Project, Monitoring Report, FY 2016 and 2017 at 3 (“Pine Beetle Monitoring 2016-17”), available at [https://www.fs.usda.gov/nfs/11558/www/nepa/81228\\_FSPLT3\\_4273675.pdf](https://www.fs.usda.gov/nfs/11558/www/nepa/81228_FSPLT3_4273675.pdf) (last viewed June 16, 2021). “The FY2018 timber sale schedule is planning for new PBR [Pine Beetle Response] timber sales on approximately 15,954 acres for 114,877 ccf. Sales sold in FY2018 will likely be completed by 2023.” *Id.* Thus, if the Forest Service met its FY 2018 projections, the ROD would allow an additional 600,000 CCF to be cut after FY 2018, despite the fact that the EIS estimated that all project logging would be completed by December 2019.

The project includes an “adaptive management” project to enable the agency to respond to changing conditions. The ROD explains:

A key feature of learning and adaptive management is to **incorporate new science or new considerations**, as appropriate, where compatible with the objectives and standards for this project. The required monitoring and reporting is included at the end of this section.

Adaptive Management is a decision process that promotes flexible decision making that can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood. Careful

monitoring of these outcomes both advances scientific understanding and helps adjust policies or operations as part of an iterative learning process.

....

The MPBR Response Project is an adaptive management project. Monitoring plays an important role in providing feedback on which design features were implemented, which were effective, and whether adaptations are needed to treatment design to make them more effective ....

MPBR ROD at 14, 20 (emphasis added). The ROD committed the Black Hills NF to preparing an annual monitoring report. *Id.* at 20 (“Effectiveness monitoring information would be evaluated and documented along with any recommended changes in The MPBR Project Implementation and Monitoring Report. The Annual project Monitoring Report will include findings on the effectiveness of treatments and conservation measures and recommendations for changes, if needed.”).

Despite the avowed importance of monitoring, the Forest Service has not published any annual monitoring data since the Fiscal Year 2016-2017 report. See Mountain Pine Beetle Response project page, “Post Decision” tab, available at <https://www.fs.usda.gov/project/?project=36775> (last viewed June 16, 2021).

The project would also target some of the largest trees on the forest – those with the greatest volume of wood – for the purpose of making older stands more resilient to beetle epidemics. The Final EIS states that: “[t]he areas with the greatest likelihood of experiencing the greatest amount of mechanized ground based harvest and cable timber harvest would be within 4B and 4C structural stage stands.” MPBR Final EIS (2012) at 92. See also *id.* at 122 (stands targeted for logging are “structural stage 3B/3C/4B/4C”). The Final EIS discloses that 27.8% of stands identified for logging are in structural stage 4C and 57.2% in structural stage 4B (totaling 178,000 acres), with the remaining 16% of logging (34,000 acres) in either structural stage 3B or 3C. *Id.* at 123. Neither the Final EIS nor the ROD address the sustainability of logging approved by the project.

The Forest Service issued a press release on March 31, 2017 declaring that 2016 surveys revealed that the beetle epidemic had ended. “The [aerial] surveys reveal the mountain pine beetle epidemic [on the Black Hills NF] is over and populations have returned to normal levels.” Black Hills NF, Press Release, Forestry Officials Release 2016 Forest Health Report (Mar. 31, 2017), available at <https://www.fs.usda.gov/detail/blackhills/news-events/?cid=FSEPRD537499> and <https://bit.ly/3pfVm1W> (both last viewed June 16, 2021).

Years after the end of the beetle epidemic, and years after the Forest Service predicted project logging would be complete, the Black Hills National Forest continues to authorize commercial timber harvesting under the Mountain Pine Beetle Response decision. For example, the Black Hills NF’s “Draft FY20 Schedule” identified three timber sales (Life Sale, Alice Sale, and Wonder Sale, all in the Bearlodge Ranger District) sold or likely to be sold in Fiscal Year 2020 that rely in whole or in part on the MPBR Final EIS. See Spreadsheet, Black Hills National Forest FY20 Schedule (Ex. 1). Implementation of these sales is likely ongoing. Further, Black

Hills NF staff stated in May 2021 that “As the FY21 schedule currently stands we have 6 sales that are using [tiering?] to PBR [Pine Beetle Response] decision to some extent.” Email of J. Word, Black Hills NF to N. Hilding, Prairie Hills Audubon Society (May 5, 2021), attached as Ex. 4.

***The End of the Mountain Pine Beetle Epidemic Requires the Forest Service to Cease Offering Timber Sales under the Mountain Pine Beetle Response Project.***

The Forest Service authorized logging under the MPBR project via the HFRA, utilizing that law’s provisions allowing the agency to circumvent normal NEPA requirements and objection deadlines. HFRA’s provisions expediting review are meant to permit the agency to address the “existence of an epidemic of disease or insects” which “poses a significant threat to an ecosystem component, or forest or rangeland resource.” 16 U.S.C. § 6512(a)(4). Because the Forest Service declared the epidemic over in March 2017, any logging pursuant to the MPBR project after March 2017 would appear unauthorized by HFRA and unjustified under the original project purpose and need. Further, the exclusion of alternatives based on HFRA’s provisions would appear unsupported for timber sales sold after the epidemic’s end.

In light of the end of the beetle epidemic, and the inapplicability of the HFRA resulting from that fact, *the Forest Service should cease any logging activity pursuant to the MPBR*. The Forest Service appears to have no legal basis for continuing such activity under that decision.

If the agency nonetheless intends to authorize additional logging under the MPBR project, the Forest Service must provide the public in writing a valid legal basis for doing so in light of the end of the beetle epidemic. If the agency can do so, it must prepare supplemental NEPA analysis to address the impacts of logging that will not play any role in addressing the past epidemic. Any new decision to authorize logging under the MPBR or HFRA should clearly disclose the evidence and rationale given that pine beetle levels have subsided and are no longer problematic.<sup>2</sup>

***The GTR Provides Significant New Information Relevant to Environmental Concerns and Bearing on the Mountain Pine Beetle Response Project and its Impacts.***

If the Forest Service intends to continue offering timber sales pursuant to the MPBR project, GTR-422 constitutes significant new information concerning the project’s impacts. The project

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<sup>2</sup> The purpose and need statements for the BHRL and MPBR projects appear to conflict with each other, providing a further basis for terminating the MPBR project. A primary purpose of the MPBR project was to mitigate the impacts of the beetle epidemic by heavily thinning 4B and 4C stands on the forest, resulting in additional 4A stands. The mountain pine beetle is currently at endemic levels and has been since 2017. The justification for thinning the 4B and 4C stands is thus no longer valid, particularly when 4B structural stage levels across the Forest are below objectives set in the current Forest Plan, and the small surplus of 4C stands is needed to eventually become woefully underrepresented structural stage 5 stands. It is therefore contradictory for the MBPR project to treat 4B and 4C stands with the goal of creating more 4A stands, while simultaneously undertaking sales for the BHRL project, whose goal is to reduce the prevalence of 4A stands.

proposed to cut more than a one million CCF of sawtimber in five to seven years, or approximately 140,000 CCF-200,000 CCF per year. The GTR recognizes that logging in response to pine beetles was a major contributing factor to the depletion of mature sawtimber on the forest that has led to a non-sustainable timber program.

Moreover, the MPBR project also proposed to log 178,000 acres of the largest trees on the Forest not identified as old growth (4B and 4C), thus targeting the trees with the largest volume, and eliminating options to provide future old growth. This strategy would exacerbate the loss of volume on the forest and thus take the Black Hill NF timber program farther from sustainability.

Even if the Forest Service could demonstrate some additional logging is appropriate under the MPBR project despite there being no remaining basis for claiming there is an “existing ... epidemic” of beetles on the forest (*see discussion below*), the NEPA and decision documentation for this project did not anticipate timber sales would continue to be conducted beyond 2020. The Forest Service should therefore supplement the EIS to provide appropriate evidence that such logging is necessary and will not contribute to unsustainable and unlawful logging on the BHNF.

The predicted volume going forward under the MPBR project would roughly meet or exceed the 72,400-90,500 CCF level that the GTR considered sustainable. As noted previously, because the GTR assumes (erroneously) that all suitable timber lands were available for harvest, the legally sustainable timber harvest is actually less than 72,400 CCF/year. The Mountain Pine Beetle Response Final EIS’s disclosure of the project’s impacts, and the duration of those impacts across the Forest, is based on false assumptions about how much timber can be sustainably logged and at what rate going forward.

Additionally, the MPBR Final EIS fails to address the key issue the GTR raises: whether the logging proposed will be sustainable. The EIS appears to simply assume that loggers can remove timber at a rate of up to 200,000 CCF per year. The GTR proves this assumption false. The EIS also fails to address the potential trade-offs between higher logging levels and the alleged benefits of logging to improve resilience to wildfire.

The Forest Service’s violation of the ROD commitments to annual monitoring reports compounds the need for supplemental NEPA because the agency has failed to disclose whether unsustainable logging levels, as have occurred for the last several years, are resulting in impacts beyond those identified in the Final EIS.

The GTR thus provides significant new information relevant to environmental concerns and bearing on the Mountain Pine Beetle Response project and its impacts. The Forest Service must prepare a supplemental EIS on the project if it intends to continue offering timber sales pursuant to the project.

## **Conclusion**

Sustained yield is one of the most fundamental and important principles of forest management. Logging more than can be sustained not only harms wildlife and other forest values, it leads to job losses and economic disruption. Allowing unsustainable logging to continue depleting the forest of trees would cause even greater harms to communities by necessitating even greater cuts to logging levels later on.

In light of the significant new information embodied in the GTR, we urge the Forest Service to initiate preparation of supplemental EISs for the Black Hills Resilient Landscapes and Mountain Pine Beetle Response projects as soon as possible. The GTR's new information should also prompt the Black Hills National Forest to re-examine NEPA documents for *all* pending sales of significant volume (not just those encompassed by the BHRL and MPBR projects) to determine whether new information contained in the GTR concerning sustainable harvest requires the completion of supplemental NEPA review, including opportunities for public participation and Tribal consultation. As part of any such review, the Black Hills National Forest must consider the need to promptly reduce logging levels to well below those recommended by the GTR as sustainable, ensuring that the annual timber sale volume addresses the need to comply with Forest Plan protections, and provides a cushion to ensure that the forest can increase standing volume and recover from the past unsustainable harvesting.

In addition, the Forest Service's approval of cutting outside of areas identified as potential CTAs for the BHRL project is both illegal and represents significant new information concerning the BHRL project's impacts. We urge the Forest Service to embark on a top-to-bottom review of the BHRL project's implementation as part of any supplemental NEPA analysis, and to immediately take steps to ensure that any sales currently being designed and implemented under BHRL comply with existing commitments and prior NEPA analysis. The Forest Service's putting a hold on the four sales for which bidding was to close in late May and early June represents a good start.

Further, before even considering new information from the GTR, the Forest Service should cease issuing timber sales pursuant to the MPBR project, because the end of the beetle epidemic terminated the HFRA's applicability to the project. If the Forest Service intends to continue to offer sales under this project, we request a written explanation as to why the agency believes it can continue to rely on the HFRA and the limited NEPA analysis performed for the MPBR project to continue to authorize logging. At a minimum, the Forest Service must provide a valid legal basis explaining how it can continue to offer sales under the MPBR analysis. If it can provide such a valid basis, it must prepare supplemental NEPA analysis and authorization, given that the original project purpose and need no longer apply.

Finally, if the Black Hills NF has completed a supplemental information report for the Black Hills Resilient Landscapes or Mountain Pine Beetle Response projects in light of GTR-422, the illegal logging of areas outside potential CTAs for BHRL timber sales, or the end of the beetle epidemic for the MPBR project, we request that the Forest Service make such document(s) available promptly to the public (and to the undersigned).

We look forward to your response. If you have any questions regarding this letter, please contact Mary Zimmerman or Ted Zukoski, whose contact information is provided below.

Sincerely,

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cc: Frank Beum, Regional Forester, Rocky Mountain Region, U.S. Forest Service  
Jacqueline Buchanan, Deputy Regional Forester, Rocky Mountain Region, U.S. Forest Service  
Jenna Sloan, Director, Ecosystem Planning, Rocky Mountain Region, U.S. Forest Service  
Meryl Harrell, Deputy Under Secretary for Natural Resources and Environment, U.S.  
Department of Agriculture  
Chris French, Acting Under Secretary for Natural Resources and Environment, U.S.  
Department of Agriculture

## **TABLE OF EXHIBITS**

- Ex. 1. Spreadsheet, Black Hills National Forest FY20 Schedule
- Ex. 2. Analysis of current timber sales on the Black Hill National Forest and their relationship to poor public accountability and overlogging (May 12, 2021)
- Ex. 3. Additional analysis of timber sales from the Black Hills Resilient Landscapes Project (BHRL) on the Black Hill National Forest (June 2021)
- Ex. 4. Email of J. Word, Black Hills NF to N. Hilding, Prairie Hills Audubon Society (May 5, 2021)

January 31, 2023

Frank Beum, Regional Forester  
Jenna Sloan, Director, Ecosystem Planning  
U.S. Forest Service, Rocky Mountain Region  
1617 Cole Blvd., Building 17  
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Frank.Beum@usda.gov  
Jenna.sloan@usda.gov

**Re: Request for Meeting Concerning Black Hills National Forest**

Regional Forester Beum and Ms. Sloan:

On behalf of those listed below, we write to request a meeting or conference call as soon as possible to discuss with you our concerns regarding the timber harvesting program on the Black Hills National Forest (BKNF).

While we appreciate that the Forest Service has reduced levels of logging on the Black Hills which will benefit the numerous natural and recreational values that are degraded by excessive logging, we hope to discuss our concerns that true progress is being stalled, reversed, or delayed until the years-long Forest plan revision is complete. It also appears the Forest is undercutting required environmental review and public involvement by implementing numerous piecemealed logging projects without adequate study of impacts, including cumulative impacts.

**The US Forest Service Must Ensure Sustainable Logging Levels.** This issue requires an urgent response because logging levels set by the current Forest Plan and recent timber targets are not only destructive but illegal under the National Forest Management Act (NFMA).

The volume of timber cut on the Forest over the last year has trended somewhat towards more sustainable levels, declining in Fiscal Year 2022 to 123,600 CCF, from 172,600 CCF in Fiscal Year 2021. See Forest Products Cut and Sold from the National Forests and Grasslands, <https://www.fs.usda.gov/forestmanagement/products/cut-sold/index.shtml> (last viewed Dec. 12, 2022). The volume of timber sold has also decreased somewhat (down from 173,100 CCF sold in FY 2019 to 112,900 CCF in 2022). *Id.* However, the Rocky Mountain Research Station's 2021 report on sustainable logging on the Black Hills, General Technical Report (GTR) 422, makes clear that logging at these levels is still unsustainable over the long term.

It also appears the agency is intent on allowing timber to be harvested from this National Forest at non-sustainable rates. In particular, we are aware that the USFS has identified a timber volume sold target for the BKNF of 120,000 CCF for FY 2023. We suspect it was selected because it is near the largest volume scenario in GTR 422. Of the 60 scenarios analyzed in GTR 422, only

five were sustainable at the 126,700 CCF level. And every one of those scenarios assumed the suitable timber base on the Forest would be treated as a commercial tree farm, without regard to other Forest uses, wildlife habitat needs, or non-logging Forest Plan constraints.

Indeed, GTR 422 itself acknowledges that the suggested sustainable harvest level range *does not include restrictions* in the Forest Plan meant to protect numerous critical values aside from timber for sale. These include, but are not limited to habitat structural stages, steep slopes, riparian areas and other special areas. GTR 422 also states that *long-term productivity is dependent on care of young trees*, something that is not happening to a meaningful degree on the BKNF. Thus, the agency's best available science and information demonstrates beyond any doubt that 120,000 CCF per year is not truly sustainable when all logging constraints are applied.

Compounding this problem, it appears the 2023 target was predicated on unrealistic assumptions that trees on the Forest would achieve the highest growth rates and the lowest mortality rates. This is unjustifiable and, in our assessment, imprudent. Regarding mortality rates, over the last two years alone the BKNF has experienced significant tree mortality from tornado damage, a pine looper infestation, and wildfires such as last summer's Fish Fire. Mortality rates are *not* low and growth rates are *not* high. In fact, the most recent FIA report "Forests of South Dakota" from 2020, shows that the standing tree inventory volume for the State (where much resides on the BKNF) had an annual net loss of 25 million cubic feet. Inventory levels are *not* improving on the BKNF; they are getting worse every year, and excessive logging is compounding the problem. Authorizing 120,000 CCF of public timber for sale in 2023 will greatly amplify the sustained yield violation, not correct it.

An August 19, 2021 Briefing Paper from Chris French to the White House (attached) described the situation on the Black Hills National Forest and said the following: "In January 2021, a final assessment of that recommendation suggested a range of 64,000 to 88,000 CCF as a sustainable annual sawtimber harvest level. The Rocky Mountain Research Station released GTR 422 in April 2021, which suggested a sustainable annual sawtimber harvest level of 72,400 to 90,500 CCF appeared to be the best option based on multiple scenarios of standing volume, projected growth, and mortality." However, even the lower volume estimates in these two sources — 64,000 ccf and 72,400 ccf/year — did not account for non-timber multiple use objectives and other Forest Plan constraints that limit logging. To comply with the law and manage the Black Hills as a National Forest rather than a tree farm, the agency should therefore be limiting the sale of commercial sawtimber to less than 64,000 ccf per year.

We are calling on you to exercise true leadership on this critical issue and not cave in to short-sighted and selfishly-motivated special interests and politicians who are pushing the agency to continue selling trees at non-sustainable rates. We ask you to immediately instruct the BKNF to bring its timber program into compliance with NFMA's sustained yield mandate in 2023 and not delay it until the Forest Plan revision is completed years from now.

**Forest Planning in Progress Does Not Permit the Forest Service to Avoid Complying with the NFMA.** While we are pleased with the commencement of Forest Plan revision, it cannot be used as an excuse to delay bringing logging on the Forest to sustainable levels. The continuing search for unsustainable levels of timber to sell has already damaged numerous Forest values. If

the ultimate decision on an appropriate, sustainable harvest level is left to the Forest Plan Revision process, unsustainable sales and harvest could go on for many years. The process is already moving slowly; scoping has not begun, and special interests are attempting to prolong the process. Delaying the sale volume reduction and plan revision will both result in more damage to all values (environmental, social, and economic) held in the Forest *including the long-term prospects of the timber industry*.

**The Black Hills NF Must Comply with NEPA for Projects and Timber Sales.** We are also concerned that the Black Hills National Forest is skirting compliance with the National Environmental Policy Act by reviewing numerous, simultaneous, overlapping projects via numerous separate environmental assessments and categorical exclusions. Many appear to constitute connected and/or cumulative actions with similar purpose and needs statements that should be considered together.

Please see the table and two maps below this letter. With no scheduled Forest Monitoring and no promised monitoring for recent large projects like the Mountain Pine Beetle Response Project or the Black Hills Resilient Landscapes Project, the public has been left in the dark about whether these large projects are achieving their goals for Habitat Structural Stage diversity, miles of roads, wildlife wellbeing, etc.... Given the current state of the timber program, is the anticipated volume output of the Projects in Table 1 below commensurate with a sustainable timber program? Are environmental, social, and economic values of the Forest in jeopardy? Should the public know more about what is taking place on the Forest?

**Meeting Request.** We are requesting the opportunity to meet with you as soon as possible to discuss these urgent issues. This will allow us to learn about your direction for the BKNF — and to understand what science and law underlies your direction, in light of the Research Station's report and NFMA's mandate that logging on National Forests be sustainable. We would also like to discuss with you the options for an approach that will ensure sustainability while also ensuring effective public involvement and legally compliant analysis.

Thank you for considering our concerns. Please notify us through Mary Zimmerman or Dave Mertz to let us know the soonest time we can meet with you.

Sincerely,

Mary Zimmerman, President  
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ATCH: August 19, 2021 Briefing Paper from Chris French to the White House

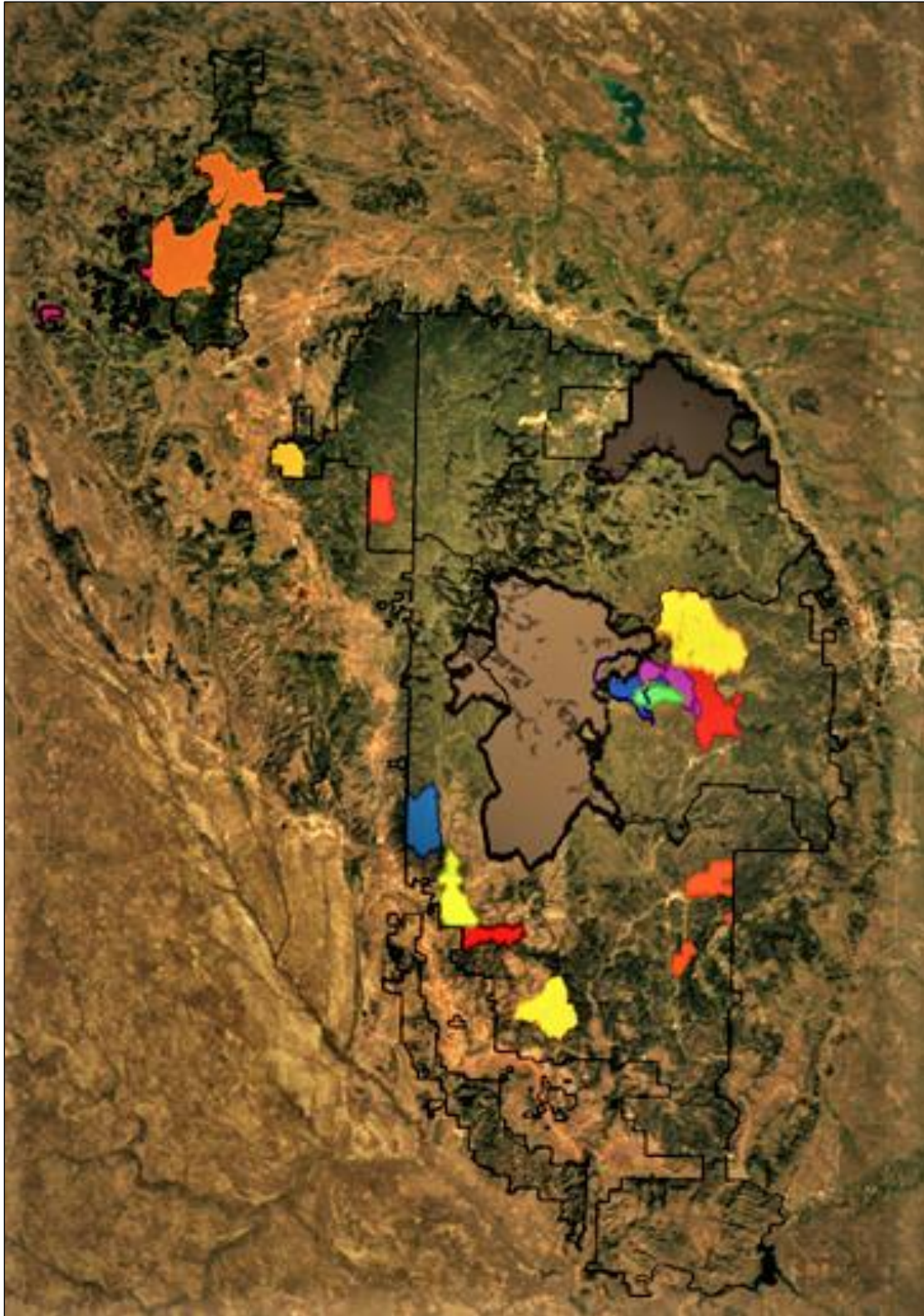
Cc: Jacqueline Buchanan, Deputy Regional Forester, Rocky Mountain Region  
Jeff Tomac, Supervisor, Black Hills National Forest

**Table 1. BHNF projects from past 4 years**  
All of these are CEs except the 3 listed last

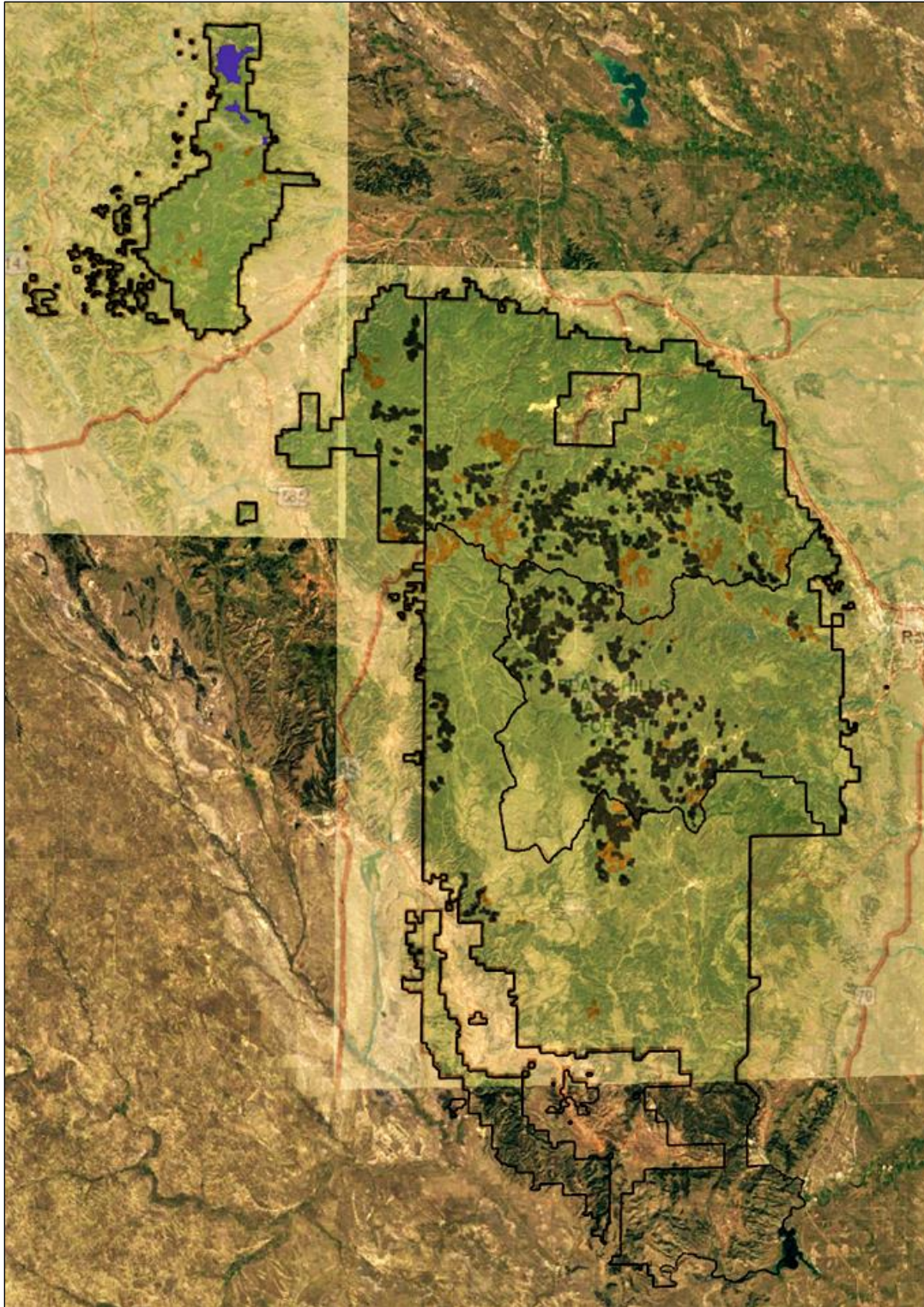
| Project name              | District                                  | Decision year       | commercial treatment acres total acres in project area     | EA Purpose and Need or CE clause                                                                                                                                                                                  | Contiguous and/or overlapping with other CEs and EAs?                                      |
|---------------------------|-------------------------------------------|---------------------|------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| <b>Teepee</b>             | Hell Canyon                               | 2019                | 2266<br>4615                                               | CE - Wildfire resilience<br>Section 605 (HFRA) 32.3(4) (16 U.S.C.6591d)                                                                                                                                           | Rx burn from BHRL cited                                                                    |
| <b>Alvin</b>              | Mystic                                    | 2020                | 744<br>~3415 (2060 acres NFS)                              | CE - Insect and disease<br>Section 8204 of the Agriculture Act of 2014 (public Law 113-79) amended Title VI of HFRA act of 2003 (16 U.S.C.6591 et. Seq.) to add Sections 602 and 603. HFRA Sections 602(d)+603(a) | Theodore<br>Simon                                                                          |
| <b>Blacktail</b>          | Hell Canyon                               | 2020                | 2845 (including Summit below)<br>7876                      | CE - Wildfire resilience<br>Section 605 (HFRA) 32.3(4) (16 U.S.C.6591d)                                                                                                                                           | BHRL: 420 acres of OR completed (Hop Spring sale)<br>Rx burn and mechanical Rx cited in DM |
| Summit                    | Hell Canyon                               | 2020                | 9870 acres total area                                      | CE - Wildfire resilience<br>Section 605 (HFRA) 32.3(4) (16 U.S.C.6591d)                                                                                                                                           | BHRL- no commercial treatments done, but Rx burn and mechanical treatments cited in DM     |
| <b>Flying Monkeys 1</b>   | Hell Canyon                               | 2021                | 1508 (includes FM2&3 below)<br>~7138                       | CE - Insect and disease<br>603 (HFRA) (16 U.S.C.6591d).                                                                                                                                                           | no                                                                                         |
| Flying Monkeys 2          | Hell Canyon                               | 2021                |                                                            |                                                                                                                                                                                                                   |                                                                                            |
| Flying Monkeys 3          | Hell Canyon                               | 2021                |                                                            |                                                                                                                                                                                                                   |                                                                                            |
| <b>Freeland</b>           | Hell Canyon                               | 2021                | 2573<br>~8397                                              | CE - Wildfire resilience<br>Section 605 (HFRA)                                                                                                                                                                    | BHRL                                                                                       |
| <b>Simon</b>              | Mystic                                    | 2021                | 1383<br>~9880 ac. total                                    | CE - TSI and/or wildlife<br>36 CFR 220.6(e)(6) Timber stand and/or wildlife habitat improvement (req. less than one mile of standard road construction)                                                           | Alvin CE<br>Theodore CE<br>Westside<br>BHRL<br>Spruce                                      |
| <b>Fish</b>               | Bearlodge                                 | 2022                | 668<br>~3992                                               | CE - Insect and disease<br>603 (HFRA) (16 U.S.C.6591d) (FSH 1909.15, 32.3(5))                                                                                                                                     | no                                                                                         |
| <b>Isolated Parcels 1</b> | Bearlodge                                 | 2022                | Unknown (incl. IP 2b-4d below)<br>527                      | CE - unknown                                                                                                                                                                                                      | no                                                                                         |
| Isolated Parcels 2a       |                                           | 2022                | 40                                                         |                                                                                                                                                                                                                   |                                                                                            |
| Isolated Parcels 2b       |                                           | 2022                | 40                                                         |                                                                                                                                                                                                                   |                                                                                            |
| Isolated Parcels 2c       |                                           | 2022                | 120                                                        |                                                                                                                                                                                                                   |                                                                                            |
| Isolated Parcels 3        |                                           | 2022                | 958                                                        |                                                                                                                                                                                                                   |                                                                                            |
| Isolated Parcels 4a       |                                           | 2022                | 40                                                         |                                                                                                                                                                                                                   |                                                                                            |
| Isolated Parcels 4bc      |                                           | 2022                | 120                                                        |                                                                                                                                                                                                                   |                                                                                            |
| Isolated Parcels 4d       |                                           | 2022                | 40                                                         |                                                                                                                                                                                                                   |                                                                                            |
| <b>Moskee</b>             | Bearlodge                                 | 2022                | 1296<br>~4423                                              | CE - Restoration objectives or increasing resilience<br>36 CFR 220.6(e)(25)                                                                                                                                       | BHRL                                                                                       |
| <b>Theodore</b>           | Mystic                                    | 2022                | 1657<br>~5954 ac.                                          | CE - Insect and disease<br>Section 602(d)+603(a) (HFRA) (16 U.S.C.6591d)                                                                                                                                          | Westside<br>Alvin<br>Simon<br>Artemis<br>Pactola                                           |
| <b>Woods</b>              | Bearlodge                                 | 2022                | 893<br>~28,865                                             | CE - Timber stand improvement and/or wildlife habitat improvement<br>36 CFR 220.6(e)(6)                                                                                                                           | BHRL                                                                                       |
| <b>Artemis</b>            | Mystic                                    | 2023 in scoping     | 2900<br>~ 10, 162                                          | CE - Insect and disease<br>Section 8204 of the Agriculture Act of 2014 (public Law 113-79) amended Title VI of HFRA act of 2003 (16 U.S.C.6591 et. Seq.) to add Sections 602 and 603. HFRA Sections 602(d)+603(a) | BHRL<br>Theodore CE<br>Pactola CE                                                          |
| <b>Pactola</b>            | Mystic                                    | 2023 in scoping     | 2947<br>~22,740                                            | CE - Wildfire resilience<br>Section 605 (HFRA)                                                                                                                                                                    | Westside<br>Artemis<br>Theodore<br>Spruce                                                  |
| <b>Chimera</b>            | Northern Hills                            | ~2023<br>In scoping | 18,805<br>54,450 (38,500 ac of NFS)                        | EA<br>Wildfire resilience                                                                                                                                                                                         | Spruce EA                                                                                  |
| <b>Spruce</b>             | Northern Hills,<br>Hell Canyon,<br>Mystic | ~2023<br>In scoping | Up to 30,000<br>~33,600 – 52,000 acres Spruce              | EA<br>P&N difference btwn existing and desired veg. conditions. Spruce Aspen.                                                                                                                                     | BHRL<br>Chimera EA<br>Westside EA<br>Pactola CE<br>Simon CE                                |
| <b>Westside</b>           | Mystic and Hell Canyon                    | ~2023<br>In scoping | up to 140,000<br>~151,000                                  | EA<br>36 CFR 218 subparts A and B adaptive management [36 CFR 220.5 (e) (2) and §220.7(b)(2)(iv)]                                                                                                                 | Spruce EA<br>BHRL<br>Simon CE<br>Theodore CE                                               |
|                           |                                           |                     | <b>Totaling more than 210,000 acres<br/>~350,000 acres</b> |                                                                                                                                                                                                                   |                                                                                            |
|                           |                                           |                     |                                                            |                                                                                                                                                                                                                   |                                                                                            |
|                           |                                           |                     |                                                            |                                                                                                                                                                                                                   |                                                                                            |

**Map 1. CEs and EAs listed in Table 1.**

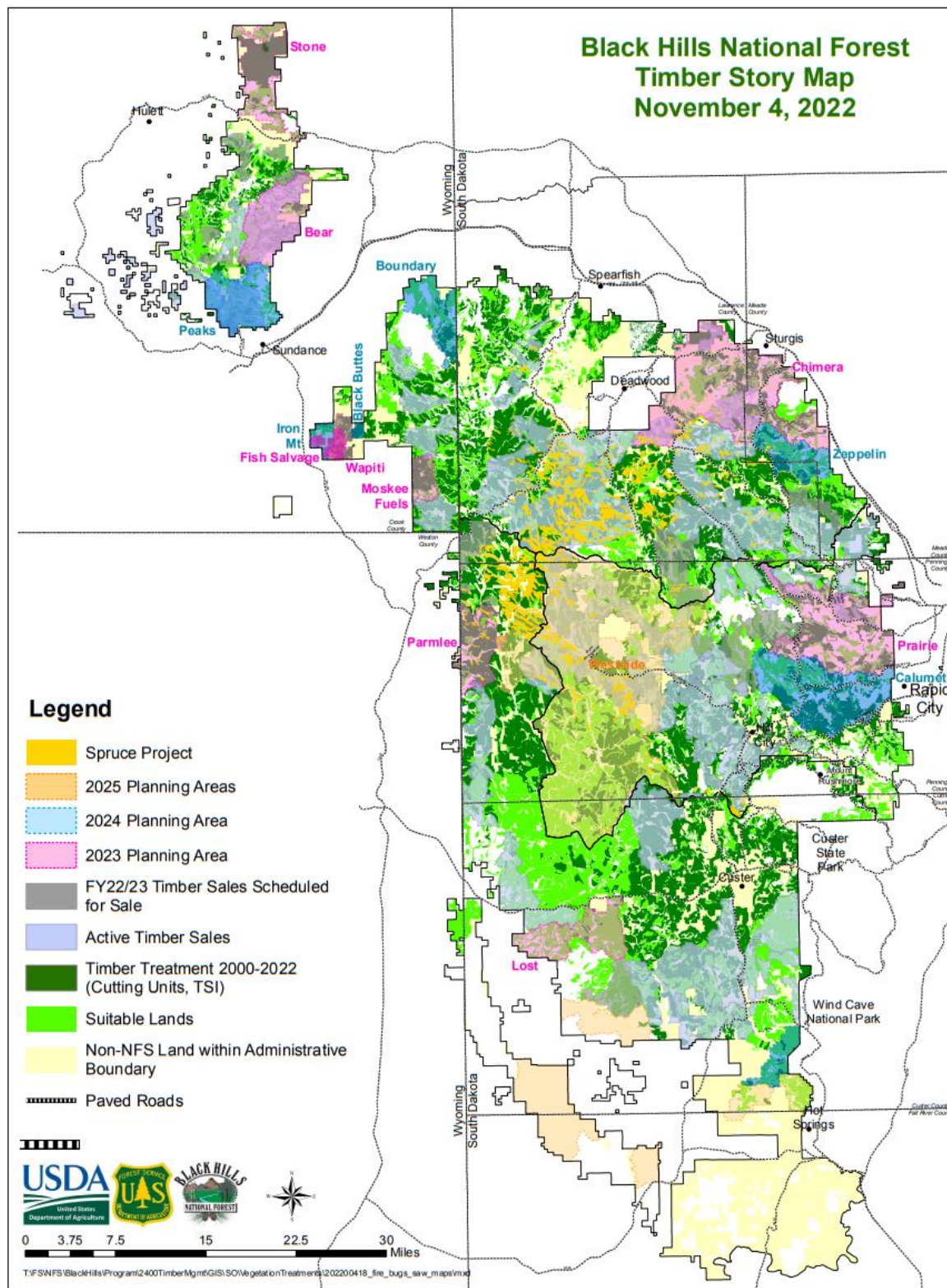
This map depicts CEs (colored polygons) and EAs (Chimera in dark grey, Westside in light grey, and Spruce in black squiggles). All are from the past four years or currently in scoping. Notice overlapping and contiguous nature among many projects.



**Map 2. 2018 BHRL Project** which occurred in areas recently treated with the MPBR project and other projects, and are also co-occurring with CE's or EAs listed in Table 1 and shown on Map 1.  
 Black: Cut units, large majority are overstory removal and clearcuts  
 Brown: Sold but not cut  
 Blue-violet: ~3080 acre "Stone" 2023 planning area for BHRL



**Map 3. Black Hills National Forest Timber Story Map, November 4, 2022**  
 Notice planning area on top of timber sales on top of more analysis and more sales.



## **ATTACHMENT**

August 19, 2021 Briefing Paper from Chris French to the White House

From: "Jenkins, Melissa - FS" <[melissa.l.jenkins@usda.gov](mailto:melissa.l.jenkins@usda.gov)>  
To: "Dawe, Christine -FS" <[christine.dawe@usda.gov](mailto:christine.dawe@usda.gov)>  
CC: "Armstrong, Katherine -FS" <[katherine.e.armstrong@usda.gov](mailto:katherine.e.armstrong@usda.gov)>  
"Snieckus, Mary -FS" <[mary.snieckus@usda.gov](mailto:mary.snieckus@usda.gov)>  
Date: 8/19/2021 2:37:25 PM  
Subject: FW: Request from WH re: Black Hills and Black Ram  
Attachments: [081821 WH Memo Black Ram.docx](#)  
[081921 WH Memo Black Hills Timber Program.docx](#)

---

Hi Christine – Here you go. Let me know if there are any questions.

Thanks!  
Melissa



**Melissa L. Jenkins**  
**Acting Deputy Chief of Staff**  
**Forest Service**  
**Office of the Chief**  
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**Caring for the land and serving people**

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From: Fargo, Anna - FS <[anna.fargo@usda.gov](mailto:anna.fargo@usda.gov)>  
Sent: Tuesday, August 17, 2021 5:42 PM  
To: Dawe, Christine -FS <[christine.dawe@usda.gov](mailto:christine.dawe@usda.gov)>; Armstrong, Katherine -FS <[katherine.e.armstrong@usda.gov](mailto:katherine.e.armstrong@usda.gov)>  
Cc: French, Chris- FS <[Christopher.French@usda.gov](mailto:Christopher.French@usda.gov)>; Harrell, Meryl - OSEC, Washington, DC <[Meryl.Harrell@usda.gov](mailto:Meryl.Harrell@usda.gov)>  
Subject: RE: Request from WH re: Black Hills and Black Ram

Got it. Thanks, Christine. We will let you know if there are any questions.



**Anna Fargo**  
**Acting Deputy Chief of Staff (8/9 8/17)**  
**Forest Service**  
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From: Dawe, Christine -FS <[christine.dawe@usda.gov](mailto:christine.dawe@usda.gov)>

Sent: Tuesday, August 17, 2021 1:51 PM

To: Armstrong, Katherine -FS <[katherine.e.armstrong@usda.gov](mailto:katherine.e.armstrong@usda.gov)>; Fargo, Anna - FS  
<[anna.fargo@usda.gov](mailto:anna.fargo@usda.gov)>

Cc: French, Chris- FS <[Christopher.French@usda.gov](mailto:Christopher.French@usda.gov)>; Harrell, Meryl - OSEC, Washington, DC  
<[Meryl.Harrell@usda.gov](mailto:Meryl.Harrell@usda.gov)>

Subject: Request from WH re: Black Hills and Black Ram

Katie and Anne,

WH is asking for memos that have the agency's official line on Black Hills and Black Ram. Apparently they have a meeting with Rick Bass on Monday about Black Ram. I know R1 has been preparing for a briefing for Senators Pingree on Thursday so perhaps can use those materials to put together something short on Black Ram? I think Frank has a paper on Black Hills already. Defer to Chris on what he wants us to communicate about each. If we can get something by end of week that should work.

Christine Dawe, Acting Chief of Staff  
Office of the Under Secretary  
Natural Resources and Environment  
United States Department of Agriculture (USDA)  
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[christine.dawe@usda.gov](mailto:christine.dawe@usda.gov)

**NRE/FORREST SERVICE BRIEFING PAPER**  
**AUGUST 19, 2021**

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**Topic: Black Ram Project – Kootenai National Forest**  
**From: Chris French, Deputy Chief, National Forest System**  
**(202) 205-1677– [chris.french@usda.gov](mailto:chris.french@usda.gov)**

---

**Issue: Black Ram Project**

**Background:** The Black Ram project is on the Three Rivers Ranger District of Kootenai National Forest, northwest of Troy, Montana, in an area known as the Yaak. The purpose of the project is to:

- Reduce the potential for high intensity wildfire while promoting desirable fire behavior characteristics and fuel conditions in the Wildland Urban Interface and other areas with values at risk.
- Promote resilient vegetation conditions by managing for landscape-level vegetation patterns, structure, patch size, fuel loading and species composition.
- Maintain or improve watershed conditions to provide water quantity, water quality, stream channel conditions, and native aquatic species habitat that support ecological functions and beneficial uses.
- Provide forest products that contribute to the sustainable supply of timber products from National Forest System Lands.

The project is the result of extensive public involvement and government to government consultation with Tribes throughout the project's development and analysis. The local collaborative group (Kootenai Forest Stakeholders Coalition) did not come to agreement on the project and did not submit comments as a group.

- An Environmental Assessment was completed in July 2019, and a Draft Decision Notice and Finding of No Significant Impact were released in September 2020. We received over 240 form letters objecting to the project which were generated by a member of the Yaak Valley Forest Council (YVFC). We also received about 60 comments in support of the project. There were 28 unique comment letters.
- The project area analyzed includes over 95,000 acres on the approximately 2.2-million acre forest. The project proposes 3,904 acres of timber harvest, 7,550 acres of prescribed burning, 580 acres of thinning within stands that are considered old growth, 3.3 miles of new road construction (0.8 mile in old growth stands), and 52 miles of road rehabilitation treatments (long-term storage and decommissioning) that provide watershed benefits.
- Of the 3,904 acres of commercial timber harvest, 2,444 acres are regeneration harvest, including 1,748 acres of clearcuts with reserve trees, and 1,460 are intermediate harvest. The regeneration harvest is designed to emulate some of the characteristics of wildfire by breaking up the continuity of the forest canopy.
- The proposed thinning treatment activities in old growth timber stands are intended to improve the resistance and resilience of old growth stands to disturbances and stressors, such as wildfires, insects, and diseases. An additional 1,551 acres of treatments are proposed within recruitment potential old growth stands that will increase the sizes of old growth stands (or patches of contiguous old growth) over time.
- The project will sustain 67 jobs and \$3.2 million in total labor income on an annual average basis over the anticipated 9-year life of the project.
- Government to Government consultation with the Kootenai Tribe of Idaho and the Confederated Salish and Kootenai Tribes began before the purpose and need were established and has been ongoing throughout the project. Consultation outcomes helped us shape the project. The Kootenai Tribe of Idaho recently objected in writing to statements claiming a lack of proper tribal consultation.

- We are working with the U.S. Fish and Wildlife Service (USFWS) to finalize terms and conditions related to the threatened grizzly bear and its habitat. When those discussions are complete, the USFWS will issue a Biological Opinion (BO). We will consult with Tribes on the final BO and then finalize, sign, and issue the Decision Notice.

**Recommendation:** Continue working with USFWS to finalize Biological Opinion and sign Decision Notice.

**Rationale:**

- Under 4 percent of the project area includes timber harvest, 37 percent of the project area is within the Wildland Urban Interface, and 2,137 acres of white pine restoration is proposed.
- YVFC expectations in their communication directly conflict with the project purpose and need as well as the 2015 Forest Plan and the KFSC guidelines.
- The impacts that would result from modifying the project based on YVFC comments include the delay of planned vegetation treatments, the delay of Decision due to change in analysis and proposed treatments, and repercussions associated with not following the 2015 Forest Plan.

**NRE/FORREST SERVICE BRIEFING PAPER**  
**AUGUST 19, 2021**

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**Topic: Black Hills National Forest Next Steps**

**From: Chris French, Deputy Chief, National Forest System**  
**(202) 205-1677– [chris.french@usda.gov](mailto:chris.french@usda.gov)**

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**Issue:** The Black Hills National Forest (BKNF) has been working towards accomplishing their current 175,000 CCF (hundred cubic feet) timber target in Fiscal Year (FY) 2021. Due to newly identified National Environmental Policy Act (NEPA) concerns, the BKNF is now projecting they will accomplish no more than 147,000 CCF overall in FY 2021, with sawtimber volume at 133,000 CCF. The Rocky Mountain Region is developing a path forward for a sustainable, science-based timber program on the BKNF over the next three years considering the NEPA concerns, the recently released General Technical Report 422 (GTR 422) from the Rocky Mountain Research Station, the pending forest plan revision effort, the Black Hills National Forest Advisory Board recommendation, and impacts to the associated timber industry infrastructure.

**Background:** There is high and polarized interest in the timber program for the BKNF, including heightened interest from Tribes. Sustainable timber harvest levels have been analyzed by several entities over the last year. In October 2020, the Black Hills National Forest Advisory Board (NFAB) put forward a non-unanimous recommended annual sawtimber harvest level of 181,000 CCF. At the request of the South Dakota State Forester, BKNF staff assessed the NFAB's recommendation. In January 2021, a final assessment of that recommendation suggested a range of 64,000 to 88,000 CCF as a sustainable annual sawtimber harvest level. The Rocky Mountain Research Station released GTR 422 in April 2021, which suggested a sustainable annual sawtimber harvest level of 72,400 to 90,500 CCF appeared to be the best option based on multiple scenarios of standing volume, projected growth, and mortality. Other scenarios analyzed in GTR 422 considered a sustainable level of up to 126,700 CCF. The reconciliation report which will address comments from stakeholders for GTR 422 is slated to be released in August 2021.

The current BKNF Plan was published in 1997, and last amended in 2008. The Forest will initiate the assessment phase of forest plan revision this summer and is preparing a public engagement strategy. In the interim, the Region will establish sustainable targets for FY 2022 through FY 2024 that will enable the BKNF to effectively plan a program of work during forest plan revision and provide transparency to industry to inform business decisions until revision is complete. The intent is to balance the need to supply wood fiber to industry and ensure long term resource sustainability.

The region has found potentially significant vulnerability with operating outside mapped Commercial Treatment Areas (CTAs) identified in the Black Hills Resilient Landscape (BHRL) decision which impacted the FY 2021 timber sale program. Timber sales are being repackaged, but not all will be viable after being modified. This will impact the outyear program as well.

The BKNF will complete a Supplemental Information Report (SIR) for the BHRL decision to consider new information, determine whether the original Environmental Impact Statement will need to be supplemented, and consider what volume will be offered over the next three years under that decision. In addition, the BKNF will evaluate new vegetation treatment options and initiate the appropriate level of environmental compliance for all new proposed actions.

The major mill owner has approximately 170,000 CCF left to harvest under contract and a milling capacity of approximately 190,000 CCF annually. Timber industry advocates have stated any reduction below 175,000 CCF will result in further impacts to industry (closure was announced on a mill in Hill City, South Dakota, in summer 2021). The views of the State Foresters of South Dakota and Wyoming are aligned with that of the timber industry. Environmental advocates support significant reductions in the BKNF timber program.

**Next Steps:** Looking to the future, sound forest stewardship will likely require adjustments to the BKNF timber program. However, long-term forest sustainability will also require a viable timber industry to help maintain forest health and resilience while providing jobs in the rural economy. We are focused on both the short- and long-term future of the Black Hills and are committed to working together with all concerned to find a path forward that ensures we have a healthy forest for all to enjoy its many benefits long into the future.

The BKNF will ensure the long-term sustainability of the timber resource by using the best available environmental, social, and economic science to inform future management during forest plan revision. The following actions are being considered to manage the timber program for FY 2021 through FY 2024:

- For FY 2021 sale program, repackage BHRL sales to include only stands completely within the CTAs and offer planned sales outside of BHRL decision.
  - Based on this reduction in volume and considering volume that can be carried forward in FY 2021, the forest will achieve no more than 147,000 CCF, with 133,000 CCF in sawtimber.
  - Communicate to the public that this is the last year of implementation for the Pine Beetle Response (PBR) decision.
- Proceed with a SIR based on new information for the BHRL project.
  - Narrowly focus the SIR on implementing work within the CTAs only.
  - The forest is working to determine how much volume would be offered in the CTAs over the next three years.
- Continue to evaluate vegetation management treatment opportunities on the BKNF and initiate the appropriate level of environmental compliance for all new proposed actions.
  - By moving forward with new decisions and completing the BHRL SIR, we will limit litigation risk associated with BHRL and have decisions that better reflect the current conditions on the landscape.
  - The goal would be to have new implementable decisions by mid FY 2022.
- Based on the assessment of treatment opportunities and considering the Forest Inventory and Analysis data, the Rocky Mountain Research Station GTR, and NFAB recommendation, determine the timber program levels over the next three years. Initially, 125,000 to 145,000 CCF annually was being considered over the next three fiscal years to balance the upper end of the GTR scenarios and the need to support industry in the area. However, initial assessments of available volume by the forest are 15 percent below these levels.
  - Any timber program level over the next three years will balance the need to adjust timber volume to a long-term sustainable future while factoring in environmental, social, and economic considerations, serving as a bridge until all factors can be fully analyzed during forest plan revision.
- As soon as possible, conduct a series of virtual engagements with Congressional offices, Tribes, States, and stakeholders to share FY 2022-2024 program levels, initiation of a SIR for the BHRL project, the status of active decisions, and the intent to begin the forest plan assessment phase this summer.
- Publish a Notice of Intent to begin the assessment phase of plan revision for the Black Hills Land and Resource Management Plan in summer 2021. The plan revision process will be open and transparent with robust public involvement. The long-term timber program will be determined through this planning process.
- Improve relationships with Tribes by gauging their interest in developing an agreement to assist the BKNF with critical precommercial thinning work to keep forests healthy and productive and increase growth of trees into the sawtimber size class.