

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

FILED

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**Terri A. Lorenzon, Director
Environmental Quality Council**

Submitted to the Chairman of the Environmental Quality Council

on

August 4, 2008

Submitted by
Friends of Sand Creek

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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.

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

Petitioner:

Friends of Sand Creek
c/o Marcia F. Dunsmore
PMB 175 24695 US Highway 85
Four Corners, WY 82715
307.941.1281
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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 lands managed solely by the United States Forest Service (USFS) in

T52N R61W: That portion of Section 26 east of the forest boundary and south of Forest Road 863; SW portion of Section 25 south of Forest Road 863 and west of Thompson Gulch; The portion of Section 35 east of Forest Road 863; western portion of Section 36 as shown on map.

T51N R61W: All of Section 1; that part of Section 2 which is east of Forest Road 863; the extreme SE portion of Section 3 east of Forest Road 863; extreme NE portion Section 10 as shown on the map; that portion of Section 11 east of Idol Gulch; all of Section 12; all of Section 13; that portion of Section 14 east of Idol Gulch; that portion of Section 24 east of Idol Gulch; the eastern portion of Section 25 as shown on the map; the eastern portion of Section 36 as shown on the map.

T51N R60W: that portion of Section 6 as shown on the map (roughly the SW ¼ west of Forest Road 852); all of Section 7 except that portion north of Forest Road 864 in the NE corner; the portion of Section 8 south of forest roads 864 and 865; the Forest Service portion of Section 17 as shown on the map; all of Section 18 excluding the private land; all of Section 19; all of Section 20; portions of Section 21 as shown on the map; portions of Section 28 as shown on the

map; the Forest Service portion of Section 29; all of Section 30; the portion of Section 31 as shown on the map; all of Section 32; all the Forest Service land in Section 33;

T50N R60W: the portion of Section 4 as shown on the map; the portion of section 5 as shown on the map.

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, Bull Hill, Welcome, Sand Creek Crossing, Cement Ridge, Spotted Tail Gulch, Pole Cabin Spring, 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: starting approximately 5.5 miles south of Beulah, Wyoming in Crook County.

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). Also attached is an original BLM topographic map showing the area in question which reflects the surface land ownership pattern (private, state, federal) in the area titled Map 1.

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</i>						
Name/Company		Address	City	State	Zip	
United States Forest Service	All surface lands	1019 North 5 th Street	Custer	SD	57730	
Description of Lands: All 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 the list of adjacent landowners.						
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 and managed by the U.S. Department of Interior Bureau of Land Management, with the Cooperation of the United States Forest Service, with the exception of the mineral holdings listed immediately below. See legal description above in section (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.						
Note 1: There are unpatented and unvalidated mining claims in the petition area. A list of the holders of these unperfected mineral claims is attached to this petition in Table I and Table II.						

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 and 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:

(I) 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 Rare and Uncommon .

(II) Seven rare vegetation types, including types in pristine condition for which pristine stands are unusual (plus an astonishing 71 rare plant species), another specific eligibility criterion in the Rule.

(III) A population of the finescale dace, an extremely rare native fish. This fish is ranked NSS1 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.

(IV) 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/mile with values as high as 8,800 fish/mile in 2002 and 10,700 fish/mile in 1999. *The fishery is hydrologically connected to the petition area on the surface, occurring in the same channel/watershed.* It also is believed to be connected through subsurface waters as well.

(V) Numerous “fragile lands” are present, such as vegetated wetlands, seeps and springs, and concentrations of ecological and aesthetic features. 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. 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.

(VI) The U.S. Forest Service has recognized some of the rare and uncommon values present in Sand Creek by designating an upstream (southern) portion of Sand Creek as a “Botanical Area” and a large part of the downstream portion as a “Late Successional Forest Landscape.” 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.

(VII) The Wyoming EQC also has previously recognized the rare and uncommon values of the Sand Creek waterbody by designating it a Class 1 Water. Sand Creek is one of only 15 named

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.

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

(B) A description follows of the wildlife, botanical, 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.

(I) **§11(d) - Wildlife Values.** The lands proposed to be designated are very rare and uncommon because they exhibit wildlife 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:

(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 Map 2. 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, 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 §11(d)(iii) of the Rare and Uncommon rule.

Finescale dace also are glacial relics, isolated after the last ice age. It is possible that the dace populations have formed unique characteristics due to this genetic isolation. 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.” (Stasiak and Cunningham 2006).

“Populations of *finescape 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.” (Stasiak and Cunningham 2006).

There is some uncertainty regarding the origins of the *finescape 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 area may affect 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 owns 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 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 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 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 1 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.

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, 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 Refuge of High Scientific 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 relic 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 relic 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.

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 affect 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).

(II) **§11(f) - Botanical Values.** The lands proposed to be designated are very rare and 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.

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. 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 Map 3.

(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 3450 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. The site was designated due to the presence of high-quality stands of native vegetation listed in Attachment 2. The site is shown on Map 4.

(c) In addition to rare vegetation types, seventy-one (71) 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. In addition, some of the rare plants found in Sand Creek are at the periphery of their range. Recent science has shown that such peripheral populations can have extraordinary conservation value. “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” (Hooper 2004). 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.” 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. 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 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.”

(III) **§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.”

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:

The Sand Creek area has been used since settlement times primarily for livestock grazing as well as hunting and fishing. The petition area includes portions of four Forest Service grazing allotments: Sand Creek, Idol, Cement Ridge, and Willow Springs.

Both placer mining and lode mining have taken place in specific portions of the petition area, most notably in the Mineral Hill district. Much of Mineral Hill is patented land and petitioners specifically exclude the patented private lands from this petition. The Tinton mining district abuts the petition area to the south and also contains patented land. These too are excluded from this petition. Portions of the Sand Creek streambed in the petition area have been subjected to placer mining. A 1931 account described a placer mining outfit as “old” with “no additional information” available at the time (Driscoll, et al. 1931).

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.

(I) 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 8,000 acres of Sand Creek as a Botanical Area due to the presence of the paper birch/hazelnut vegetation type and numerous rare plants (USDA Forest Service 1997). 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). However, these withdrawals from mineral entry were never made and, since designation in 1997,

approximately 75 new mining claims have been staked in the upper portion of the area, 20 of which are entirely or partially inside the Botanical Area.

“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).

(II) 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, 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 successional ponderosa pine forest is now extremely rare in the Black Hills (and 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, A. and M. 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 H)). For brown creepers, “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. 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. 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, A. and M. Bynum. 2005.

(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. 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 Sand Creek comprising 78 percent/9,832 acres 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 1,400 acres, all USFS; and Cement Ridge/Sand Creek Headwaters at 1,600 acres, 1,260 acres, all USFS.

(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 refuge (scientific values)

655 N. Cedar St.
Laramie, WY 82072

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

1207 11th 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
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Sundance, WY 82729

Nancy Hilding

President, Prairie Hills Audubon Society
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Sam Mortimer

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Jean 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 owners of lands contiguous to the area proposed for designation are in Table III attached to this petition.

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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- Marriott, H. 2000c. Vegetation of the Black Hills. *Castilleja* – The Newsletter of the Wyoming Native Plant Society 19:2.
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ATTACHMENT 1 – RARE VEGETATION TYPES PRESENT IN SAND CREEK PETITION AREA	
Botanical Name	Site Name
Populus tremuloides / Corylus cornuta Forest	Cranberry Springs
Betula papyrifera / Corylus cornuta Forest	Cranberry Springs, Upper Sand Creek
Pinus ponderosa / Quercus macrocarpa Woodland	Cranberry Springs
Salix bebbiana Shrubland	Sand Creek Headwaters
Crataegus douglasii - (Crataegus chrysocarpa) Shrubland	Sand Creek Headwaters
Sporobolus heterolepis - Stipa richardsonii - Danthonia intermedia Herbaceous Vegetation	Sand Creek Headwaters

ATTACHMENT 2 – Native Vegetation Types in Cranberry Springs Site: Pristine Conditions	
Botanical Name	Site Name
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 (CEGL000844) B	Pinus ponderosa / Arctostaphylos uva-ursi Woodland
Ponderosa Pine / Bur Oak Woodland (CEGL000873) AB	Pinus ponderosa / Quercus macrocarpa Woodland
Ponderosa Pine / Chokecherry Forest (CEGL000192) B	Pinus ponderosa / Prunus virginiana Forest
Ponderosa Pine / Little Bluestem Woodland (CEGL000201) B	Pinus ponderosa / Schizachyrium scoparium Woodland
Ponderosa Pine / Snowberry Forest (CEGL000203) B,BC	Pinus ponderosa / Symphoricarpos albus Forest

ATTACHMENT 3 – RARE PLANT SPECIES PRESENT IN SAND CREEK PETITION AREA, INCLUDING DISJUNCT SPECIES		
Scientific Name	Common Name(s)	
<i>Adoxa moschatellina</i>	Moschatel	
<i>Adenocaulon bicolor</i>	American Trailplant	Disjunct
<i>Agastache foeniculum</i>		
<i>Antennaria neglecta</i>	Field Pussytoes	
<i>Aralia nudicaulis</i>		
<i>Asclepias ovalifolia</i> (oval-leaf milkweed)		
<i>Athyrium filix-femina</i>		
<i>Botrychium virginianum</i>	Rattlesnake Fern	
<i>Carex alopecoidea</i>	Foxtail Sedge	Disjunct
<i>Carex backii</i> var. <i>backii</i>		
<i>Carex bebbii</i>		
<i>Carex deweyana</i> var. <i>deweyana</i>		
<i>Carex granularis</i> var. <i>haleana</i>	Meadow Sedge	
<i>Carex peckii</i>		
<i>Carex rosea</i>	Rosy Sedge	Disjunct
<i>Carex stipata</i>		
<i>Carex tenera</i>		
<i>Carex torreyi</i>		
<i>Celastrus scandens</i>		
<i>Cinna latifolia</i>		
<i>Circaea alpina</i> var. <i>alpina</i>		
<i>Corallorhiza wisteriana</i>		
<i>Cornus canadensis</i>		
<i>Corylus cornuta</i>		
<i>Crataegus columbiana</i> var. <i>chrysocarpa</i>		
<i>Dichanthelium linearifolium</i>	Slim-leaf Witchgrass	
<i>Diphasiastrum complanatum</i> (syn: <i>lycopodium complanatum</i>)	Ground Cedar	Disjunct
<i>Dryopteris filix-mas</i>		
<i>Elymus diversiglumis</i> (interrupted wild rye)		
<i>Equisetum scirpoides</i>	Dwarf Scouring Rush	Disjunct
<i>Equisetum sylvaticum</i>	Woodland Horsetail	
<i>Erigeron philadelphicus</i>		
<i>Galium aparine</i> var. <i>aparine</i>		
<i>Geranium bicknellii</i>		
<i>Geranium carolinianum</i>		
<i>Gymnocarpium dryopteris</i>	Oak Fern	Disjunct
<i>Habenaria viridis</i> var. <i>bracteata</i>		
<i>Halenia deflexa</i>		

Hieracium umbellatum var. umbellatum		
Liatris ligulistylis		
Lonicera dioica var. glaucescens		
Luzula multiflora		
Lycopodium annotinum		
Lycopodium dendroideum	Treelike Clubmoss	Disjunct
Maianthemum Canadense	Canada Mayflower, False Lily of the Valley	Disjunct
Melica subulata		
Muhlenbergia glomerata	Marsh Muhly	
Ostrya Virginiana	Eastern Hop Hornbeam	Disjunct
Oxalis stricta		
Penstemon grandiflorus		
Picea glauca	White Spruce, Black Hills Spruce	Disjunct
Polygala senega		
Polystichum lonchitis		
Prosartes hookeri var. oregano	Hooker's Fairy Bell	
Prunus pensylvanica		
Pteridium aquilinum var. latiusculum		
Ranunculus pensylvanicus		
Ribes americanum		
Ribes oxycanthoides var. oxycanthoides		
Rubus pubescens		
Sambucus racemosa var. pubens		
Scirpus atrocinctus		
Scirpus cyperinus	Cottongrass Bulrush	Disjunct
Ulmus americana		
Unamia alba		
Vaccinium membranaceum		
Verbena stricta		
Viburnum lentago	Nannyberry, Sheepberry, Wild Raisin, Sweet Viburnum	Disjunct
Viburnum opulus var. americanum	Highbush Cranberry	Disjunct
Viola pubescens		
Viola renifolia var. brainerdii	Kidney-leaf White Violet	Disjunct