AGATE FOSSIL BEDS NATIONAL MONUMENT

NATIONAL ENVIRONMENTAL POLICY ACT
ENVIRONMENTAL ASSESSMENT

AND

NATIONAL HISTORIC PRESERVATION ACT
ASSESSMENT OF EFFECT

TO DEVELOP A WILDLAND FIRE MANAGEMENT PROGRAM WITHIN THE PARK

Agate Fossil Beds National Monument proposes to initiate a wildland fire management program within the park, having considered alternatives of continued wildfire suppression, prescribed fire, and mowing. The use of prescribed fire, in addition to continued wildfire suppression, is the environmentally and management preferred alternative. Evaluation of park resources and public use indicates that such a management program would have negligible or minor to moderate beneficial impacts the park environment, hence cause no impairment. Introducing prescribed fire on federal lands is controversial, but public response indicates that it is an acceptable alternative to potential uncontrolled wildfire on public park lands.

Approved by:

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PURPOSE AND NEED FOR THE PROPOSED ACTION

Agate Fossil Beds National Monument

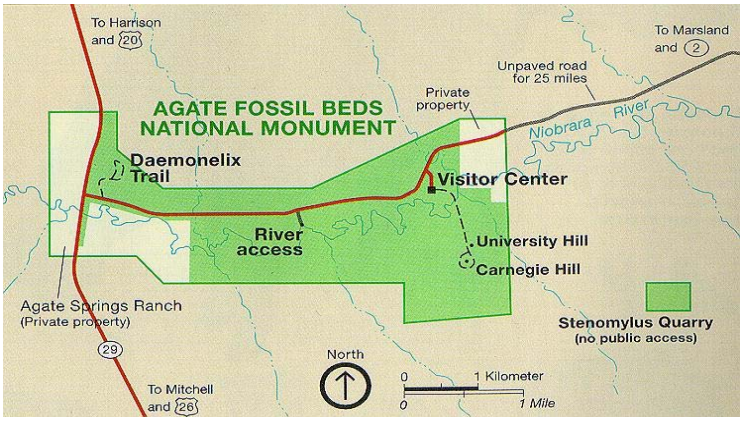

Figure 1. Agate Fossil Beds National Monument Regional and Site Maps

Agate Fossil Beds National Monument (Agate), a management unit of the U. S. Department of the Interior's National Park Service (Service), is in Sioux County in far northwestern Nebraska (Third Congressional District). The park is along the upper Niobrara River 10 miles east of Wyoming and south of the Pine Ridge and the Black Hills. The park was authorized in 1965, established in 1997, and includes 3055 acres of which 2270 are fee-owned, 467 are privately owned but under a Federal easement, 293 are privately owned without easement, and the remainder publicly owned. The area around Agate is relatively isolated, rural (0.7 persons/mi.^{2}) ranch country, with a stable mixed grass prairie. The park is surrounded by private ranchlands. Agate is 50 miles north of Scotts Bluff National Monument (Scotts Bluff), which has administrative supervisory responsibility for Agate. The nearest community is Harrison, the Sioux County seat, 22 miles north of Agate. Agate's FY03 baseline funding allocation is $498,000 with a full-time-equivalent staff of eight, and the park had 17,129 visitors in calendar year 2003. Its small stream has not been designated as a wild, scenic, or recreational river and there is no designated wilderness within its boundaries.

Agate was authorized in 1965 (P. L. 89-33, 79 Stat. 123)

> …to preserve for the benefit and enjoyment of present and future generations the outstanding paleontological sites known as the Agate Springs Fossil Quarries, and

> nearby related geological phenomena, …to facilitate the protection and exhibition of a valuable collection of Indian artifacts and relics that are representative of an important phase of Indian history…. [It] shall be administered…pursuant to the Act to establish a National Park Service….

The National Park Service Organic Act (16 U.S.C. 1) requires that Agate be promoted and regulated to conform to the Service's fundamental purpose, which is

> …to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations.

Proposed Action

Agate Fossil Beds National Monument proposes development of a plan to manage wildland fire on the park's fee-owned lands, in response to both formal public policy and resource management needs. Park lands have not been grazed, burned (except for a few acres in a research project), or mowed (other than maintenance and thistle control) since the park's authorization, and a heavy grass fuel load has built up that needs to be reduced in an environmentally appropriate program. Fire is a natural element in this upper Niobrara River valley habitat. Insofar as possible, Agate wants to manage the occurrence of fire on and impacts to park lands and structures in consideration of impacts to private inholdings, Service scenic easements, adjacent private lands, and visitor and affiliated Native American interests. The proposed management program would address the response to wildfires, the use of prescribed fire, and the impacts of both on Agate's natural, cultural, and human resources.

Service Fire Management Policy

National Park Service management policy (NPS 2001, cf. NPS 2002) requires that:

> Each park with vegetation capable of burning will prepare a fire management plan and will address the need for adequate funding and staffing to support its fire management program. The plan will be designed to guide a program that responds to the park's natural and cultural resource objectives; provides for safety considerations for park visitors, employees, neighbors, and developed facilities; and addresses potential impacts to private and public property adjacent to the park. An environmental assessment developed in support of the plan will consider the effects on air quality, water quality, health and safety, and natural and cultural resource management objectives. Preparation of the plan and environmental assessment will include collaboration with adjacent communities, interest groups, state and federal agencies, and tribal governments.

Cultural and Natural History of the Park Lands

The lands included within Agate Fossil Beds National Monument (Fig. 1) have probably been used by people for at least the past 11,000 years based on archeological materials from the Hell Gap site 30 miles west of Agate (Frison 1978). Those archeological remains are based on eroded bedrock, leaving the question of earlier occupational evidence moot. Traditional Native American oral histories in the region cite people as having lived in the area since time

immemorial, and Lakota affiliation with the cultural landscape associated with the fossil remains has been documented by LeBeau (2002). Agate is an old cultural landscape.

In the nineteenth century the Cheyenne and Lakota (Siouan) people probably made frequent use of the Niobrara River springs, sheltering cottonwoods, game and plants, nearby chalcedony (for tool stone), and sacred landscape. The area of the Agate Springs Ranch headquarters was homesteaded in the 1870s by Dr. Elisha Graham of Cheyenne, Wyoming Territory; Graham's daughter Kate Graham Cook and son-in-law James H. Cook established the Agate Springs Ranch there in 1887 (Cook 1968, Cook 1980, Meade 1990). Cook was acquainted with the Lakota Chief Red Cloud from the early 1870s until the latter's death in 1909, and after the Indians had been confined to the Pine Ridge Reservation in South Dakota Cook frequently invited Red Cloud and his band members to spend time at the Ranch. From the Ranch's establishment it was always open to Native American visitors, who came to camp, hunt, sometimes work cattle, socialize, and counsel with Jim Cook (Meade 1994). The most frequent visitors were probably Cheyennes or members of Red Cloud's band. The Ranch also employed African Americans as ranch hands during its historic operations, and possibly former members, friends, or relatives of the Buffalo Soldiers stationed at Fort Robinson. Professional paleontologists and/or geologists were also frequent Ranch guests, and the Ranch continues to operate today as a working cattle ranch. Ranch operating records from the James and Harold Cook eras are held in the Agate Fossil Beds National Monument archives.

Agate is located at the northern edge of what is now identified as the High Plains physiographic province, which is bounded on the north by the Pine Ridge escarpment. About 20 million years ago it was a grassland savannah in the rain-shadow of the rising Rocky Mountains, with meandering streams and abundant wildlife (Hunt 1984, Kiver and Harris 1999). Increasing drought during the Early Miocene apparently resulted in the death of herds of mammals around shallow waterholes. Remains of these animals were subsequently buried under the silt and ash that, even later, were exposed in what are now the upper breaks of the Niobrara River valley at Agate. Native people have taken note of these remains for generations (cf. LeBeau 2002), and they were the focus of professional paleontologists and geologists from the late nineteenth century to the present time.

The Agate natural environment is presently a mixed grass prairie with an extensive wetland along the Niobrara River meanders and springs, with impacts from a century of domestic cattle and horse grazing and haying operations but no extensive disturbance of the native sod. The landscape has been managed as a national park with minimal development for thirty years. There is a resident white-tailed and mule deer population, occasional antelope, with accompanying small mammals, frogs and snakes, turtles, and a range of birds including golden and bald eagles, meadowlarks, lark buntings, and sparrows. There is reliable scientific documentation of most of Agate’s floral and faunal resources.

Agate Fire Management History

There is quite a bit of written documentation about the natural history of the Agate landscape, including published histories (H.J. Cook 1968, J. H. Cook 1980) and extensive archival records of the Agate Springs Ranch operations from the 1800s to the present. Kyle Wendtland (1993) conducted fire research at Agate from 1988 to 1992, and noted the presence of Agate

fire records since 1961 but didn't provide any references; none is known today. In addition to some small research "prescribed" fires set by Wendtland, there is a record of the September 1990, 10.5-acre Scout creeping ground fire north of the Niobrara River in the vicinity of the Buckley field. This humanly caused wildland fire extended from south of River Road to the river. The records suggest that there has been no other wildland fire on what are now Agate fee lands in the past century, despite Dodd and Smith's (1994) evaluation that prior to Euroamerican settlement of the area fires probably occurred at five to ten year intervals.

Agate currently participates in the Northern Great Plains Area Fire Management group, based at Wind Cave National Park, under an Interpark Agreement (NGPAFM 2003), which arranges for funding for Agate fire support. The group assists in the development and implementation of wildland fire prevention, preparedness, and suppression at Agate, as well as in the coordination and implementation of prescribed fire programs, fuel treatment, and fire use programs according to Agate's fire management plan (see attached). Agate also cooperates with the Harrison Rural Fire Protection District in fire control activities on park lands or outside of the park within a Mutual Aid Zone (AGFO/HRFPD 2002).

Public Scoping Issues

A public scoping meeting about the proposed fire management program was held at the park on January 10, 2002, after a news release to regional papers had been distributed on December 20, 2001 (Appendix). Coincidentally letters notifying tribes of the park's intent to consider initiation of prescribed fire on park lands was sent to all of Agate's consulting Native American tribes, inviting general comment. The scoping meeting was led by Agate Superintendent Ruthann Knudson, Scotts Bluff National Monument Superintendent Valerie Naylor, and Northern Great Plains Fire Management Officer Bill Gabbert, with several Agate staff members as well as the Northern Great Plains Fire Ecologist participating. Five members of the public participated in the discussion, and none provided written comments. The primary concern during the discussions was control of wildfire and/or prescribed fire within Agate's fee land boundaries, and compensation of neighboring ranchers if fire escaped on to their lands. The consensus was that fire is always potentially dangerous, but that it was an appropriate tool on Agate's ungrazed prairie. In response to the tribal letters of intent, five tribal organizations (Crow Tribe, Pawnee Tribe of Oklahoma, Shoshone-Bannock Tribes, Cheyenne and Arapaho Tribes of Oklahoma, and Three Affiliated Tribes) responded and all were supportive of the use of fire to manage Agate park lands; all responding tribes asked to be kept informed of the program and project activities.

Compliance Issues

Section 106 of the **National Historic Preservation Act** (NHPA) as amended (16 U.S.C. 460) requires that Federal agencies take into account the effect of any undertaking on "any district, site, building, structure, or object that is included in the National Register." NHPA Section 110(a)(2) directs Federal agencies to "exercise caution" that any properties eligible for the National Register of Historic Places not be inadvertently demolished or substantially altered. The entire Agate Fossil Beds National Monument landscape is in process of nomination to the National Register as a cultural landscape. Hence the proposed project design must be developed

in consultation with the Nebraska State Historic Preservation Officer and, if appropriate, with the Advisory Council on Historic Preservation. The Bone Cabin Complex within the landscape is already listed on the Register. Thirty-one Native American tribes have been determined to be culturally affiliated with the Agate landscape, and within that landscape the Crazy Buffalo Complex traditional cultural property is considered to be eligible for Register listing. Given the tribes' affiliation with the park, Agate is particularly concerned about its compliance with the **American Indian Religious Freedom Act** (42 U.S.C. 1966), **Executive Order (E.O.) 13007** (**Indian Sacred Sites;** 61 FR 26771), and **E. O. 13175** (**Tribal Consultation**; 65 FR 67249) supplemented by U. S. Department of the Interior **Departmental Manual** (512 DM 2, 3) and **Environmental Compliance Memorandum** (ECM97-2). These require consultation with tribal representatives and consideration of trust resources and spiritual values throughout the management process.

The proposed use of prescribed fire at Agate could involve ground-disturbing activity that must comply with requirements of the **Archaeological Resources Protection Act** as amended (16 U.S.C. 470a) to avoid disturbing any archeological sites. In addition, the **Native American Graves Protection and Repatriation Act** (25 U.S.C. 3001-3013) requires that if any Native American cultural items are discovered in an emergency situation when no such items were expected to be found, disturbance of the items must immediately cease until appropriate tribes are consulted about treatment of the remains.

The proposed use of prescribed fire at Agate could involve ground-disturbing activity affecting fossils that must comply with the **Antiquities Act** of 1906 (P.L. 59-209, 16 U.S.C. 431-433).

The **National Environmental Policy Act** (NEPA)as amended (42 U.S.C. 4321) requires that, prior to initiating any major action that affects environmental quality, a detailed statement of the proposed action's alternatives, effects, and commitments of resources be developed in consultation with interested parties. Because of the complexities of the cultural and natural interactions involved with this fire management proposal, and the long-term government-to-government relations among the Service and federally recognized tribes, this document has been developed in consultation with organizations and individuals listed below. It is also being made available to the general public for review and comment before being implemented.

The proposed project must also comply with requirements of the **Clean Air Act** as amended (42 U.S.C. 7401 et seq.), **Clean Water Act** as amended (33 U.S.C. 1251 et seq.), **Endangered Species Act** as amended (16 U.S.C. 1531 et seq.), **E.O. 11988** (**Floodplain Management**; 42 FR 26951) and **E.O. 11990** (**Protection of Wetlands**; 42 FR 26961), and **E.O. 12898** (**Environmental Justice**; 59 FR 7629) as well as with the **Occupational Safety and Health Act of 1970** (29 U.S.C. 650).

Environmental Impact Issues Relevant To the Proposed Action

The staff at Agate has determined that a wide range of proposed actions, environmental resources, and potential effects merits address in this evaluation of the use of prescribed fire on Agate lands. While there is not a neat list of topics that must be addressed in 40 CFR 1500 ("Regulations for Implementing the Procedural Provisions of the National Environmental

Policy Act"; Council on Environmental Quality, 1978), given NEPA's broad definition of "environment" this Environmental Assessment addresses these issues:

- Cultural Resources: archeological sites, historic properties including cultural landscapes and traditional cultural properties, and ethnographic resources;
- Natural Resources: fossil and associated geological deposits, soils, wetlands and floodplains, exotic species, threatened and endangered species, fuel load, state-listed rare plants, and hydrologic and air resources; and
- Human Resources: socioeconomic resources, health and safety, environmental justice.

An overview of Agate's natural, cultural, and human environment is presented following the discussion of proposed project alternatives. This description of the park environment provides a context within which to address specific impact issues, as identified above, and identifies some environmental characteristics (e.g., soils) that are not adverse issues for this evaluation. The proposed action has no conflicts with land use plans, policies, or controls for the area, and doesn't affect energy requirements and conservation potential, prime and unique agricultural lands, or ecologically critical areas (e.g., wilderness, wild and scenic river).

ALTERNATIVES

The following reasonable alternatives were developed in discussions among an interdisciplinary team of park preparers and consultants, as identified later in this document.

Alternative 1. No New Action, Total Wildland Fire Suppression Continues

Agate's current fire management policy (AGFO 1988) is as follows.

> A. Suppress, by utilizing a direct control strategy, all wildfires that threaten human life, developed property, to leave park boundaries, or to adversely impact cultural (paleontological [*sic*] or historic) resources.
> B. Suppress, by utilizing a containment strategy, all other wildfires when they reach an existing firebreak or a suitable location to initiate a backfire.
> C. Suppression will be done in a prompt, safe, aggressive and cost effective manner commensurate with minimum damage to park resources.
>
> Should an outside agency participate in the suppression of fire with the Monument, it must be recognized that Monument personnel are ultimately responsible for the protection of natural and cultural resources. The use of heavy equipment, e.g., bulldozers or other vehicles which may excessively disturb surface or subsurface resources will not be allowed except to save human life. Smaller, less intrusive, vehicles will be used only when other methods of extinguishing the fire are not practical.

Wildland fire suppression activities at Agate work from established roads and trails throughout the park, including River Road and well roads that extend from River Road north and south to private property wells. Firefighters are provided with sensitivity maps for the protection of cultural and geological/fossil resources with known scientific and cultural values, so those resources can be avoided by mechanical disturbance and, in the case of the Bone Cabin and

Hoffman House, provided special protection. These maps are returned to park files after their use, so their locational information is not retained in public.

Under Alternative 1, no mechanical reduction (mowing) of hazardous fuels for fire management is authorized, nor is the use of prescribed fire for general fuel load reduction. Mowing around the Agate Visitor Center and Museum and picnic areas, Bone Cabin Complex, maintenance facility, and five employee residences is done as part of the park's landscape maintenance and human safety program. While this has obvious benefits in minimizing potential impacts of wildfire, it is not conducted primarily for fire control. Mowing is currently an element in Agate's integrated Canada thistle control program in heavily infested and machine-accessible areas. This is not an authorized fire management effort, and results in increased duff in the mowed areas.

The use of prescribed fire to enhance resources is also not authorized if this alternative is accepted. A new Agate fire management plan will be developed to comply with current nationwide Service policy, but the park-specific policy underlying that plan will remain essentially unchanged from what it has been since 1988.

Inferred within this wildland fire management policy is a directive to wet down all park structures, including the Visitor Center and Museum, if they are threatened, but to leave the structures and move to a position of personal safety unless one is a qualified structural firefighter. This directive is the same for all alternatives offered here.

Alternative 2 (Preferred). Fire Management Program includes Suppression and Prescribed Fire

Agate managers prefer to implement a multi-faceted fire management program at the park that includes suppression of wildland fires as discussed under Alternative 1, as well as the use of prescribed fire to reduce Agate's hazardous fuel load. The park would like to use prescribed fire to enhance the park's native ecology, specifically to reduce the current infestation of cheatgrass (*Bromus tectorum*); reduce the Canada thistle (*Cirsium arvense*) seedbed and infiltration among willows that persists despite an active thistle control program (Knudson 2003); and possibly increase the proportion of native forbs in the Agate prairie.

Agate is set within steep valley walls and draws, with unpredictable updrafts. In the main Niobrara Valley terraces and intervening wetlands, hazardous fuel may be safely burned under prescription whereas wetlands aren't always accessible for mowing. Detailed evaluation of the Agate landscape, using information held in relational vegetation, Canada thistle insectaries, hydrological, soils, cultural, fossil, geological, and infrastructure graphic databases, has assisted in developing the safest, more resource protective/enhancing, and feasible fire management plan to meet a variety of park management objectives under Alternative 2.

As mentioned under the discussion of Alternative 1, prior to conducting a prescribed fire at Agate firefighters would be provided with resource sensitivity maps, so those areas can be protected from mechanical disturbance or provided special protection as needed.

As mentioned previously, Agate participates in the Northern Great Plains Area Fire Management group as well as under a Mutual Aid agreement with the Harrison Rural Fire Protection District.

Firefighters and engines from these organizations, as well as other local and federal firefighting units in the area, would be called on to participate in any prescribed fire on Agate lands. A Fire Management Plan (see attached) and included Fire Effects Monitoring Plan has been developed to implement Alternative 2 use of prescribed fire, should that be the accepted alternative.

Alternative 3. Fire Management Program includes Suppression and Mowing without Prescribed Fire

Following this alternative, the park would continue to suppress wildfires, would mow some natural vegetation to reduce hazardous fuels on its lands, and would not use prescribed fire as discussed in Alternative 2. Prairie lands on the 15' or Holocene terraces would be mowed, and on the alluvial fans that extend from that terrace north or south to the park boundaries. The accessible T1 terrace (~6"-1' above the river) would also be mowed, but the rest of the wetlands are not mower-accessible. Mowing would be done with a flail and/or sickle mower followed by removal of vegetation by a rake and baler. The work could be done by park staff or a contractor. Up to 1200 acres of the contiguous park lands would be mowed. The valley bottom/terraces (~25 acres) in the Stenomylus Quarry section would also be mowed. Prescribed fire would not be used to reduce the hazardous fuel loads on the Agate landscape, thus addressing some local concerns about potential out-of-control fires.

Summary Assessment of Alternatives and Associated Environmental Consequences

For ease in evaluating the impact of these alternatives, and based on the detailed discussion presented in a subsequent section, the following table (Table 1) summarizes the environmental consequences associated with each alternative. Those consequences are discussed in detail later in this document.

Table 1. Alternatives and Associated Environmental Impacts

ALTERNATIVES: **AFFECTED ENVIRONMENT:**	**1 (No New Action; Suppression only)**	**2 (Suppression and Prescribed Fire [PREFERRED])**	**3 (Suppression and Mowing)**
Archeological Sites	Negligible to minor adverse direct impacts		
Historic Properties, including Cultural Landscapes and Traditional Cultural Properties	Negligible impacts		
Ethnographic Resources	Negligible impacts		
Fossils and Associated Geological Deposits	Negligible impacts		
Soils	Negligible impacts		Moderate direct adverse impacts
Flora (general)	Minor direct beneficial impacts		
Fauna (general)	Negligible impacts		

ALTERNATIVES: AFFECTED ENVIRONMENT:	1 (No New Action; Suppression only)	2 (Suppression and Prescribed Fire [PREFERRED])	3 (Suppression and Mowing)
Wetlands and Floodplains	Minor direct beneficial impact possible, otherwise negligible impact	Minor direct beneficial impacts	Minor direct beneficial impact possible, otherwise negligible impact
Threatened and Endangered Species	No such species in the park		
Exotic Species	Minor site-specific and local direct beneficial impact possible, otherwise negligible impact	Moderate site-specific and local direct beneficial impact	Minor site-specific and local direct beneficial impact possible, otherwise negligible impact
State-Listed Rare Plants	Negligible impact		Minor direct adverse impact
Fuel Load	Minor direct beneficial impact possible, otherwise negligible impact	Moderate beneficial impact	Minor direct beneficial impact possible, otherwise negligible impact
Hydrological Resources	Negligible direct site-specific and local adverse impact		
Air Resources	Minor direct site-specific and local adverse impact		
Socioeconomic Resources, including Health and Safety and Environmental Justice	Minor local indirect beneficial impact possible, otherwise negligible impact except for risk of fire escape	Minor local indirect beneficial impact, except for risk of fire escape	Minor local indirect beneficial impact

THE AFFECTED ENVIRONMENT INCLUDING HISTORIC PROPERTIES

Cultural Resources

Agate's long-term objective is to identify and preserve all the cultural resources found on its fee lands, as well as identify those cultural resources found on non-federal lands within the Agate boundaries. The area of cultural resource analysis is Agate fee-owned lands.

Archeological Sites

Most of Agate's surface-evident archeological sites (95) have been inventoried by qualified specialists over the past 25 years, and all of these sites are known or presumed to be in good condition. Field condition assessment of all known sites will be documented during 2004. Figure 2 indicates the areas of documented site inventory. Most of the known sites only have components older than 150 years, with flaked stone artifacts or pieces of pottery, and all of the known deposits are sparse, even to depths of 120cm (Clark 1993:12). Test excavations (e.g.,

Clark 1993, 1994; Olinger 1980; Wandsnider and MacDonell 1997) have provided little information about the period(s) in which the sites were occupied. While there are one or two artifacts that were probably first manufactured up to 9,000 years ago, most of the material appears to date to the last thousand years. However, as mentioned previously, the Agate landscape has probably been used by people for the past 11,000 years.

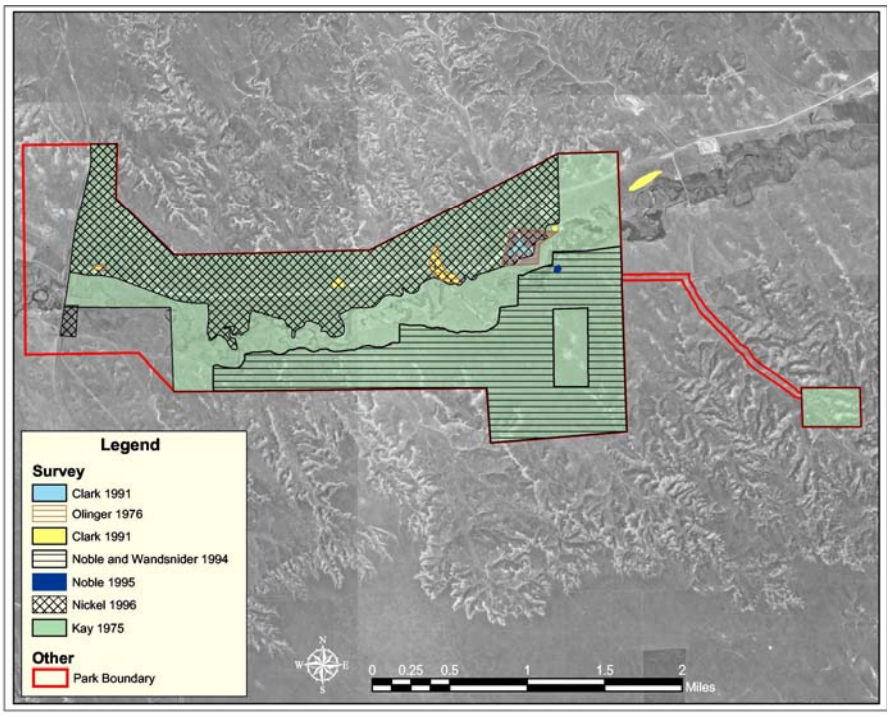

Figure 2. Agate Fossil Beds Monument Archeological Survey Coverage

Historic Properties (including Cultural Landscapes and Traditional Cultural Properties)

The original archeological surveys of Agate lands (Kay 1975) inventoried a large number of sites in part because cattle grazing had only ended the previous year and the ground surface was readily apparent. By the time Nickel (2002) resurveyed the northern portions of the park in 1996, the buildup of grass and duff made the surface difficult to see. There is evidence of two historic homesteads and one historic Euroamerican gravesite in the Agate archeological record, and there are probably a few more remnants of the early twentieth century homesteading effort in the Niobrara River Valley. One of these historic sites is within the Bone Cabin Complex (see below).

Adverse impacts to these resources would cause the loss of scientific and humanistic information values, either from disturbance of the archeological site context or from changes in the artifact form (e.g., potlidding of flaked stone artifacts so as to modify or destroy their temporally diagnostic scar patterns, melting of glass artifacts, or burning of structural timbers).
Agate's Bone Cabin Complex (NeHBS #SX00-28) is a historic property listed on the National Register of Historic Places (Sanford n.d.), and the vernacular Cabin and associated windmill and fence have been restored. These structures are listed on the List of Classified Structures, as are several rock mounds presumed to be >100 years old and associated with Native Americans. The

latter are part of Agate's traditional cultural property suite within the Agate cultural landscape, as discussed below. The Hoffman House is near the Bone Cabin Complex. It was constructed in 1952, is now Register-eligible as a feature within the Agate cultural landscape, and is currently used as an Agate employee residence.

All the lands within the Agate park boundaries are in the process of being documented and nominated to the National Register as a cultural landscape, with several component landscapes. The Red Cloud Campsite component landscape (NPS 2002b), which includes federal fee-owned lands south of the Niobrara River on the east side of and immediately adjacent to S. H. 29, is included within the Red Cloud Campsite area. There are no surface-evident remnants of the historic activities associated with this component landscape. The historic Fort Laramie-Fort Robinson freight trail is reported to have traversed the length of the park on the north side of the Niobrara River, but has not been documented; the late nineteenth-early twentieth century ranch roads on either side of the river through the park have also not been documented.

One complex of a dozen traditional cultural properties has been identified at Agate by the Lakota (LeBeau 2002), and the park is in the process of nominating this complex to the National Register of Historic Places as the Crazy Buffalo Complex Traditional Cultural Property. The complex consists of humanly constructed and natural rock and topographic features associated with the Lakota Crazy Buffalo tradition and related ceremonies. The Complex is considered to be a sacred site. Traditional cultural properties are considered by Native Americans to be a part of the natural landscape and ecological system, as is fire, and therefore modification of them by fire would be a natural event. However, disturbance of these properties by mechanical disturbance or inappropriate human behavior could be an adverse impact to them, as the sacred nature of the property could be violated.

Historic properties are eligible for listing on the National Register because, in part, of their integrity. These properties would be adversely affected if fire or fire suppression activities cause the properties to lose their integrity and become ineligible for the Register.

Ethnographic Resources

Agate's ethnographic resources include places, sites, structures, landscapes, and objects, which may or may not be historic or traditional cultural properties or archeological sites. As mentioned previously, these are of concern to 31 affiliated Native American tribes, as well as to the regional Euroamerican ranching community. Again, as mentioned previously, these are all considered to be part of Agate's environment that could be affected by the proposed fire program. As discussed above, these properties are considered by Native Americans to be a part of the natural landscape and ecological system, as is fire, and therefore modification of them by fire would be a natural event. However, disturbance of these properties by mechanical disturbance or inappropriate human behavior would be an adverse impact to them, as (if an attribute) the sacred nature of the property could be violated.

Biological and Geological Resources

Agate's long-term objective is to identify and preserve all the paleontological resources on its fee lands, as well as identify the geological and biological resources there (including soils, flora and fauna, hydrology, and air) and preserve the habitat and faunal community insofar as is appropriate and feasible. Although difficult to achieve in a changed modern world, the Service's goal is to restore an Agate ecosystem to a state comparable to that found on these lands in the late nineteenth century. The area of biological and geological resource analysis is the Agate fee-owned lands.

Fossil and Associated Geological Deposits

Agate Fossil Beds National Monument obviously exists in large part because of its Miocene mammal fossils and their associated paleoecological contexts. There has been a century of research on this internationally known paleontological resource, and its geological deposits. A compilation of specific fossil and related geological locality locations, their attributes, and their local, regional, tribal, national, and international significance is being documented during summer 2003. The park's goal is to protect all known localities from potential harm from uncontrolled intense heat or inappropriate mechanical or human impacts. Table 2 is a listing of Agate's presently known fossil and important (have information value) geological localities, the presence of any kind of scientific documentation (other than listing in the park database), and their proximity to present interpretive or management trails or roads.

Table 2. Agate Fossil Beds National Monument Fossil and Geological Localities

LOCALITY NAME	PROXIMITY TO TRAIL	DOCUMEN-TATION
Agate Ash Dated Section	no	yes
Agate Ash Outcrops (3 localities)	no	yes
Agate Ash Quarry	no	no
Agate Road Quarry	no	no
Artiodactyl Locality I	no	no
Artiodactyl Locality II	no	no
Beardog Hill	no	yes
Buffalo Woman Rock w/ Daemonelix	no	no
Carnegie Hill North Quarry	yes	yes
Carnegie Hill Northwest Quarry	yes	yes
Carnegie Hill South Quarry	yes	yes
Carnegie Hill Southwest Quarry	yes	yes
Carnegie Hill West Quarry	yes	yes
Carnegie Quarry 3	no	yes
Daemonelix Group	yes	no
Deep Daemonelix	yes	no
Double Daemonelix	yes	no
Hickey Locality	no	no
North Ridge	no	no
North Ridge (Carnegie Quarry A)	no	yes

LOCALITY NAME	PROXIMITY TO TRAIL	DOCUMEN-TATION
North Ridge North Outcrop	no	no
North Ridge South Outcrop	no	yes
Paleodunes	yes	no
Paleocastor skull	no	no
Stenomylus Quarry	no	no
University Hill	yes	yes
University Quarry	yes	yes

NB: Most of the data is from Hunt 1984

These localities are identified on Agate's GIS database, and their general area will be identified on sensitivity maps to be protected and/or avoided during wildland fire suppression or prescribed wildfire.

Soils

Agate's soils (NRCS 1998) are mapped and those data are available as a rectified AGFO GIS data layer; they are summarized in Table 3 and their distribution illustrated in Figure 3. The darkest soils represent the Niobrara River wetlands (Lc, Bh soils), while the major terraces with their native grasslands and exotic cheatgrass (OwB, AwD soils) and frequent archeological associations, and the higher slopes (AwE soils) are represented in the intermediate grays. The butte tops and breaks are the lightest gray to white (BxE, RkG, TbG soils) and have frequent traditional cultural property and fossil/geological associations. The complex terrain is illustrated by the interfingering of the various soil distributions.

The Agate soils are categorized as "Well Drained and Somewhat Excessively Drained, Sandy and Loamy Soils on Hillslopes, Alluvial Fans, and Stream Terraces" in either the Mitchell-Otero-Ashollow or Otero-Las Animas-Lisco associations (NRCS 1998). The soils receive little rainfall during the summer, which can result in soil blowing. Once vegetation is crushed, and indentations are made in the friable topsoil, the damage to vegetation and soil lasts for many growing seasons but would not change the fundamental nature of the soils.

Table 3. Agate Fossil Beds National Monument Soils

SYMBOL	SOIL NAME	COMMENT
AwD	Ashollow loamy very fine sand, 3%-9% slopes	Terraces about 4420' elevation
AwE	Ashollow loamy very fine sand, 9%-20% slopes	Slopes above the 4420' terraces
Bh	Bigwinder fine sandy loam, 0%-1% slopes	River channel, wetlands
BxE	Busher-Tassel complex, 6%-20% slopes	Ridges either side of the Fossil Hills
Lc	Las Animas-Lisco complex, 0%-2% slopes, occasionally flooded	Terrace 1'-2' above water level
OwB	Otero loamy very fine sand, 0%-3%	Terraces about 4400'

SYMBOL	SOIL NAME	COMMENT
	slopes	elevation; Visitor Center and Museum level
RkG	Rock outcrop-Tassel complex, 9%-70% slopes	Fossil Hills, Stenomylus Quarry hill
TbG	Tassel-Ashollow-Rock outcrop complex, 9%-60% slopes	Tableland, with Daemonelix in the edges of these

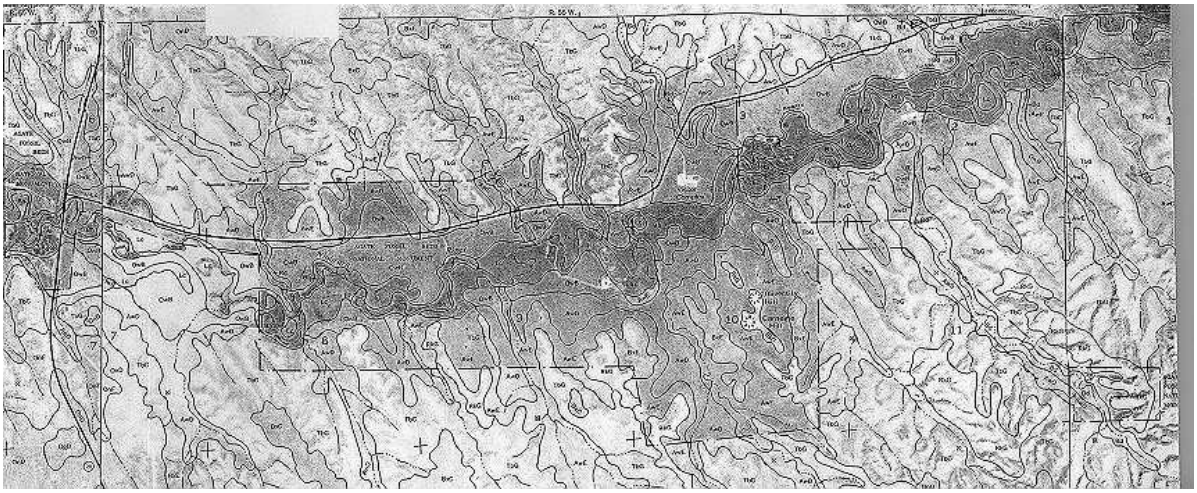

Figure 3. Agate Fossil Beds National Monument Soils Distribution Map

Flora (general)

Agate has a relatively complete inventory of its plant community, which has been mapped (http://biology.usgs.gov/npsveg/AGFO), and the lichens have been documented (Wetmore 1998). Agate is part of the Prairie Cluster Long-Term Ecological Monitoring program (DeBacker and Mlekush 2000, Thomas et al. 2001), and is a member of the Northern Great Plains Inventory and Monitoring Network (2001).

The vegetation communities are structured into wetlands, terrace and slope mixed prairie grasslands, and valley breaks and tablelands. The park is

> …in the central portion of the northern mixed-grass prairie of the high plains. Two-thirds of the park's 3,000 acres consist of mixed grass prairie, the most common type being sandreed/sand bluestem prairie. Needle & thread/blue grama prairie occurs on shoulders of flat-topped hills and on eroding sandstone slopes on the sides of hills, while western wheatgrass, willow and cottonwoods are common to the floodplain of the Niobrara River. The Niobrara River, originating 60 miles to the west, provides important habitat for prairie birds and wildlife. Seasonally flooded gravel washes provide habitat for several state listed rare plant species. (Thomas et al. 2001:A-2)

The near-century of domestic cattle and horse grazing across the Agate landscape (which ended in 1974) has resulted in a relative forb (e.g., aster, puccoon, lupine, vetch, phlox)-poor prairie. Burning across the prairie in summer or fall could promote better forb growth, whereas burning in the spring would promote growth of grasses.

Fauna (general)

Agate has a relatively complete inventory of its plant and animal communities, including its birds (Powell 2000), fish (Stasiak 1990), and mammals, reptiles, and amphibians (Graetz, Garrott and Craven 1995). The park supports most of the animal species characteristic of the northern Great Plains (92 birds, 31 mammals, 16 reptiles, 6 amphibians). Both white-tailed and mule deer are common, as are coyotes, badgers, pocket gophers, cottontail rabbits, kangaroo rats, woodrats, moles, and deer and pocket mice. Prairie rattlesnakes, racers, and garter snakes are present, as are lizards, toads, and frogs. Powell (2000) recorded 50 species of birds at Agate, including western meadowlark, lark bunting, grasshopper sparrows, red-winged blackbirds, and lark sparrows in descending order of abundance. Great blue herons, wood ducks, mallards, red-tailed hawks, kestrels, prairie chickens, bobwhites, killdeer, doves, short-eared owls, flickers, phoebes, kingbirds, swallows, longspurs, grosbeaks, dickcissels, and goldfinches are also present, and golden eagles are occasionally sighted.

The Niobrara River through the park supports a macroinvertebrate fauna probably once typical of the western portion of the high plains, a mixture of Midwestern, Rocky Mountain, and widespread species (Harris, Kondratieff, and Boyle 1991; NPS 1998a: 4-54-55). This fauna is indicative of the health of the small river. The sandy to sand/mud stream substrate receives a lot of solar radiation, but doesn't support much surface algae.

Wetlands and Floodplains

Agate's riverine wetlands are recognized by the U. S. Army Corps of Engineers and are included in the National Wetland Inventory (http://wfs.sdstate.edu). They are recognized as wetlands by the State of Nebraska (cf. LaGrange 1997). They cover approximately 468 acres of the Agate fee-owned landscape and consist of western wheatgrass [*Pascopyrum smithii*], Baltic rush [*Juncus balticus*], and cattail [*Typhus latifolia*] herbaceous vegetation and sandbar willow [*Salix exigua*] shrublands. They appear to contribute litter and detritus to the Niobrara River that meanders through them at a very low gradient. Canada thistle (*Cirsium arvense*) has infiltrated the willow shrubland.

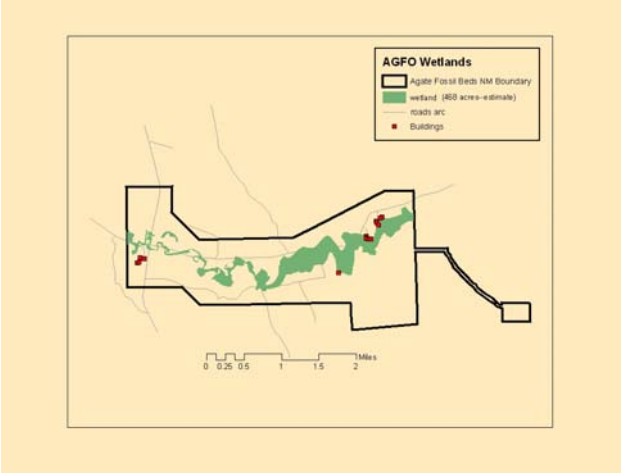

Figure 4. Agate Fossil Beds National Monument Wetlands Map

The Agate Fossil Beds National Monument floodplain is coincidental with its wetlands supplemented by the low (6"-1') Niobrara River terrace adjacent to the wetlands. This floodplain is set down 15'-20' within the park's primary Holocene terraces, which date to 6737±53 ^{14}C years before present at their base and range up to 1,410±37 ^{14}C years before present about 1' below their present surface (Sabin 2002).

Threatened and Endangered Species

There are no federally or Nebraska-listed threatened or endangered plant or animal species resident at Agate Fossil Beds National Monument.

State Listed Rare Plants

The vegetation on public and private Agate park lands was thoroughly inventoried in the mid-1990s (USGS 1998), and has been part of the Prairie Cluster Long-Term Ecological Monitoring program since 1995 (Thomas et al. 2001). During these inventories six species of plants of special concern, as listed in Table 4, have been identified on Agate fee lands.

Table 4. Nebraska-Listed Plants of Special Concern

SPECIES	COMMON NAME	NEBRASKA STATUS*
Chenopodium subglabrum (S. Wats.) A. Nels	Smooth goosefoot	S3
Erigeron ochroleucus Nutt.	Buff fleabane	S2
Eriogonum cernuum Nutt.	Nodding wild buckwheat	S1
Fritillaria atropurpurea Nutt.	Purple mission bells	S2
Phacelia hastata Dougl. ex Lehm.	Scorpionweed	S2
Tripterocalyx micranthus (Torr.) Hook.	Small-flowered sand verbena	S1

*S1=critically imperiled, S2=imperiled, S3=rare or uncommon, SU=status undetermined; NNHP 2002

Exotic Species

Based on all of Agate's plant and animal resource documentation (NPS 2002a), the park is known to contain 49 exotic plant species and 11 exotic animal species (10 birds, 1 fish). Of these, only two species (Canada thistle [*Cirsium arvense*] and cheatgrass [*Bromus tectorum*]) are targeted for treatment because of their relatively wide distribution across the park ecosystem and adverse impacts to the native vegetation. Canada thistle is listed as a noxious weed in Nebraska (Noxious Weed Control Act [Neb. Rev. Stat. § 2-945 et seq.], 25 NAC 10 et seq.). The thistle is limited to the low (~6"-1' high) Niobrara River terraces and interfingers with the wetland cattails and willows. The cheatgrass is densest on the 15' or Holocene terraces and associated alluvial fans that have been disturbed by plowing or domestic grazing in the past century or so, including the area of the Buckley and Hoffman fields and the Hoffman corrals and horse pasture.

In 1997 Canada thistle (*Cirsium arvense*) had infested some 125 acres of park fee lands. The NPS (1999:5) is working toward control of these nonnative species where they jeopardize native plant communities. An integrated pest management program was initiated in 1997 to control this

exotic weed, including the establishment of eight insectaries with varying percentages of *Ceutorhyncus litura* (stem-mining weevil) and/or *Urophora cardui* (stem and shoot gall fly).

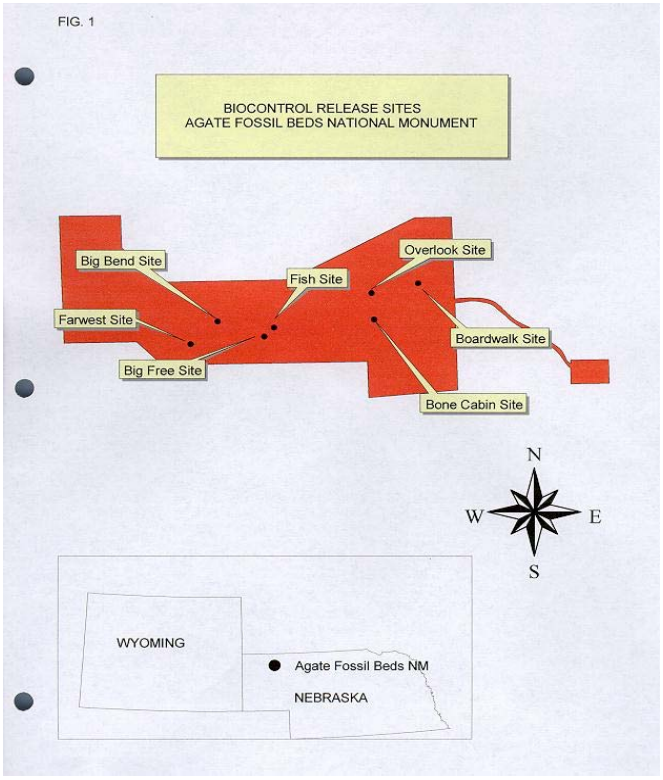

Figure 5. Biocontrol Release Sites, Agate Fossil Beds National Monument

Infested acres outside of the insectaries are mowed before the set of thistle heads and/or treated with herbicide after the first killing frost. The program has been documented in Agate's Geographic Information System data layer and two annual reports (Gray 2002, Howard 2002), and by 2002 this infestation had been reduced to 25 acres (Knudson 2003). However, with a wet spring in 2003 the thistle increased its spread to some 50 dispersed low density acres. Fire or mechanical disturbance of the insectaries in the spring would inhibit initial development of the weevils or galls in the young thistle plants, and would destroy them in the early summer (June-July) when they are in the stems. A quick hot fire through these areas in the fall would probably have only minor adverse impacts, and this would be mitigated in the gall fly release areas if the galls were harvested prior to burning.

Based on a 2002 field assessment, it was estimated that some 200 acres of park fee lands were infested with *Bromus tectorum* (cheatgrass). This is generally confined to the Hoffman corral areas on the terrace south of the Niobrara and the Bone Cabin Complex, and to the Buckley oldfield that was planted to potatoes for a year or so in the mid-1950s. Wendtland conducted a small fire research project in the northern area of the oldfield and noted that cheatgrass was the primary grass in his study plots (1993:31) but that there were also quantities of native western wheatgrass (*Agropyron [Pascopyrum] smithii*), needleandthread grass (*Stipa comata*), and blue grama (*Bouteloua gracilis*). Dodd and Smith (1994:5) recommended fall burning of cheatgrass-infested areas to destroy newly germinated seedlings.

Fuel Load

Since Agate "routinely [has a] continuous cover of [mixed grass] fuel loads that exceed the minimum necessary to spread fire during late summer and early fall it is prudent to conclude [it] probably had fire return intervals of five years or less" (Dodd and Smith 1994). Based on graduate research by Kyle Wendtland (1993), research supervisors Dodd and Smith recommended that Agate's nineteenth century ecosystem (including the wetlands) could be restored by the managed use of summer fires, probably in August, with a return interval of five years or less. Dodd and Smith recommended that if fall burns are used they should be done every two or three years. While they further recommended that spring burns should be avoided completely because of adverse impacts on the grassland communities, this merits reconsideration in the development of specific burn plans based on detailed vegetation and soils maps.

Hydrological Resources

There are eleven miles of Niobrara River meanders through the west-east length of Agate Fossil Beds National Monument, without any feeder streams. The area of analysis for this assessment is the Niobrara through the park and approximately two miles downstream through private property. This area would include any potential short-term increase in suspended solids in the river as the result of fire burning to or across the river on park lands, whether during wildfire suppression or prescribed fire. The park's wetland vegetation makes it likely that there would be very few if any such solids, because the cattails under the water table and riparian willows will hold sediments.

There has been some reduction of river discharge over the past 30 years, which researchers in the early 1990s thought could be because of upriver groundwater withdrawals (Harris, Kondratieff, and Boyle 1991; NPS 1998a:5-10). Groundwater monitoring in the park was initiated in 2003.

> The Niobrara River is a perennial groundwater supplied stream. The flow is consistent with few flood or low water events. …The concentrations of total nitrogen and pho[s]phorus are relatively low compared to most streams indicating that few nutrients are being added. The organic carbon concentrations are low for a range of streams but within that expected for the prairie grassland region…(Harris, Kondratieff, and Boyle 1991; NPS 1998a:3-29).

The average discharge documented by the USGS (Boohar, Hoy, and Steele 1991:42) was 13.6ft.^{3}/s or 9,850 acre-ft/year, with peak flows February through April and lower flows July through September. A new Niobrara River gaging station was installed in 2003 to monitor river flow, with publicly available records maintained by the Nebraska Department of Natural Resources.

Air Resources

The air resource area of analysis for this fire management program assessment, given the average wind direction and speed and local population dispersion discussed below, is defined as the park and an area approximately five miles in all directions.

Agate has a Remote Access Weather Station (RAWS) that records hourly temperature, humidity, wind speed, maximum wind speed, wind direction, precipitation, and fuel stick temperature and

moisture. From July 1997 to September 2002, Agate temperatures ranged from -22°F. to104°F., with maximum temperatures of 95°F. to 104°F. in June through August. Minimum temperatures in December through February ranged from -5°F. to the low -22°F. Mean annual precipitation at the park was 10.91", ranging from 12.97" in 1998 to 5.85" in 2002 with most of it falling from January to August. The prevailing mid-day winds recorded from 1987 through 2000 were predominantly from the northwest, secondarily in descending order from the west, southwest, and south, and were only calm 12% of the time. During the period for which records are presently available at the park (October 1, 2001, through February 28, 2002), the average wind speed was 13 mph with a range from 0pmh to 40mph (February norther).

A National Oceanographic and Atmospheric Administration U. S. Climate Reference Network meteorological station was installed in the park in late August 2003, and it will eventually provide real time quality-assured Internet-accessible temperature, wind, and precipitation data.

The Niobrara River valley and its included wetlands through the Agate Fossil Beds National Monument is incised some 250’ below the surrounding tablelands. The prevailing northwesterly and westerly winds across these tablelands are often drier and warmer than the air down in the valley, resulting in local inversions that hold in cool moist air. For example, from 1 October 2001 through 28 February 2002, Agate’s daily RAWS-recorded humidity reached 100% 40 nights, about 25% of the time, with most of the humidity in October and November. Scheduling prescribed fires has to take this microclimate into consideration.

Air quality and visibility at Agate are good. John Ray (2002; cf. EPA 2000), NPS Air Quality Specialist, estimates that over the past five years the ozone levels at Agate have been below the Environmental Protection Agency’s Primary Standard, with the fourth highest annual daily eight-hour maximum ozone level being 68-75ppb (85% of the current National Ambient Air Quality Standards) and the average annual daily one-hour maximum at 87-98ppb (74% of the older Standard).

Smoke from wildland or prescribed fires could create a localized, short-term air quality and safety concern. The state of Nebraska doesn’t regulate smoke emissions from prescribed fires. The EPA (1998) has a recommended policy for smoke management during prescribed fires that is based on two public policy goals: “…(1) to allow fire to function, as nearly as possible, in its natural role in maintaining healthy wildland ecosystems, and (2) to protect public health and welfare by mitigating the impacts of air pollutant emissions on air quality and visibility.”

Socioeconomic Resources, including Health and Safety and Environmental Justice

Agate Fossil Beds National Monument is located in a relatively isolated, rural environment, and the area of analysis for this assessment includes ranches and communities within a 35-mile radius of the park. The closest community, Harrison (Sioux County seat), is 22 miles north of the park and has a population of 276. Mitchell is 34 miles south of Agate and has a population of 1,831. Sioux County, in which Agate is relatively centered, has a population of 0.7 persons/mi.^{2}, most of who are of Northern Euroamerican background. The minority population in the county is less than 1%. Most Sioux County adults work on farms, and the county and local governments, including the public schools, are the largest institutional employers in the county (Imerman

2002). The Sioux County per capita income in 2001 was $15,563, and 9% of the families in the county were below the poverty level in 1999 (U. S. Census Bureau 2003). Agate is surrounded by private ranchlands, and has two private ranch inholdings (Fig. 1). In fiscal year 2003 Agate has a full-time equivalency employment of eight persons, with eight permanent full- or part-time employees and 5 seasonal employees. Three Volunteers-in-Park were also part of the park "staff" during 2003. Most of the Agate employees live in Sioux County, and half of them are involved in ranching.

Agate has had 18-17,000 visitors each of the past three years, who come to see the landscape and its historic paleontological quarries, and hike the four miles of pedestrian trails, as much as they do to see the paleontological and Native American exhibits. Visitor use is projected to be steady or slowly increasing over the next five to ten years.

Agate has access to emergency medical support from the Harrison Volunteer Fire Department, or from AirLink and Regional West Medical Center, Scottsbluff.

While Agate has its own fire engine, fire cache, and red-carded staff, as mentioned previously it has a General Agreement with the Harrison Rural Fire Protection District (and by extension of their interagency agreement, with the Harrison Volunteer Fire Department) for cooperative fire control activities. In Fiscal Years 2001 and 2002 Agate was able to provide some financial support to the District/Department through the federal Rural Fire Assistance program.

Grass and hay crops are economic commodities in ranching country, and loss of these through wildfire can have adverse effects to a ranch’s financial health. Therefore, it is important that wildfires or prescribed fires that are initiated on the Agate landscape, or that enter into it with the capability of passing through to private lands, be controlled on the Federal lands.

Protection and maintenance of firefighters and any other individuals potentially affected by wildfire or prescribed fire is a primary objective. This objective is a primary motivator in developing an Agate Fire Management Plan and individual burn plans.

ENVIRONMENTAL CONSEQUENCES

Analysis Methods

The interdisciplinary team for this environmental assessment consisted of the Agate staff and a variety of consultants, as identified in the Preparers and Qualifications section below. After definition of the alternative methods for achieving the desired goals of the proposed Agate parklands fire management program (e.g., reduce fuel load, enhance native ecosystem diversity, control exotic vegetation), and considering the affected environment, the park staff and consultants developed the outline presented earlier as Table 1 to assess the interconnectedness of resources, actions, and impacts. This assessment was based on, and complements, the objective and accurate presentation of data about the existing environment, the proposed alternatives, and the expected impacts of those alternatives on that environment.

The area of analysis and impact thresholds were defined resource by resource, as the assessment was conducted, with consideration of the intensity, duration, and timing of the potential adverse and beneficial impacts of the proposed actions on the park environment. Definitions of impact evaluation factors varied by affected resource, but the following definitions were applied across this evaluation.

- ***Impact type***:
  - *Beneficial*: A positive change in the condition or appearance of a resource or a change that moves the resource toward a desired condition.
  - *Adverse*: A change that moves the resource away from a desired condition or detracts from its appearance or condition.
  - *Direct*: An effect caused by an action at the same time and place.
  - *Indirect*: An effect caused by an action where the effect is later in time or removed in space, but is reasonably foreseeable.
  - *Cumulative*: Impacts to a resource that increase in effect, size, quantity, etc., over time; have an additive impact over the past, present, and future.
- ***Impact intensity (either adverse or beneficial)***:
  - *Negligible*: Impact at the lowest levels of detection, barely measurable with no perceptible consequences.
  - *Minor*: Impact is measurable or perceptible, with little loss of resource integrity and changes are small, localized, and of little consequence.
  - *Moderate*: Impact is measurable and perceptible and would alter a defining characteristic of the resource but not modify overall resource integrity, or the adversity could be mitigated successfully.
  - *Major*: Impacts would be substantial, highly noticeable, and permanent.
- ***Context****:*
  - *Site-specific*: Impact is limited to the area of the proposed action.
  - *Local*: Impact extends beyond the area of the proposed action, generally within five to ten miles of the specific site.
  - *Regional*: Impact extends beyond the specific or local area of the proposed action, generally within a hundred miles of the specific site.
- ***Duration***:
  - *Short-term*: An effect would no longer be detectable in resource appearance or condition within a relatively short period of time, generally less than three years.
  - *Long-term*: A change in the appearance or condition of a resource that for all purposes is permanent.
- ***Impairment***: "…[A]n impact that, in the professional judgment of the responsible NPS manager, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values. Whether an impact meets this definition depends on the particular resources and values that would be affected; the direct and indirect effects of the impact; the cumulative effects of the impact in question and other impacts" (NPS 2001:12).

Alternative 1. No New Action, Total Wildland Fire Suppression Continues

If the present total wildland fire suppression policy is maintained, with no use of prescribed fire or mowing to reduce hazardous fuels, little will change at Agate. The following environmental consequences will continue to be expected. All of the expected impacts would be short-term, and direct and site-specific unless specified otherwise.

- ***Archeological sites***: Negligible to minor adverse direct impacts of wildfire suppression are expected, given the use of sensitivity maps during fire suppression for avoidance of mechanical disturbance to sites. Archeological evaluations of the effect of grassland fire across such materials (e.g., Buenger 2001a,b; Picha et al. 1991; Ryan 2001; Sundstrom 2002) are that surface-lain stone and ceramic artifacts may be scorched and smoke-blackened, but that artifact forms and materials and depositional characteristics of subsurface deposits (even at less than 1 cm. depth) would not be modified so as to harm their information values. The park has recently consulted with the 31 culturally affiliated tribes about the park's control of wildfire on this property; the five responses received (Cheyenne and Arapahoe Tribes of Oklahoma, Crow Tribe, Three Affiliated Tribes, Shoshone-Bannock Tribes, Pawnee Tribe of Oklahoma) support fire management activities throughout the Agate cultural landscape, including over the archeological sites.

- ***Historic properties, including cultural landscapes and traditional cultural properties***: Negligible impacts of wildland fire suppression are expected. The Bone Cabin Complex and Hoffman House would be specifically protected, and mechanical intrusion into the cultural landscapes and traditional cultural properties would be avoided by limiting engines to established roads. Traces of any historic or more recent trails would remain after burning or may even be enhanced by the removal of vegetative cover. As mentioned previously, the park's culturally affiliated tribes support fire management activities throughout the park-wide cultural landscape.

- ***Ethnographic resources***: Negligible impacts of continued wildfire are expected, with engines limited to established roads and sensitivity maps provided to fire fighters. Fire over these resources is part of the native ecosystem and would not adversely affect them, but mechanical disturbance and inappropriate human behavior related to them could adversely impact traditional values.

- ***Fossil and associated geological deposits***: Suppression of wildfires at Agate will have negligible impacts to the fossil and associated geological deposits. A recent study of the effects of fire on paleontological and/or geological resources at Badlands National Park (Benton and Reardon 2002) suggested that low to moderate fire conditions have negligible to minor effects on fossils except where they are in direct contact with fuel. That is, the fossil structure and identifying characteristics, (e.g., their scientific values) are not debased. Agate's fossils and associated geological features (e.g., ancient sand dunes) are not associated with any heavy fuel load.

- ***Soils***: Wildfire suppression across park soils will have a negligible impact on them since grassland fire will not be intense and mechanical intrusion will be limited to established roads and trails.

- ***Flora (general):*** Wildfire suppression will have a minor beneficial impact on the park vegetation community. Graetz, Garrott, and Craven (1995:15) commented that:

  > Fire could also be beneficial to both animal and plant communities. Selective burning every 3-5 years would create a habitat type favored by Upland sandpipers…and Sharp-tailed grouse…. In general, fire has been shown to increase plant productivity…and plant species diversity…in many grassland communities.

- ***Fauna (general)***: Wildfire suppression at Agate is expected to have a negligible impact on the park fauna, and Graetz, Garrott, and Craven's comments apply to park animals as well as plants. Wildfire over the Niobrara River, with its included fish, amphibians, and macroinvertebrates, is not expected to be hot enough to have an impact.

- ***Wetlands and floodplains*****:** Wildfire through the wetlands (cf. Kirby, Lewis, and Sexton 1988) would have a minor beneficial impact by restoring healthier wetlands and/or the Niobrara riverbed (by decreasing the cattail or willow growth). Because of this non-adverse impact, approval of this Environmental Assessment does not require an E. O. 11990 *Statement of Findings*.

- ***Exotic species***: Wildfire suppression through areas of exotic plant growth would have moderate beneficial effects, depending on the season of plant growth. Spring or early summer wildfire through the Canada thistle insectaries could have an adverse impact on the biocontrols, but would not in the late summer or fall. Wildfires across the Agate landscape are most likely to occur in late summer or fall.

- ***Threatened and endangered species, including state-listed rare plants***: Continuation of the present Agate fire management policy would have a negligible impact on the state-listed rare plants on park lands, since a fast prairie fire would not damage their root systems.

- ***Fuel load***: Wildfire suppression across the Agate landscape would have a negligible to minor beneficial effect, depending on the path of the suppressed fire, in reducing the park's fuel load.

- ***Hydrological resources***: Wildfire across the Niobrara River, which is embedded in wetlands for most of its length through the park, would have a minor adverse effect (fire ash) on surface water quality or quantity within the park and for a short distance downstream. However, ash deposits would disperse quickly. The wildfire would have a negligible impact on park groundwater.

- ***Air resources***: Wildfire suppression on Agate parklands would be of short duration and thus have only a minor adverse impact on air quality in the park or within the local

airshed. Low population density reduces the number of smoke receptors, and the prevailing winds would dissipate smoke within hours.

- ***Socioeconomic resources, including health and safety and environmental justice***: Wildfire suppression on Agate lands could have a minor indirect beneficial impact in eliminating some of the fuel load and diminishing the risk of uncontrolled wildfire out onto local private property. The impact on regional socioeconomic resources and/or the health and safety of involved individuals would be negligible

Alternative 2 (Preferred). Fire Management Program includes Suppression and Prescribed Fire

Alternative 2 includes the continued suppression of wildfire across Agate lands, so that all of the impacts discussed under Alternative 1 apply here. There are few additional impacts from using prescribed fire as well as suppression activities.

- ***Flora (general)***: The addition of prescribed fire would have a minor beneficial impact by increasing the opportunity for additional forb colonization, hence enhancing the native ecosystem.

- ***Exotic species***: The addition of prescribed fire would have a moderate beneficial effect in assisting in cheatgrass control, and would be scheduled to have a negligible impact on the Canada thistle insectaries.

- ***Fuel load***: The addition of prescribed fire across the Agate landscape would diminish the park's fuel load, thus having a moderate beneficial impact.

Alterative 3. Fire Management Program includes Suppression and Mowing

Alternative 3 includes continued wildfire suppression as in Alternative 1, and the impacts of this activity as described above for that alternative. Alternative 3 also includes mowing of accessible terrace and alluvial fan areas, but would not use prescribed fire. There are few additional impacts from adding mowing to the park's current fire management control program.

- ***Soils***: Operation of a mower, and then a rake and baler, would disturb the fragile topsoil in the mowed area, leaving it susceptible to blowing and erosion; this would be a moderate adverse impact.

- ***Wetlands and floodplains***: Unless there was a wildfire across the wetlands, there would be no removal of litter there and thus implementation of this alternative would have a negligible impact.

- ***Exotic species***: Unless there was a wildfire across the wetlands and floodplain, and across the Holocene terraces, there would be no removal of the Canada thistle seedbed there. Thus, implementation of this alternative would have a negligible impact.

- ***Threatened and endangered species, include state-listed rare plants***: Mowing and raking across the Holocene terraces would have an minor adverse impact on the state-listed rare plants there by damaging their fragile root systems.

- ***Fuel load***: Mowing the terraces and alluvial fans would reduce the park's fuel load and thus have a minor beneficial impact. However, it would leave grassy upper slopes adjacent to rocky butte tops that are more likely to take lightning strikes and thus have a negligible impact.

- ***Air resources***: The use of mowing rather than prescribed fire to reduce the park's fuel load would diminish the likelihood of smoke impacts on local air quality but still be a negligible impact.

- ***Socioeconomic resources, including health and safety and environmental justice***: The use of mowing rather than prescribed fire on Agate lands would diminish the risk of wildland fire escaping from the park onto adjacent private lands. Use of a contractor to do the mowing and baling might be economically beneficial for the contractor.

Cumulative Impacts

Wildfire has been suppressed on Agate park lands for the past century, with the cumulative effect of hazardous fuels buildup across the landscape. Continued suppression of wildfires will continue this buildup. Implementation of the preferred alternative, suppression of wildfires on Agate lands complemented by the use of prescribed fire, will have the beneficial cumulative effect of reducing the fuel loads and allowing the park to maintain its landscape in conditions much more like those of pre-Euroamerican settlement of the Niobrara valley.

Potential Resource Impairment

Initiation of the preferred alternative would not impair any of the park's historic properties, including its cultural landscapes or traditional cultural properties, or its archeological sites or ethnographic resources. None of its fossil and associated geological deposits, soils, flora, fauna, wetlands and floodplains, exotic species, or state-listed rare plants would be impaired, nor would its hydrological or air resources.

Environmentally Preferable Alternative

Agate fire management planning Alternative 2, the preferred alternative, is the plan that would best promote America's national environmental policy as expressed in laws, regulations, and guidance. This alternative is responsible stewardship of public land and its resources, promoting a safe, healthful, productive, and esthetically and culturally pleasing surroundings. It will not support environmental degradation, will preserve America's natural and cultural heritage, and prove a balance between resource use and stewardship in the public interest. It will enhance the quality of the renewable vegetation community at Agate, supporting the regeneration of a native ecosystem. It will please the local ranching community, which sees the lack of grassland management at Agate as irresponsible, and will

not have any adverse effects on minority or low income populations. It will be a part of the park's environmental education program, communicating the benefits of responsible natural and cultural heritage stewardship to Agate visitors as well as schools and other public organizations to which the park staff make presentations. Introduction of prescribed fire complemented by suppression of wildland fires is the environmentally preferable program at Agate.

Recommendation Based On the Environmental Assessment and Assessment of Effect

Based on the information and evaluations presented above, Agate Fossil Beds National Monument prefers to institute a new Fire Management Plan and policy at the park. The new policy, presented here as Alternative 2, would be to continue to suppress wildfire and to use prescribed fire to enhance Agate's native plant communities and reduce hazardous fuel loads.

Identification of sensitivity areas in fire planning, with provisions for protection and/or avoidance as is appropriate to the specific resources, should not result in any adverse impacts to those resources. Development of a Native American Emergency Discovery Plan within a revised Agate Fire Management Plan, and adherence to it in specific burn unit planning and implementation, would fulfill the requirements of the Native American Graves Protection and Repatriation Act. Consultation with tribes affiliated with the Agate cultural landscape will involve tribal review of this draft *Environmental Assessment and Assessment of Effect* and review and comment on the Agate Fire Management Plan.

SELECTED BIBLIOGRAPHY

Agate Fossil Beds National Monument (AGFO). 1966. *Master Plan for Agate Fossil Beds National Monument.* U. S. Department of the Interior, National Park Service, Agate Fossil Beds National Monument, Harrison, NE.

----------. 1988. *Wildfire Management Plan, Agate Fossil Beds National Monument.* U. S. Department of the Interior, National Park Service, Agate Fossil Beds National Monument, Harrison, NE.

----------. 1995. *National Park Service Agate Fossil Beds National Monument Statement for Management.* U. S. Department of the Interior, National Park Service, Agate Fossil Beds National Monument, Harrison, NE.

----------. 2000a. *Agate Fossil Beds National Monument Resources Management Plan.* U. S. Department of the Interior, National Park Service, Agate Fossil Beds National Monument, Harrison, NE.

----------. 2000b. *Strategic Plan for Agate Fossil Beds National Monument, October 1, 2001, - September 30, 2005.* U. S. Department of the Interior, National Park Service, Agate Fossil Beds National Monument, Harrison, NE.

Agate Fossil Beds National Monument and Harrison Rural Fire Protection District (AGFO/HRFPD). 2002. General Agreement between the National Park Service Agate Fossil Beds National Monument and Harrison Rural Fire Protection District. On file in the park and district, Harrison, NE.

Benton, Rachel, and Jim Reardon. 2002. The Study of Fire Effects on Paleontological Resources at Badlands National Park. Report on file, Badlands National Park, Interior, SD.

Boohar, J. A., C. G. Hoy, and G. V. Steele, 1991. *Water Resources Data Nebraska Water Year 1990*. U. S. Geological Survey Water-Data Report NE-90-1.

Bradley, Edward. 1956. Geology and Ground-Water Resources of the Upper Niobrara River Basin, Nebraska and Wyoming. *U.S. Geological Survey Water-Supply Paper* 1368. Government Printing Office, Washington.

Brown, Barnum. 1929. A Miocene Camel Bed-Ground. *Natural History* 29:658-662.

Buenger, Brent A. 2001a. The Impact of Landscape Fire on Archaeological Resources. NPS Canon Scholarship Proposal. Department of Anthropology, University of Kansas, Lawrence.

----------. 2001b. The Effects of Prescribed and Wildland Fire on Archaeological Resources: A Preliminary Investigation. Presentation at the 59th Plains Anthropological Conference, Lincoln, NE.

Clark, Caven P. 1993. Archeological Survey and Testing at Agate Fossil Beds National Monument, Sioux County, Nebraska. *Midwest Archeological Center Technical Report* No. 22. U. S. Department of the Interior, National Park Service, Midwest Archeological Center, Lincoln.

----------. 1994. Archeological Investigations on Marsland Road, Agate Fossil Beds National Monument, Sioux County, Nebraska. *Midwest Archeological Center Technical Report* No. 31. U. S. Department of the Interior, National Park Service, Midwest Archeological Center, Lincoln.

Cook, Harold J. 1968. *Tales of the 04 Ranch: Recollections of Harold J. Cook, 1887-1909.* University of Nebraska Press, Lincoln.

Cook, James H. 1980. *Fifty Years on the Old Frontier as Cowboy, Hunter, Guide, Scout, and Ranchman*. 2nd ed. University of Oklahoma Press, Norman.

DeBacker, Mike. 1998. State Listed Rare Plants. Electronic message to Marten A. Schmitz, on file, Agate Fossil Beds National Monument, Harrison, NE.

DeBacker, Mike, and Karola Mlekush. 2000. Annual Status Report: 1999 Plant Community Monitoring for Agate Fossil Beds National Monument. Prairie Cluster Long-Term Ecological Monitoring Program, Wilson's Creek National Battlefield, Republic, MO.

Dodd, Jerrold L., and Michael A. Smith. 1994. Fire Ecology and Management of Scotts Bluff and Agate Fossil Beds National Monument: Final Report. Report on file, U. S. Department of the Interior, National Park Service, Agate Fossil Beds National Monument, Harrison, NE.

Environmental Protection Agency (EPA). 1998. *Interim Air Quality Policy on Wildland and Prescribed Fires*. Environmental Protection Agency, Washington.

----------. 2000. *Air Quality Index. A Guide to Air Quality and Your Health*. U. S. Environmental Protection Agency, Washington.

Frison, George C. 1978. *Prehistoric Hunters of the High Plains*. Academic Press, New York.

Graetz, Jennifer L., Robert A. Garrott, and Scott R. Craven. 1995. Faunal Survey of Agate Fossil Beds National Monument. Report by the Department of Wildlife Ecology, University of Wisconsin, Madison, on file at the Midwest Regional Office, National Park Service, U.S. Department of the Interior, Omaha.

Gray, Garrett. 2001. Canada Thistle Control Project, 1997-2001. Report on file, U. S. Department of the Interior, National Park Service, Agate Fossil Beds National Monument, Harrison, NE.

Haferkamp, Marshall R. 2001. Annual Bromes—Good or Bad? *Rangelands* 23(5):32-35.

Harris, Mitchell A., Boris C. Kondratieff, and Terrence P. Boyle. 1991. Assessment of the Aquatic Resources of Agate Fossil Beds National Monument. Manuscript on file, Water Resources Division, National Park Service, U.S. Department of the Interior, Ft. Collins, CO.

Howard, Kimberly. 2002. Canada Thistle Control Program 2002 Report. Report on file, Agate Fossil Beds National Monument, Harrison, NE.

Hughes, David T. 1998.*Cultural Affiliation of Native Americans to the Region Encompassing Scotts Bluff National Monument and Agate Fossil Beds National Monument in Northwestern Nebraska.* Report to the National Park Service submitted by Wichita State University; on file, Agate Fossil Beds National Monument, Harrison, NE.

Hunt, Robert M., Jr. 1984. The Agate Hills. History of Paleontological Excavations, 1904-1925. Report on file, Agate Fossil Beds National Monument, Harrison, NE.

Imerman, Mark. 2002. Sioux County, Nebraska. Nebraska PROfiles. Public Resources Online. http://ne.profiles.iastate.edu/bea.

Kay, Marvin. 1975. Archaeological Surveys in Scotts Bluff and Agate Fossil Beds National Monuments, Nebraska. Report on file, U. S. Department of the Interior, National Park Service, Midwest Archeological Center, Lincoln, NE.

Kirby, R.E., Lewis, S.J., and Sexson, T.N. 1988. Fire in North American Wetland Ecosystems and Fire-Wildlife Relations: An Annotated Bibliography: U.S. Fish and Wildlife Services, Biological Report, v. 88, no. 1, p. 1-146.

Kiver, Eugene P., and David V. Harris. 1999. Agate Fossil Beds National Monument (Nebraska). *Geology of U. S. Parklands*, 5th ed., pp. 719-725.

Knudson, Ruthann. 2003. Keeping Canada Thistle under Control at Agate. *Natural Resource Year in Review--2002*, pp. 76-77. U. S. Department of the Interior, National Park Service, Washington.

LaGrange, Ted. 1997. *Guide to Nebraska's Wetlands and Their Conservation Needs*. Nebraska Game and Parks Commission, Lincoln.

Larson, Robert W. 1997. *Red Cloud. Warrior-Statesman of the Lakota Sioux*. University of Oklahoma Press, Norman.

LeBeau, Sebastian C., II. 2002. Wico'cajeyate. Traditional Cultural Property Evaluation Agate Fossil Beds National Monument. Report submitted to U. S. Department of the Interior, National Park Service, Agate Fossil Beds National Monument, Harrison, NE.

Meade, Dorothy C. 1990. *The Story of the Agate Springs Ranch.* Print Express, Scottsbluff, NE.

Meade, Dorothy Cook. 1994. *Heart Bags & Hand Shakes. The Story of the Cook Collection.* National Woodlands Publishing Company, Lake Ann, MI.

National Park Service (NPS). 1998a. Baseline Water Quality Data Inventory and Analysis, Agate Fossil Beds National Monument. Technical Report NPS/NRWRD/NRTR-98/151. U. S. Department of the Interior, National Park Service, Water Resources Division, Fort Collins, CO 80525.

----------. 1998b. *National Park Service Procedural Manual #77-1: Wetland Protection*. Technical Report NPS/NRWRD/NRTR-98/203. U. S. Department of the Interior, National Park Service, Water Resources Division, Ft. Collins, CO.

----------. 1999. *Natural Resource Challenge. The National Park Service's Action Plan for Preserving Natural Resources*. U. S. Department of the Interior, National Park Service, Washington.

----------. 2002a. Agate Fossil Beds National Monument Park Profile. Natural Resources Information Division, Natural Resources Program Center, National Park Service, Ft. Collins, CO.

----------. 2002b. Red Cloud Campsite, Agate Fossil Beds National Monument. CLAIMS database-generated report, U. S. Department of the Interior, National Park Service, Midwest Regional Office, Park Historic Structures and Cultural Landscapes Program, Omaha.

----------. 2001. *Management Policies 2001*. U. S. Department of the Interior, National Park Service, Washington.

----------. 2002. *Director's Order #18: Wildland Fire Management*. U. S. Department of the Interior, National Park Service, Washington.

Natural Resources Conservation Service (NRCS). 1998. *Soil Survey of Sioux County, Nebraska.* U. S. Department of Agriculture, Natural Resources Conservation Service, in cooperation with the University of Nebraska, Conservation and Survey Division, Lincoln.

Nebraska Natural Heritage Program (NNHP). 2002. *Nebraska Plants of Concern*. http://www.natureserve.org/nhp/ us/ne/plants.html.

Nickel, Robert K. 2002. The 1996 Archeological Survey at Agate Fossil Beds National Monument. Report on file, U. S. Department of the Interior, National Park Service, Midwest Archeological Center, Lincoln, NE.

Northern Great Plains Area Fire Management (NGPAFM). 2003. Interpark Agreement between Northern Great Plains Fire Management and Agate Fossil Beds National Monument, Badlands National Park, Devils Tower National Monument, Jewel Cave National Monument, Mount Rushmore National Memorial, Scotts Bluff National Monument, and Wind Cave National Monument. U. S. Department of the Interior, National Park Service, Northern Great Plains Area Fire Management, Wind Cave National Park, SD.

Northern Great Plains Inventory and Monitoring Network (NGPI&MN). 2001. Northern Great Plains Network Inventories of Vascular Plants and Vertebrates Draft Study Plan, National Park Service, FY 2001-2004. U.S. Department of the Interior, National Park Service, Midwest Region, Omaha, NE.

Olinger, Danny E. 1980. Agate Fossil Beds National Monument: Archeological Investigations at Site 25SX163. *Midwest Archeological Center Occasional Studies in Anthropology,* No. 6. U. S. Department of the Interior, National Park Service, Midwest Archeological Center, Lincoln, NE.

Peterson, O. A. 1905. Description of New Rodents and Discussion of the Origin of *Daemonelix*. *Carnegie Museum, Memoirs* 2:139-191.

Picha, Paul R., Stanley A. Ahler, Rodney D. Sayler, and Robert W. Seabloom. 1991. Effects of Prairie Fire on Selected Artifact Classes. *Archaeology in Montana* 32(2):15-28.

Powell, Abby N. 2000. Grassland Bird Inventory of Seven Prairie Parks. Arkansas Project Office, Northern Prairie Wildlife Research Center, U. S. Geological Survey, U. S. Department of the Interior, Fayetteville, AR.

Pyne, Stephen J. The Fires This Time, and Next. *Science* 294:1005-1006.

Ray, John D. 2002. Air Quality Materials. Electronic message sent to Ruthann Knudson, February 13, 2002.

Ryan, Kevin C. 2002. Evaluating Fire Effects on Cultural Resources. Session 6: Cultural Resources Protection and Fire Management Planning. Mather Training Center, January 14-18, 2002. U.S. Department of the Interior, National Park Service, Mather Training Center, Harpers Ferry, WV.

Sabin, Ty. n.d. Cenozoic Evolution of the Niobrara River, Northern Nebraska. Doctoral dissertation in preparation, Department of Geography, University of Wisconsin, Madison.

Sanford, Dena. n.d. Historic Structure Report: Cook Homestead Cabin (HS-1), Agate Fossil Beds National Monument. In preparation, U. S. Department of the Interior, National Park Service, Midwest Regional Office, Omaha.

Sioux County History Book Committee. 1986. *Sioux County History. First 100 Years 1886-1986*. Curtis Media Corporation, Dallas.

Skinner, M. F., S. M. Skinner, and R. J. Gooris. 1977. Stratigraphy and Biostratigraphy of Late Cenozoic Deposits in Central Sioux County, Western Nebraska. *American Museum of Natural History Bulletin* 158(5):263-371.

Smith, Janet Kapler, ed. 2000. *Wildland Fire in Ecosystems: Effects of Fire on Fauna*. Gen. Tech. Rep. RMRS-GTR-42-vol. 1. U. S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Ogden, UT.

Stasiak, Richard H. 1990. Fishes of the Niobrara River at Agate Fossil Beds National Monument 1979 and 1989. Manuscript on file, U. S. Department of the Interior, National Park Service, Agate Fossil Beds National Monument, Harrison, NE.

Stinson, K. J., and H. A. Wright. 1969. Temperature Headfires in the Southern Mixed Prairie of Texas. *Journal of Range Management* 22:169-174.

Sundstrom, Linea. 2002. *Effects of Wildfire and Fire Suppression on Cultural Resources, Flagpole/Chilson Fire Complex, Hell Canyon Ranger District, Black Hills National Forest, Custer, SD*. Report on file, South Dakota State Historical Society, Pierre, and Black Hills National Forest, Custer.

Thomas, Lisa Potter, Michael D. DeBacker, John R. Boetsch, and David G. Peitz. 2001. Conceptual Framework, Monitoring Components and Implementation of a NPS Long-Term Ecological Monitoring Program. Prairie Cluster Prototype Program Status Report. U.S. Department of the Interior, National Park Service, Prairie Cluster Prototype LTEM Program, Wilson’s Creek National Battlefield, Republic, MO.

U. S. Census Bureau. 2003. DP-3, Profile of Selected Economic Characteristics: 2000. Census 2000 Summary File 3 (SF 3) - Sample Data. Sioux County, Nebraska. http://factfinder.census.gov/bf/_lang=en_vt_name=DEC_2000_SF3_U_DP3_geo_id=05000US31165.html.

U.S. Geological Survey, Biological Resources Division. 1999. Agate Fossil Beds National Monument, USGS-NPS Vegetation Mapping Program Products. Aerial Photography, Vegetation Information, Field Data for Plots, Geospatial Vegetation Information, Accuracy Assessment Information, Mapping Report. http://biology.usgs.gov/npsveg/AGFO/index.html.

Volesky, Jerry D., and Sherry B. Connot. 2001. Vegetation Response to Late Growing-Season Wildfire on Nebraska Sandhills Rangeland. *Journal of Range Management* 53:421-426.

Wandsnider, LuAnn, and George H. MacDonell, editors. 1997. *Agate Fossil Beds Prehistoric Archaeological Landscapes, 1994-1995. Report on 1994 and 1995 Archaeological Activities by the Department of Anthropology, University of Nebraska-Lincoln and the NPS Midwest Archeological Center at Agate Fossil Beds National Monument.* U. S. Department of the Interior, National Park Service, Midwest Archeological Center, Lincoln, NE.

Wendtland, Kyle J. 1993. Fire History and Effects of Seasonal Prescribed Burning on Northern Mixed Prairie, Scotts Bluff National Monument, Nebraska. M.S. thesis, Department of Range Management, University of Wyoming, Laramie. 188pp.

Wetmore, Clifford M. 1998. The Lichens of Scotts Bluff National Monument and Agate Fossil Beds National Monument. Manuscript on file, U. S. Department of the Interior, National Park Service, Agate Fossil Beds National Monument, Harrison, Nebraska. 18pp.

CONSULTATION/COORDINATION

Agencies Consulted

Apache Tribe of Oklahoma
Arapahoe Tribe of the Wind River Reservation
Assiniboine and Sioux Tribes of the Fort Peck Indian Reservation
Cheyenne-Arapahoe Tribes of Oklahoma
Cheyenne River Sioux Tribe of the Cheyenne River Reservation
Comanche Indian Tribe of Oklahoma
Crow Creek Sioux Tribe of the Crow Creek Reservation
Crow Tribe of Montana
Flandreau Santee Sioux Tribe
Fort Sill Apache Tribe of Oklahoma
Jicarilla Apache Tribe of the Jicarilla Apache Indian Reservation
Kiowa Tribe of Oklahoma
Lower Brule Sioux Tribe of the Lower Brule Reservation
Mescalero Apache Tribe of the Mescalero Reservation, New Mexico
Nebraska Game and Parks Commission, Wetland Program
Northern Cheyenne Tribe of the Northern Cheyenne Indian Reservation
Northwestern Band of Shoshoni Nation
Oglala Sioux Tribe of the Pine Ridge Reservation
Omaha Tribe of Nebraska

Pawnee Indian Tribe of Oklahoma
Ponca Tribe of Indians of Oklahoma
Ponca Tribe of Nebraska
Rosebud Sioux Tribe of the Rosebud Indian Reservation
Santee Sioux Tribe of the Santee Reservation
Shoshone-Bannock Tribes of the Fort Hall Indian Reservation of Idaho
Shoshone Tribe of the Wind River Reservation
Shoshone-Paiute Tribes of the Duck Valley Reservation
Spirit Lake Sioux Tribe of the Devils Lake Sioux Reservation, North Dakota
Standing Rock Sioux Tribe of the Standing Rock Reservation, South Dakota and North Dakota
Three Affiliated Tribes of the Fort Berthold Reservation
Yankton Sioux Tribe

Persons Consulted

Dr. Edward Buchwald, Retired Professor of Geology and Environmental Studies, Carleton College, Northfield, MN; Agate Fossil Beds National Monument Volunteer-in-Park
Chuck Butterfield, Assistant Professor, Agriculture and Range Management, Chadron State College, Chadron, NE
Dave Carr, Fire Management Officer, Crescent Lake National Wildlife Refuge, U. S. Fish and Wildlife Service, Oshkosh, NE
Cyndi Crayton, Owner, Integrated Weed Control. Bozeman, MT
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Philip Hughson, President, Harrison Rural Fire Protection District, Morrill, NE
Trinkle Jones, Western Archeological and Conservation Center, Tucson, AZ
Senator Chuck Hagel, U. S. Senate, Washington
Kenny Keener, landowner, Mitchell, NE
Leona Keener, landowner, Harrison, NE
Richard Klukas, retired NPS Supervisory Research Biologist, Omaha, NE
Senator Leroy Louden, Nebraska State Capitol, Lincoln
Nancy Neibauer, President, Agate Springs Ranch, Englewood, CO
Ritch Nelson, District 1 Manager, Habitat Partners Section, Wildlife Division, Nebraska Game and Parks Commission, Alliance, NE
Senator Ben Nelson, U. S. Senate, Washington
Joe Nunn, Sioux County Commissioner and landowner, Harrison, NE
Congressman Tom Osborne, U. S. House of Representatives, Washington
Paul R. Picha, Chief Archeologist, Historic Preservation Division, State Historical Society of North Dakota, Bismarck
Charles Skavdahl, Skavdahl Brothers, Harrison, NE
Harold Skavdahl, Skavdahl Brothers, Harrison, NE
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Dr. Linea Sundstrom, Cultural Resource Consultant, Shorewood, WI
Lyndon Vogt, General Manager, Upper Niobrara White Natural Resource District, Chadron, NE

PREPARERS AND QUALIFICATIONS

This Environmental Assessment and Assessment of Effect was prepared by Dr. Ruthann Knudson, Superintendent, Agate Fossil Beds National Monument, with the assistance of Bill Matthews, AGFO Maintenance Worker Supervisor, Casey J. Osback, AGFO Park Ranger (Protection), Lil Morava, AGFO Visitor Use Assistant, Kelly Mansfield, AGFO Office Clerk, Mark Hertig, AGFO Curator, and other park seasonal maintenance and interpretive staff members. John Ray, NPS atmospheric chemist, Dennis Haddow, U. S. Fish and Wildlife Service fire air quality specialist, and Larry Martin, NPS hydrologist, were of assistance, as were Mike DeBacker of the NPS Prairie Cluster Prototype Long-Term Ecological Monitoring Project and Lisa Thomas of the Colorado Plateau Cooperative Ecological Study Unit Network. Anne Vawser, Archeologist, at the NPS Midwest Archeological Center, provided the park survey coverage map. Dr. Knudson has 40 years of experience in cultural resource management, and 28 years' experience in NEPA compliance, Native American relationships, and public land management. The document was reviewed by Valerie J. Naylor and Ralph Moore, sequential Superintendents, Scotts Bluff National Monument; Nick Chevance, National Park Service Midwest Regional Environmental Compliance Specialist; several NPS Midwest Regional resource specialists; and Robert Puschendorf, Deputy Nebraska State Historic Preservation Officer. It was made available to all of the points of consultation and coordination listed above.

RESPONSE REQUIREMENTS

Comments concerning this Environmental Assessment and Assessment of Effect should be submitted in writing to the Superintendent, Agate Fossil Beds National Monument (301 River Road, Harrison NE 69346-2734, Ph. 308.668.2211, FAX 308.668.2318, agfo_superintendent@nps.gov) by no later than **5:00pm, 14 February 2004**.

For Immediate Release Contact: Ruthann Knudson, 308-668-2211

AGATE FOSSIL BEDS NATIONAL MONUMENT FIRE DISCUSSION MEETING

(HARRISON, NE) The public is invited to participate in a meeting on Thursday, January 10, 2002, to discuss the possible use of fire in managing Agate Fossil Beds National Monument's natural and cultural landscape. The meeting will be held at the Monument's Visitor Center and Museum from 4pm to 7:30pm, and people are invited to come at any time during that period to talk with staff members about Agate fire-related issues.

Agate Fossil Beds includes 2270 acres of publicly owned land within its boundaries, which are surrounded by private land. The National Park Service requires that managers assess the potential effects of wildfire and/or prescribed fire on its lands. Wild or even humanly set fires undoubtedly occurred across the Niobrara River valley at Agate before the Agate Springs Ranch was established there in the 1880s, but haven't happened since. The park lands have not been grazed for over thirty years, and there is an accumulation of dry grasses and shrubs across the landscape. Fire can be a very useful tool in managing such grasslands and avoiding the spread of dangerous wildfires.

Agate's Bone Cabin Complex is listed on the National Register of Historic Places, and all of the private and public lands within the Monument boundaries are considered to be a cultural landscape eligible for Register listing. Many American Indian tribes are also culturally affiliated with this landscape, which includes at least two traditional cultural properties. Miocene fossil beds are located in several locations along the valley breaks. Canada thistle on monument lands is being managed in an integrated program of insect, herbicide, and mowing controls. There are extensive wetlands along the Niobrara River, and these and the grasslands support deer, porcupines, beavers, coyotes, hawks, harriers, and a range of small mammals.

In the coming months the monument will complete a Draft Environmental Assessment of the effects of managed fire and other alternatives on this complex landscape. An evaluation of the impact that fires might have on Agate's cultural sites will also be completed. This meeting is to gather public input so that all issues are addressed in reaching a sound management decision.

The Visitor Center and Museum is located at 301 River Road in central Sioux County, just off State Highway 29. People may make comments at the meeting or provide them in writing to the Superintendent, Agate Fossil Beds National Monument, 301 River Road, Harrison, NE 69346-2734 (FAX 308-668-2318), by January 20, 2002.

12/20/01

NEBRASKA STATE HISTORICAL SOCIETY
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11 February 2004

Dr. Ruthann Knudson
National Park Service
Agate Fossil Beds National Monument
301 River Road
Harrison, NE 69346-2734

Re: Agate Fossil Beds National Monument
Fire Management Program
Sioux Co.
H.P. #0201-001-01

Dear Dr. Knudson:

A review of our files indicates that the referenced project does not contain recorded historic resources. It is our opinion that no survey for unrecorded cultural resources will be required. Your undertaking, in our opinion, will have no effect for archaeological, architectural, or historic properties.

There is, however, always the possibility that previously unsuspected archaeological remains may be uncovered during the process of project construction. We therefore request that this office be notified immediately under such circumstances so that an evaluation of the remains may be made, along with recommendations for future action.

Sincerely,

Terry Steinacher
H.P. Archaeologist

Concurrence:

L. Robert Puschendorf
Deputy NeSHPO