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Environmental Assessment

Craven Canyon Mineral Withdrawal

Hell Canyon Ranger District
Black Hills National Forest
Fall River County, South Dakota

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SUMMARY

The Black Hills National Forest proposes to recommend withdrawal of 3,957 acres of National Forest System land from mineral entry for 20 years to protect cultural resources, including rock art of great cultural, scientific and public interest. The significance of Craven Canyon from a traditional use perspective is not limited to the rock art. Rather, Craven Canyon should be viewed as an Ethnographic Landscape. National Park Service Preservation Brief 36 defines an Ethnographic Landscape as "a landscape containing a variety of natural and cultural resources that associated peoples define as heritage resources" (NPS 1994: 2). As mentioned above, some Lakota were more interested in Craven Canyon as a whole, and are not interested specifically in the rock art. For these individuals, the need for protection of Craven Canyon goes well beyond physical protection of the rock art, and includes a need for protecting the natural landscape features of Craven Canyon. For this reason, the proposed withdrawal includes consideration of the viewshed of the natural landscape as seen from the Rock Art sites. Additionally, archaeological and paleoenvironmental investigations in Craven Canyon indicate that there is still much to be learned about post-Pleistocene deposits and post-Pleistocene human activities. Much of the area north of Craven Canyon along what is known as Long Mountain has yet to be surveyed. Therefore, the proposed action also includes areas that are likely to contain additional archeological discoveries on Long Mountain.

The project area is located approximately 30 miles southwest of Custer, SD and 17 miles west of Hot Springs, SD and is within the Hell Canyon Ranger District, Black Hills National Forest, South Dakota and Wyoming. The proposed action would withdraw these lands from mineral exploration and development under the U.S. Mining Laws, subject to valid existing rights determination. There are approximately 160 acres within the proposed withdrawal area that were previously withdrawn from mineral entry (PLO 1232). There are 6 existing mining claims within this withdrawal area. This area is excluded from this proposal. Outside of the existing mineral withdrawal, but within the proposed withdrawal area (see map on page 10), there are 72 existing mining claims.

This action is needed to preserve unique prehistoric and historic cultural properties in and surrounding Craven Canyon. Currently, the Forest Service has no authority to deny mining exploration and development in this area subject to the laws and requirements under the Archeological Resources Protection Act (ARPA) of 1979, or the National Environmental Policy Act (NEPA), regulated through the Forest Service 36 CFR 228 mineral regulations. Mineral exploration and development may continue to occur on those mining claims with valid existing rights, even if a withdrawal is approved. However, no additional mining claims would be approved once the mineral withdrawal is established.

The proposed action may preclude some mining opportunities in these areas where valuable minerals may exist but a discovery associated with a mining claim has not yet been made. The proposed Craven Canyon withdrawal area has (1) a high potential for small to medium sized roll-front-type uranium and vanadium deposits in sandstone within fluvial unit 1 of the Lakota Formation and the lower unit of the Fall River Formation, (2) a moderate potential for oil and gas resources in subsurface Phanerozoic

strata, (3) a low potential for subbituminous coal resources in the basal portion of fluvial unit 1 of the Lakota Formation, and (4) a low potential for mineral materials suitable for sand and gravel, clay, and building stone.

In addition to the proposed action (Alternative 2), the Forest Service also evaluated the following alternatives:

- **No Action Alternative –** This alternative is required as a comparison to the action alternatives. Under the No Action alternative, the existing withdrawal would remain in effect. No additional area would be withdrawn from mineral entry.

  Alternative 3. This alternative would reduce the area to be withdrawn by approximately 1,308 acres. Under this alternative about 2,649 acres would be withdrawn from mineral location and entry under the U.S. Mining Laws, subject to valid existing rights. This alternative would protect the prehistoric rock art within and along the canyon walls from exploration and development activities, but may not protect known sites above the canyon. This alternative would allow mineral location and entry in some areas above the canyon wall, which may not protect the visual resources and traditional cultural properties. Under this alternative, 27 of the 46 known archaeological sites would be protected, 81% of the Long Mountain Archaeological Research Area would be protected, and 57% of the areas without previous archaeological survey would be protected. Alternative 3 would exclude approximately 72 existing claims within the project area boundary.

  Alternative 4. This alternative would reduce the area to be withdrawn by approximately 948 acres. Under this alternative about 3,009 acres would be withdrawn from mineral location and entry under the U.S. Mining Laws, subject to valid existing rights determination. This alternative would protect the prehistoric rock art within and along the canyon walls from exploration and development activities, as well as most sites above the canyon and the majority of the culturally significant viewsheds. This alternative would allow mineral location and entry in some areas above the canyon wall, which may not protect all visual resources and traditional cultural properties. However, under this alternative, the majority of culturally significant sites (85%) and viewsheds (91%) would be protected. Mineral withdrawal as proposed under Alternative 4 would include 24 existing claims within the withdrawal area boundary.

The United States Department of the Interior (USDI) Bureau of Land Management is a cooperating agency in the development of this document and will be the Decision Maker for this project. The United States Department of Agriculture (USDA) Forest Service is preparing this Environmental Assessment. Based upon the effects of the alternatives, the Responsible Official for the USDA Forest Service will make a recommendation to the Regional Forester, who will in turn transmit a recommendation to the Bureau of Land Management. The Decision Maker will decide:

1) If mineral withdrawal is warranted to preserve the resources and other values associated with Craven Canyon; and

2) If mineral withdrawal is warranted, to what extent should the withdrawal be applied?

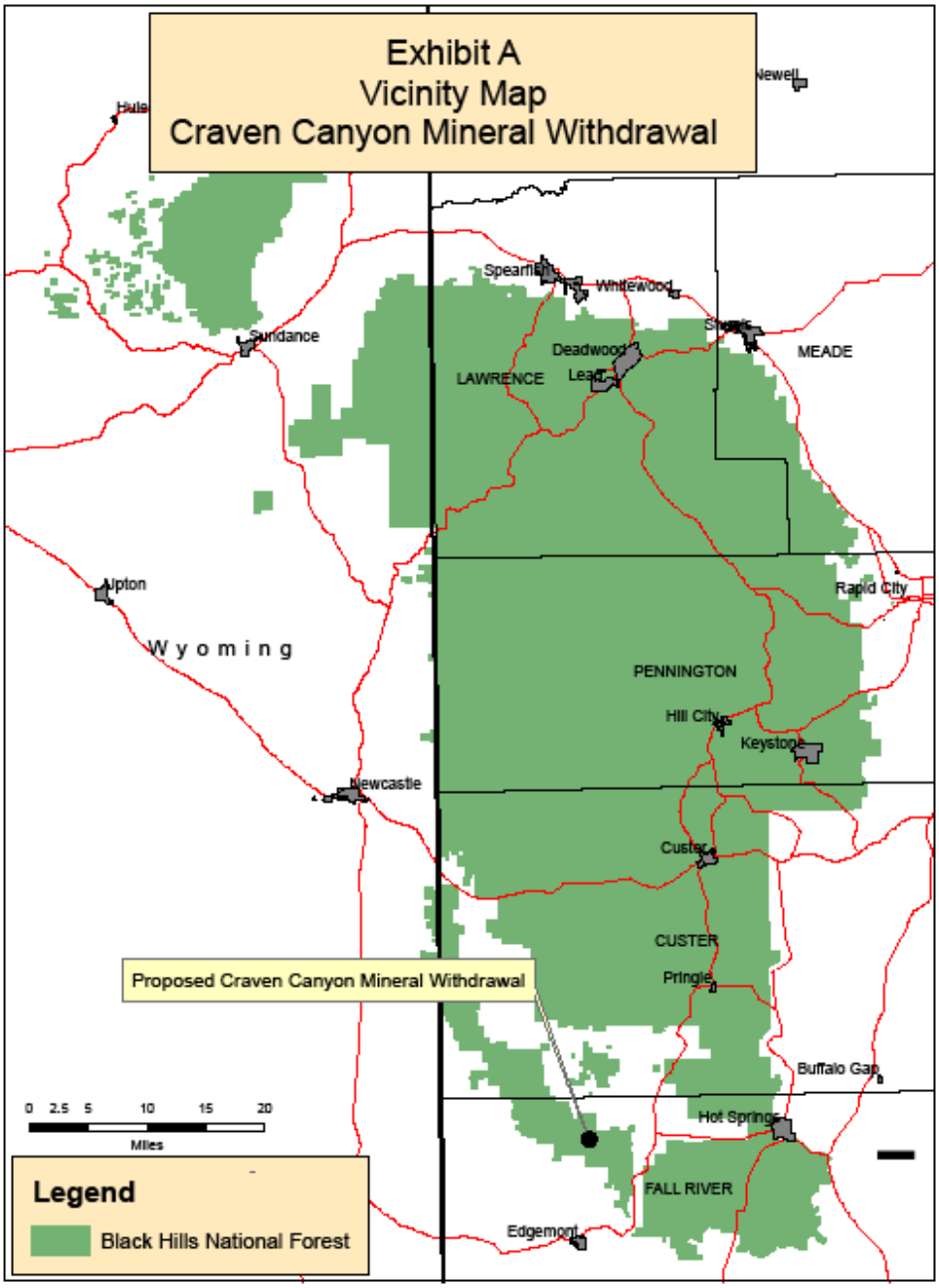

Figure 1. Vicinity Map.

CHAPTER 1. PURPOSE AND NEED FOR ACTION

Document Structure

The Forest Service has prepared this Environmental Assessment for, and in cooperation with, the BLM and in compliance with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws and regulations. This Environmental Assessment discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed action and alternatives. The document is organized into four parts:

- *Chapter 1 Purpose and Need for Action:* This section includes information on the history of the project proposal, the purpose of and need for the project, and the agency's proposal for achieving that purpose and need. This section also details how the Forest Service informed the public of the proposal and how the public responded.
- *Chapter 2 Alternatives, including the Proposed Action:* This section provides a more detailed description of the agency's proposed action as well as alternative methods for achieving the stated purpose. These alternatives were developed based on significant issues raised by the public and other agencies. This discussion also includes possible mitigation measures. Finally, this section provides a summary table of the environmental consequences associated with each alternative.
- *Chapter 3 Affected Environment and Environmental Consequences:* This section describes the environmental effects of implementing the proposed action and other alternatives. This analysis is organized by resource area. Within each section, the affected environment is described first, followed by the effects of the No Action Alternative that provides a baseline for evaluation and comparison of the other alternatives that follow.
- *Chapter 4 List of Preparers, and Distribution:* This section provides a list of preparers and agencies and persons consulted during the development of the environmental assessment.
- *Appendices:* The appendices provide more detailed information to support the analyses presented in the environmental assessment.

Additional documentation, including more detailed analyses of project area resources, may be found in the project planning record located at the Hell Canyon Ranger District Office in Custer, South Dakota.

Background

The southern Black Hills in general contain an unparalleled diversity of rock art styles spanning the entire breadth of human occupation of the area. The most significant representation of this diversity exists in Craven Canyon. Archaeological investigations, consultation with Native Americans, and oral histories of local ranchers have established that Craven Canyon is an irreplaceable element of the plains Native American cultural fabric.

From an archaeological standpoint, the rock art sites in Craven Canyon are a highly significant cultural resource. They have yielded, and continue to yield, information about

ideology, aesthetics, technology, and social organization not found in other types of archaeological sites (Sundstrom 1993; Sundstrom 2004). In addition, recent investigations by Fredlund (1996), and Sundstrom and Fredlund (2007) indicate that rock shelters and lithic scatters in Craven Canyon contain intact and deeply stratified deposits and intact paleosols not found elsewhere in the Black Hills. These sites have the potential to answer questions about paleoenvironmental conditions and human use of the Black Hills throughout the Holocene.

The importance of Craven Canyon from a cultural use perspective cannot be overstated. For peoples' whose culture, history, values, morals, and beliefs are largely or wholly oral rather than written, *places* serve as "indispensable aids for remembering and imagining" (Basso 1996:7). Lakota, Cheyenne, Arapaho, Kiowa, and many other plains peoples regard the Black Hills as sacred (La Pointe 1976). These peoples have a special connection to rock art sites in the Black Hills because they are the descendants of the people who made them. The rock art sites in Craven Canyon, and indeed the canyon itself, continue to serve as landscape repositories of history, beliefs, wisdom, and inspiration. When one place or one rock art site is damaged or altered, the corresponding piece of history, moral value, or belief is also threatened because the particular place which served as the heuristic devise for remembering is no longer intact. Thus, any adverse effect in Craven Canyon is rightly viewed as an affront to plains Native American culture and Indigenous human rights.

The Black Hills National Forest Land and Resource Management Plan, as amended (BHNF LRMP) emphasizes the management of cultural resources to protect them from loss or damage until they can be evaluated for significance, to be retained for appropriate uses, to provide opportunities for scientific study about past human behavior and environments, or to offer the public a better understanding of its collective human heritage. The Archaeological Resource Protection Act of 1979 (ARPA), the National Environmental Policy Act of 1969 (NEPA), and the Forest Service mineral regulations at 36 CFR 228 (subpart A) provide much needed protection of archeological sites and viewsheds from authorized mining activities. Even so, the mere presence of industrial activities, such as mining, are disruptive to traditional religious activities, many of which are private in nature and require a great sense of solitude.

Mining activities such as exploratory drilling, mining, blasting and the operation of heavy equipment, by their very nature, can be destructive to surface resources. Some methods of mining, such as underground mining, can be conducted with minimal surface impacts. In the Craven Canyon area, some past mining did use underground mining methods and could possibly be used in the future. The area in and around Craven Canyon has been mapped as having a high mineral reserve potential for uranium and vanadium deposits. There are 72 mining claims within the project area, and because of renewed interest in uranium exploration and development, it is foreseeable that additional claims could be filed.

Management Direction

The project area lies within Management Area (MA) 5.1A Southern Hills Forest and Grassland Areas per the Black Hills National Forest Revised Land and Resource Management Plan (BHNF LRMP, as amended). Forest Plan direction for the Craven

Canyon area emphasizes managing for sustainability of the physical, biological and visual values associated with areas of woody vegetation and open grassland. This area is dominated by open grasslands and areas of woody vegetation, with deep sandstone canyons and very little surface water available. Though forested areas exist, they do not produce commercially profitable wood fiber as a result of poor site conditions. Wildlife habitat and forage production for both livestock and wildlife are emphasized.

More specifically, the following Forest Plan goals, objectives, standards and guidelines for the Craven Canyon area were used to develop the proposed action. All alternatives proposed within this environmental assessment comply with Forest Plan standards and guidelines.

Minerals

Standard 1509. For classified lands not withdrawn from operations under the general mining laws (research natural areas, national recreation areas, special interest areas such as "scenic", "botanical", and "geologic", national historical sites, and "scenic" and "recreation" segments of wild and scenic rivers):

a. The status of classified lands with respect to withdrawal must be checked before an operating plan can be approved.
b. Provide for reasonable protection of the purposes for which the lands were classified.
c. Reclaim disturbed lands to a condition suitable for the purposes for which the lands were classified.
d. Pursue withdrawals where appropriate.

Guideline 1510. Developed recreation areas should be withdrawn from locatable mineral entry. Maintain existing withdrawals.

Heritage Resources

Objective 405. Manage all heritage sites listed in the National Register of Historic places in consultation with the State Historical Preservation Officer (SHPO) and the President's Advisory Council on Historic Preservation (ACHP).

Objective 406. Provide opportunities for the public to participate in heritage management activities, including the monitoring, excavation, and protection of archeological sites.

Wildlife

Standard 3102. Where caves are important nurseries or hibernacula for sensitive and local concern bat species protect the caves and maintain their microclimates when designing management activities. Protect known bat day and night roosts.

R2 Sensitive and SOLC Plants

The Forest Plan (USDA Forest Service 2006) states that Region 2 (R2) sensitive plant species, and plant species of local concern would be protected as follows:

Objective 221. Conserve or enhance habitat for R2 sensitive species and species of local concern (SOLC).

Guideline 4102a. Avoid the use of earth-moving equipment within national register eligible heritage resource sites, known locations of R2 sensitive species and species of local concern plants, BAs, RNAs, or in stream channels, except at designated points and with proper mitigation. Prohibit this use in the Wilderness.

Standard 4304. Treat individual plants or group of plants in areas where R2 sensitive or species of local concern plants occur. Use a treatment method that is the least risk to the species being protected.

Purpose and Need for Action

The purpose of and need for action is to protect and preserve existing Native American cultural resources including rock art of great cultural, scientific, and public interest, and traditional cultural properties with associated viewsheds. This action is needed because there is potential for damage of the unique values associated with this area from future mining activities. Lands in most of this area are currently open to mineral location and entry, mineral lease, and mineral material sale under the U.S. Mining Laws.

The Black Hills National Forest Land and Resource Management Plan, as amended (BHNF LRMP) emphasizes the management of cultural resources to protect them from loss or damage until they can be evaluated for significance, to be retained for appropriate uses, to provide opportunities for scientific study about past human behavior and environments, or to offer the public a better understanding of its collective human heritage.

The purposes for this withdrawal from mineral activities are to provide opportunities for scientific study about past human behavior and environments, to continue to serve the religious and cultural needs of Native Americans, and to offer the public a better understanding of its collective human heritage.

This action responds to the goals and objectives outlined in the Black Hills Forest Plan, as amended, and helps move the project area towards desired conditions described in that plan. The resource values and risks for Craven Canyon and surrounding area are described below.

Proposed Action

The proposed action was developed by the Forest Service to meet the purpose and need for action. Specifically, the Forest Service proposes to withdraw approximately 3,957 acres of National Forest System land from mineral location and entry for 20 years to protect cultural resources, including rock art of great cultural, scientific and public interest. The proposed action would withdraw these lands from mineral exploration and development under the U.S. Mining Laws, subject to valid existing rights. This means that during the life of the withdrawal (20 years, with option for renewal), new mining claims cannot be established, and mining exploration and development would not be allowed on pre-existing mining claims unless valid existing rights determination is made and a Plan of Operations is approved. Approval of a Plan of Operations would require additional site specific environmental analysis. The proposed withdrawal area is shown in Figure 2.

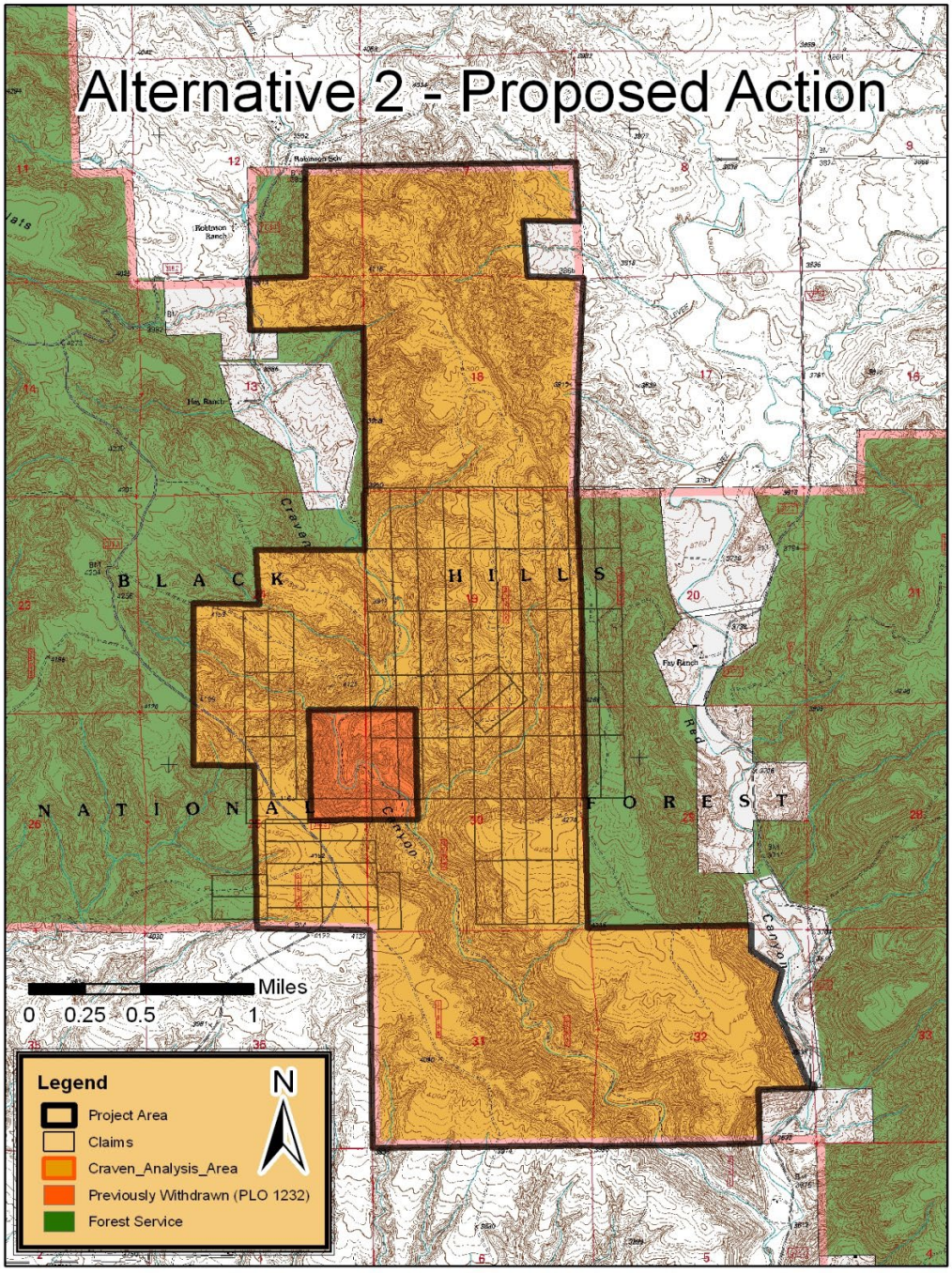

Figure 2. Proposed Action

Decision Framework

The USDI Bureau of Land Management is a cooperating agency for the development of this environmental assessment (EA) and is responsible for the final decision regarding this mineral withdrawal. Mineral withdrawals fall under the administrative responsibilities of the USDI Bureau of Land Management (43 CFR 2310.1). Section 104 of the Federal Land Policy and Management Act of 1976 gives the Secretary of the Interior authority to make, modify, extend, or revoke most withdrawals on public or reserved Federal lands. The Forest Service must apply to the Secretary of the Interior for withdrawal actions on National Forest lands (FSM 2761.01). The Forest Service initiates an application with the BLM for a mineral withdrawal, which includes a proposed action. The application and withdrawal proposal are reviewed and approved by the Recommending Official. The Recommending Forest Service Official for mineral withdrawals for the Craven Canyon area is the Rocky Mountain Regional Forester (FSM 2761.04). The Recommending Official will decide 1) if mineral withdrawal is necessary to protect the culturally significant resources within and surrounding Craven Canyon, and 2) if so, what the appropriate size of the withdrawal should be.

The BLM publishes notice of an application for withdrawal in the Federal Register along with a segregation order. The segregation order prohibits new mineral claims for a period of two years. In those two years, the Forest Service then completes an environmental assessment (EA) on behalf of, and in conjunction with, the BLM and provides supporting specialist reports to meet the requirements of the National Environmental Policy Act (1969).

The notice of application for withdrawal and order of segregation was published in the Federal Register on August 20, 2008, with comments and requests for public meetings due by November 18, 2008. For a period of two years from the August 20th date of publication in the Federal Register, the land identified in this assessment would be segregated from location or entry under the United States mining laws, unless the application to withdraw is denied or canceled or if the withdrawal is approved prior to that date.

This Environmental Assessment is not a Forest Service decision document. The Director of the BLM makes the decision on the proposed withdrawal and publishes notice of decision in the Federal Register. Therefore, the final decision is not appealable to the Forest Service (36 CFR 215.12(h).

Public Involvement

Public involvement on this project began prior to the formal scoping period. Scoping as defined by the Council on Environmental Quality (CEQ) includes refining the proposed action, identifying preliminary issues, and identifying interested and affected persons. Notices of the proposed withdrawal and segregation orders were published in the Federal Register on August 20, 2008. The proposal was listed in the Schedule of Proposed Actions in October 2008. The proposal was provided to the public and other agencies for comment during scoping which began on January 12, 2009. In addition, as part of the public involvement process, the agency provided maps and information on the Black Hills National Forest website (www.fs.fed.us/r2/blackhills). At the request of the Fall

River County Commissioners, the Forest Service met with the Commissioners on May 15, 2009 to discuss the proposed withdrawal. Using the comments from the public, other agencies, and tribal contacts the interdisciplinary team developed a list of issues to address.

Issues

The Forest Service reviewed input submitted during scoping and separated the issues into two groups: significant (as directed by the Council on Environmental Quality (CEQ) regulations (40 CFR 1500.4(g) and 1501.7)) and non-significant issues. Significant issues were defined as those directly or indirectly caused by implementing the proposed action. Non-significant issues were identified as those: 1) outside the scope of the proposed action; 2) already decided by law, regulation, Forest Plan, or other higher level decision; 3) irrelevant to the decision to be made; or 4) conjectural and not supported by scientific or factual evidence. The Council on Environmental Quality (CEQ) NEPA regulations require this delineation in Sec. 1501.7, "…identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review (Sec. 1506.3)…" A list of non-significant issues and reasons regarding their categorization as non-significant may be found in the project record. The Forest Service identified the following significant issue during scoping.

Issue #1: Protection of culturally significant resources.

There is concern from several members of the public that disturbances associated with exploration and development of mining could impact both known and yet to be discovered archeological sites, and the viewsheds associated with the Craven Canyon setting. Archeological resources are non-renewable and cannot be re-created.

Measures:

1. Number of culturally significant sites protected.
2. Viewshed acres protected.

Issue #2: Effects on existing mining claims, and opportunities for exploration and development.

There is concern that the size of the withdrawal is too large and would have adverse effects on mining opportunities. There are approximately 72 mining claims that exist within the proposed withdrawal area. There is concern that the withdrawal would eliminate opportunities for future exploration and development of mineral resources, and that archeological resources, including rock art sites and viewsheds within the Craven Canyon area, could be protected with existing protection and mitigation measures available through the existing 160-acre Pictograph Withdrawal and through the Forest Service 36 CFR 228 mineral regulations. Mineral resources are non-renewable and are of economic importance both locally and nationally.

Measures:

1. Active mineral claims within withdrawal area.
2. Size of withdrawal area.
3. Cost of Valid Existing Rights Determination.

CHAPTER 2. ALTERNATIVES, INCLUDING THE PROPOSED ACTION

This chapter describes and compares the alternatives considered for the Craven Canyon Mineral Withdrawal project. It includes a description and map of each alternative considered. This section also presents the alternatives in comparative form, sharply defining the differences between each alternative and providing a clear basis for choice among options by the decision maker and the public. Some of the information used to compare the alternatives is based upon the design of the alternative (i.e., location and size of the withdrawal) and some of the information is based upon the environmental, social and economic effects of implementing each alternative (i.e., the amount of high potential minerals withdrawn).

Alternatives

Alternative 1

No Action

Under the No Action alternative, current management plans would continue to guide management of the project area. No additional areas would be withdrawn to accomplish project goals. The existing mineral withdrawal (PLO 1232 - 160 acres, after partially revoked) would remain in effect. All 3,957 acres proposed for withdrawal in the Craven Canyon area would remain open to mineral exploration and development. Mineral exploration and development would continue to be subject to the laws and requirements under the Archeological Resources Protection Act (ARPA) and the National Environmental Policy Act (NEPA), regulated through the Forest Service 36 CFR 228 mineral regulations. There are 6 mining claims within the existing withdrawal area. These claimants would be required to submit a Plan of Operations, subject to approval, prior to any exploration and development activities.

Alternative 2

The Proposed Action

The Black Hills National Forest proposes to recommend withdrawal of 3,957 acres of National Forest System land from mineral location and entry for 20 years to protect cultural resources, including rock art of great cultural, scientific and public interest. The proposed action would withdraw these lands from new mining claim locations and from mineral exploration and development under the U. S. Mining Laws, subject to valid existing rights. The proposed withdrawal is intended to provide further protection of the unique resources present at Craven Canyon from adverse effects that could be caused by future mining activities. There are currently approximately 72 existing mining claims within the proposed mineral withdrawal area. The benefit of withdrawing this area from mineral location and entry is that once withdrawn, no new mining claims can be filed. The proposed action would not disallow mining of valid existing mining claims, but would preclude mining on invalid claims, as determined by a certified government minerals examiner. If an existing claim is determined to be valid, the claimant must then

submit a Plan of Operations, at which time a site specific environmental analysis is completed to determine if further mitigation measures are needed for surface resources that may be impacted.

The significance of Craven Canyon from a traditional use perspective is not limited to the rock art. Rather, Craven Canyon should be viewed as an Ethnographic Landscape. National Park Service Preservation Brief 36 defines an Ethnographic Landscape as "a landscape containing a variety of natural and cultural resources that associated peoples define as heritage resources" (NPS 1994: 2). As mentioned above, some Lakota are more interested in Craven Canyon as a whole, and are not interested specifically in the rock art. For these individuals, the need for protection of Craven Canyon goes well beyond physical protection of the rock art, and includes a need for protecting the natural landscape features of Craven Canyon. For this reason, the proposed withdrawal includes consideration of the viewshed of the natural landscape as seen from the Rock Art sites. Additionally, archaeological and paleoenvironmental investigations in Craven Canyon indicate that there is still much to be learned about post-Pleistocene deposits and post-Pleistocene human activities. Much of the area north of Craven Canyon along what is known as Long Mountain has yet to be surveyed. Therefore, the proposed action also includes areas suspected to contain additional archeological discoveries on Long Mountain.

Under alternative 2, no new mining claims would be accepted within the area withdrawn. Existing mining claims (72) would remain in place; however, mineral development on those claims would be subject to a valid existing rights determination prior to any ground disturbing activities. Mineral activity on existing mining claims within the withdrawal area, including mineral exploration, would require a Plan of Operations under Forest Service 36 CFR 228 regulations. Before a Plan of Operations can be approved, valid existing rights determination must be made for each mining claim on which the activity is proposed. This determination is verified through mineral examinations conducted by a government certified mineral examiner. If minerals have not been found in sufficient quantity and quality to constitute a valid discovery of a valuable mineral deposit on the subject claims as of the date of withdrawal through to the date of the examination, then those claims will be declared null and void, and will no longer exist. Therefore, existing claims will remain after the withdrawal is established, but once an operator wishes to pursue any discovery, exploration or development, they would be required to submit a Plan of Operations, subject to approval. Undiscovered mineral resources would be lost to future exploration and development during the term of the withdrawal.

Table 1. Components of Alternative 2 – Proposed Action	
Acres to be withdrawn	**3,957 acres**
Archaeological Sites included in proposed withdrawal area	**46 (100%)**
Acres of the Long Mountain Research Area included	**386 acres (100%)**
Un-surveyed Acres included	**2,780 (100%)**
Culturally Significant Sites included	**9 (100%)**
Culturally Significant Site Viewsheds included	**16 (100%)**
Total Culturally Significant Viewshed Acres included	**621(100%)**
Existing Claims included in proposed withdrawal area	**72 (100%)**

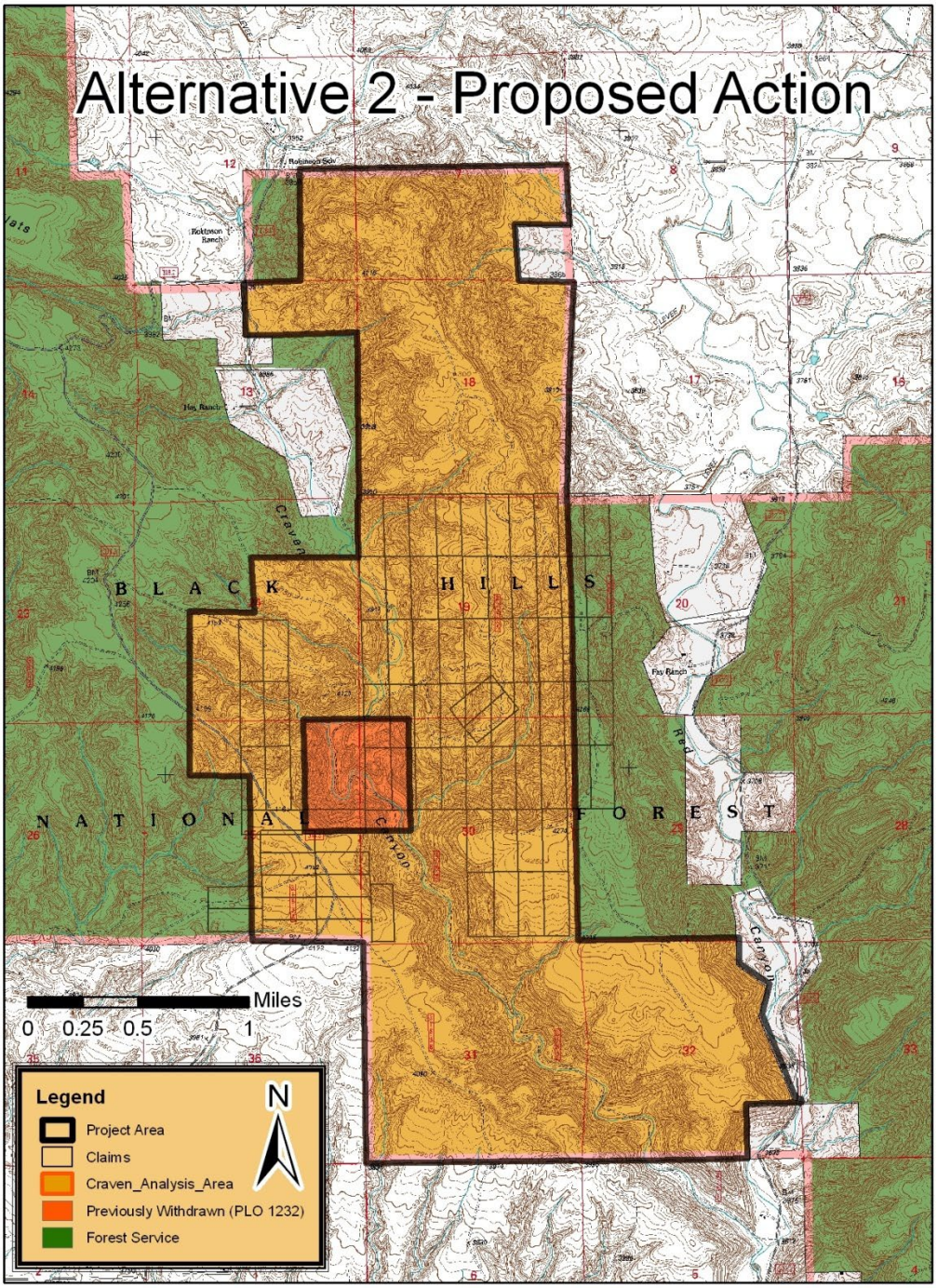

Figure 3. Alternative 2 – Proposed Action

Alternative 3

Alternative 3 was developed in response to an issue raised during public scoping. Some commenter's felt that the proposed withdrawal is larger than necessary to protect the resources at risk and would adversely affect mining opportunities. Therefore, the Interdiciplinary Team (IDT) developed Alternative 3 which would only partially withdraw the canyon, rock art sites, and significant associated viewsheds, which are considered part of this cultural site and important to Native populations. This alternative seeks to withdraw all areas of the current analysis area except areas with existing mining claims. Under this alternative approximately 2,649 acres would be withdrawn from mineral location and entry under the U.S. Mining Laws, subject to valid existing rights.

Under this alternative, the areas that are not withdrawn would continue to be open to new claim filings. If a claimant for an existing claim outside of the withdrawal area wishes to pursue discovery of their mineral resource, that may do so subject to the Archaeological Resource Protection Act of 1979 (ARPA), the National Environmental Policy Act of 1969 (NEPA), and the Forest Service mineral regulations at 36 CFR 228 (subpart A).

Under this alternative 67% of the analysis area would be included in the withdrawal. This would protect 59% of the archaeological sites, 81% of the Long Mountain Archaeological Research Area would be protected, 57% of areas without previous archaeological survey would be protected, and 89% of the culturally significant sites would be protected. This alternative would withdraw the viewshed for 63% of the culturally significant sites totaling 76% of the total viewshed acres. This alternative would partially cover heritage resources at risk, but allows more opportunities for existing and future mineral exploration and development than does Alternative 2.

Table 2. Components of Alternative 3	
Acres to be withdrawn	**2,649 acres (67%)**
Archaeological Sites included within proposed withdrawal	**27 (59%)**
Acres of the Long Mountain Research Area included	**313 acres (81%)**
Un-surveyed Acres included	**1,574 (57%)**
Culturally Significant Sites included	**8 (89%)**
Culturally Significant Site Viewsheds included	**4 (25%)**
Total Culturally Significant Viewshed Acres included	**473 (76%)**
Mining Claims included in proposed withdrawal area	**0 (0%)**

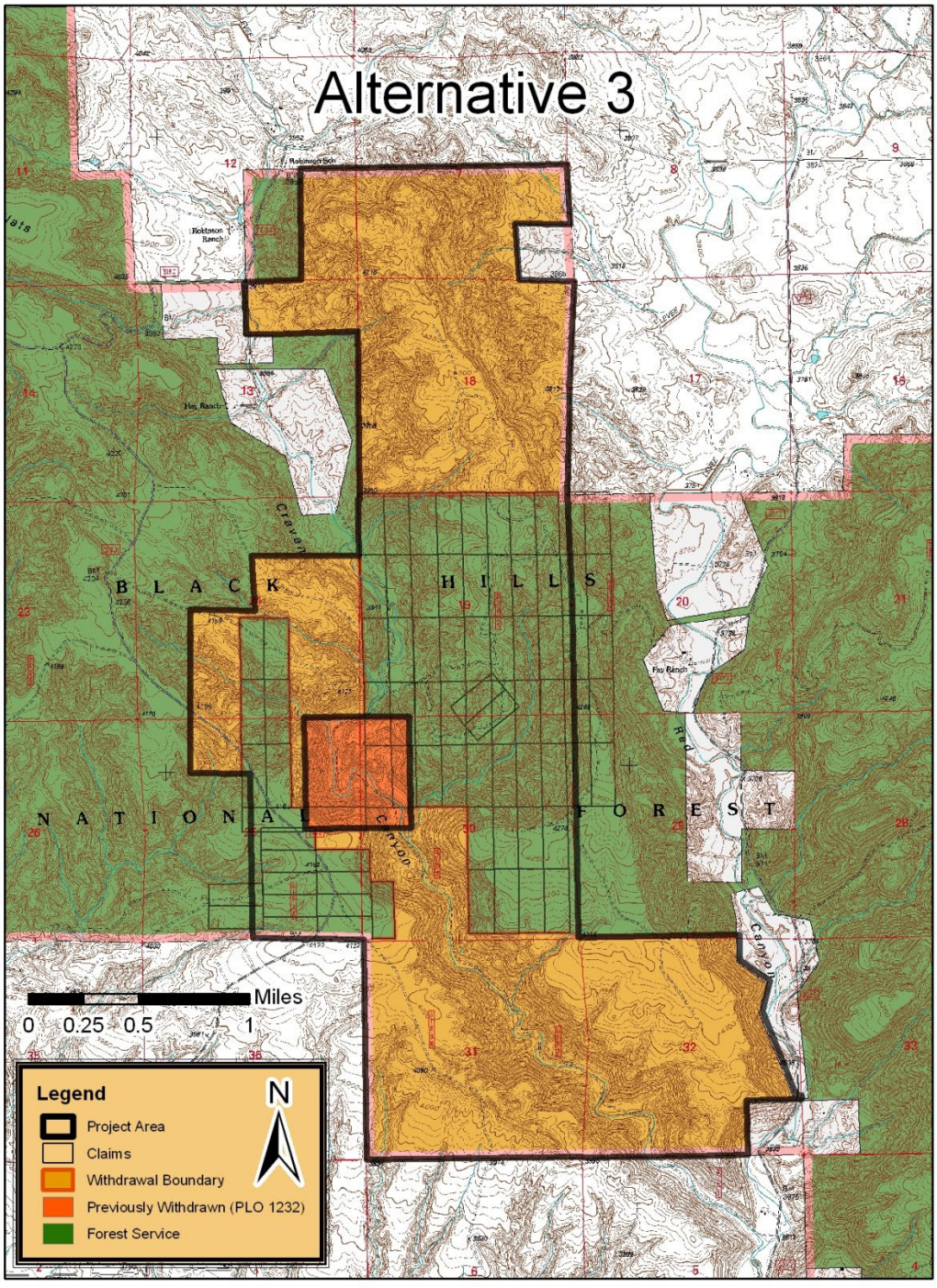

Figure 4. Alternative 3

Alternative 4

Alternative 4 was developed to reduce the number of mining claims requiring evaluation for Valid Existing Rights Determination, while also providing some protection of the physical location of archaeological sites and viewsheds. This alternative was not developed with explicit consideration of the setting or viewshed at culturally significant sites, but rather as a compromise to preserving the majority of the culturally significant sites and viewsheds, while also reducing the impact to existing and future mining claims within and outside of the withdrawal area. Additionally, this alternative would serve to reduce the cost for valid Existing Rights Determinations, which range from $40,000 to $60,000 per case to the government where the claim is within the area withdrawn.

Under alternative 4, existing claims (24) would be required to submit a Plan of Operations, subject to approval and requiring a valid existing rights determination, as described under Alternative 2. Alternative 4 would result in 3,009 acres being withdrawn from mineral location and entry under the U.S. Mining Laws, subject to valid existing rights.

Table 3. Components of Alternative 4	
Acres to be withdrawn	**3,009 (76%) acres**
Archaeological Sites included in proposed withdrawal area	**38 (83%)**
Acres of the Long Mountain Research Area included	**386 acres (100%)**
Un-surveyed Acres included	**1,933 (70%)**
Culturally Significant Rock Art Sites included	**9 (100%)**
Culturally Significant Rock Art Site Viewsheds included	**11 (69%)**
Culturally Significant Viewshed Acres included	**563 (91%)**
Mining Claims included in proposed withdrawal area	**23 (32%)**

Under this alternative 76% of the Analysis Area would be included in the withdrawal. This would physically protect 83% of the archaeological sites. 100% of the Long Mountain Archaeological Research Interest Area would be protected under this alternative. 70% of the areas without previous archaeological survey would be protected. 100% of the culturally significant sites would be physically protected. This alternative would protect the viewshed for 69% of the culturally significant sites totaling 91% of the total viewshed acres. It does not protect the viewsheds at all culturally significant sites, though it achieves full physical protection for sites of both archaeological and cultural significance. Protecting only 70% of the un-surveyed areas leaves a considerable chance that undocumented cultural resources will not be protected from mining activities. Since this alternative protects only 91% of the significant viewshed acreage, selecting this alternative means that the remaining 9% of the viewshed acreage would require consideration under guidance from the 36 CFR 228 subpart A regulations.

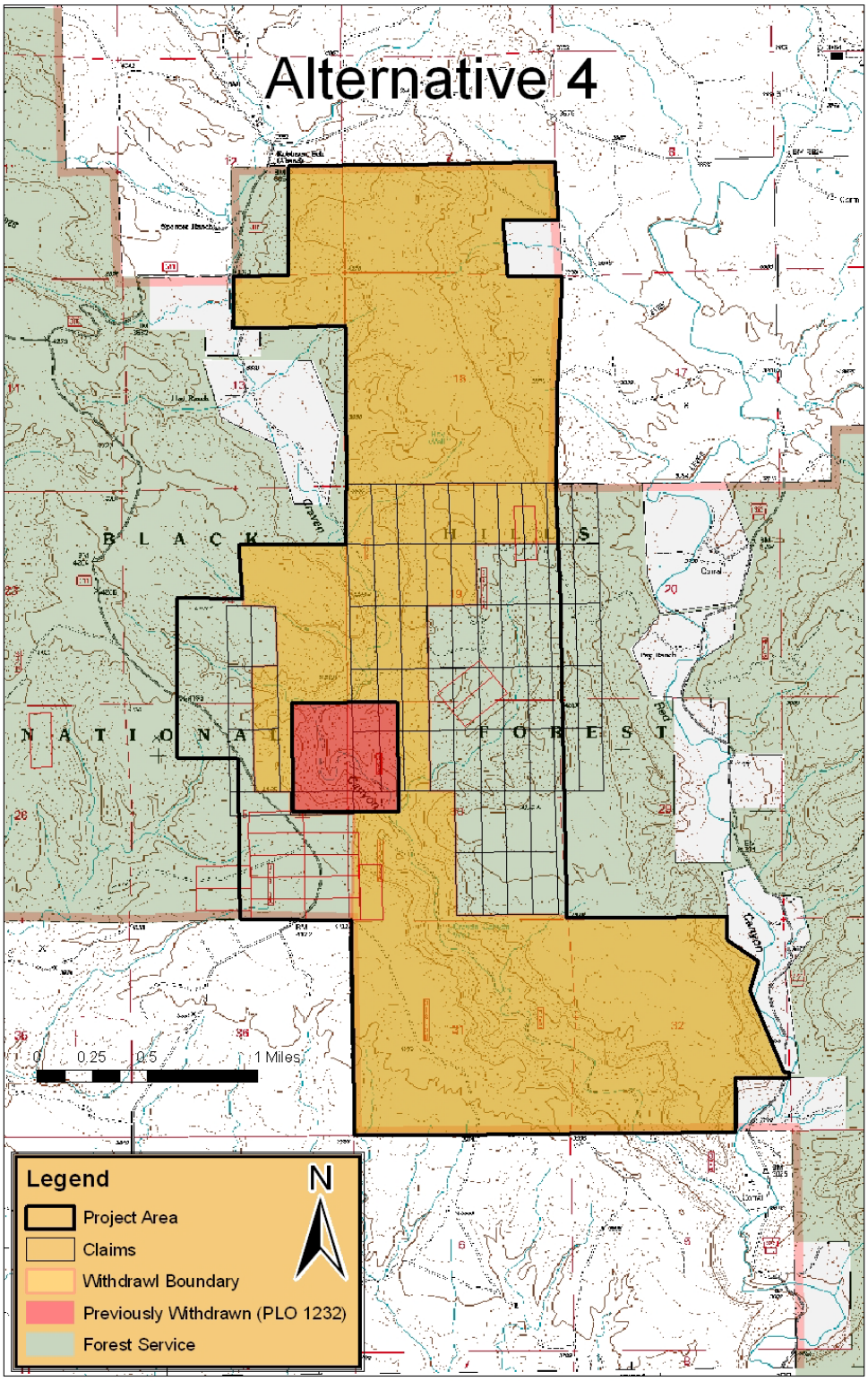

Figure 5. Alternative 4

Comparison of Alternatives

This section provides a tabular summary of the effects of implementing each alternative on the Significant Issues identified for this project. Information in the table is focused on the comparison of each alternative by using the four measures identified to compare the effects of implementing each of the alternatives.

Table 4. Comparison of Alternatives

Issue	Measure	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Effects on Existing Mining Claims	**Size of Withdrawal Area** Acres Proposed to be Withdrawn from Mineral Location and Entry	0 ac (0%)	3,957 ac (100%)	2,649 ac (67%)	3,009 ac (76%)
	Retention of Existing Mining Claims Mining Claims Included In Withdrawal area	6 existing claims	72 existing claims	6 existing claims	24 existing claims
	Potential Cost to Government to Determine Valid Existing Rights	$240,000 – $360,000	$2,880,000 – $4,320,000	$240,000 – $360,000	$960,000 – $1,440,000
Protection of Culturally Significant Resources	**Protection of Archeological Sites** Known Archeolocial Sites Included In Withdrawal area	0	46	27	39
	Protection of Culturally Significant Viewsheds Acres of Culturally Significant Viewsheds Included In Withdrawal area	0 ac	621 ac	473 ac	563 ac

CHAPTER 3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This section summarizes the physical, biological, social and economic environments of the affected project area and the potential changes to those environments due to implementation of the alternatives. It also presents the scientific and analytical basis for comparison of alternatives presented in the chart above.

Past, Present, and Reasonably Foreseeable Actions

- Uranium exploration and extraction has occurred in the project area in the past. Permit applications for uranium exploration and extraction have been submitted to federal and state agencies for areas adjacent to the analysis area, however, no permits have been issued. It is reasonably foreseeable that uranium exploration and extraction could occur within, or adjacent to the analysis area in the near future. Other activities in the analysis area include recreation, traditional cultural activities, and cattle grazing. All of these activities may have a cumulative effect on heritage resources in the form of increased soil erosion, increased visitor use, vandalism, and damage from unauthorized mining activities or mining activities that are in noncompliance with an approved plan of operation.
- Livestock grazing is expected to continue as managed under the current Allotment Management Plans for the Basin, Long Mountain and Robinson Flats Grazing Allotments.
- Surveys for rare plants, wildlife and heritage resources within the analysis area would be ongoing.
- The Black Hills National Forest Travel Management Decision (May 2010) reduced allowable motorized travel in the project area.

Heritage Resources

Affected Environment

The significance of rock art sites in the Black Hills has been established in two previous National Register of Historic Places (NRHP) nominations (Rock Art of the Southern Black Hills, 1980; Prehistoric Rock Art of South Dakota, 1993). All rock art sites in Craven Canyon discovered prior to 1993 are listed in the NRHP. Several more rock art sites have been discovered since 1993 and have been determined eligible for listing in the NRHP, but have not yet been nominated.

The southern Black Hills in general contains an unparalleled diversity of rock art styles spanning the entire breadth of human occupation of the area. The most significant representation of this diversity exists in Craven Canyon. Archaeological investigations, consultation with Native Americans, and oral histories of local ranchers have established that Craven Canyon is an irreplaceable element of the plains Native American cultural fabric.

Figure 6. Digitally enhanced image of a Paleo-Indian hunting scene at 39FA0099. (Photo taken during the 2005 Craven Canyon Passport In Time Project)

Prehistoric Context

The Black Hills are part of the greater culture area of the Northwestern Plains (Sundstrom 1989). Human occupation of this area has been divided into five broad cultural periods (Frison 1991):

Paleo-Indian	11,500 B.P. to 7,000 B.P.
Early Archaic	7,000 B.P. to 5,000 B.P.
Middle Archaic	5,000 B.P. to 3,000 B.P.
Late Archaic	3,000 B.P. to 1,500 B.P.
Late Prehistoric	1,500 B.P. to 500 B.P.

Field Surveys at Craven Canyon

All rock art sites in Craven Canyon are already listed, except those discovered after the earlier nominations were submitted. Rock art sites in the Craven Canyon District not yet listed, but eligible under the 1993 Prehistoric Rock Art of South Dakota thematic nomination are the following: 39FA1651, 39FA1652, 39FA1653, and 39FA1702.

Archaeological Significance of Craven Canyon and Long Mountain

Archaeological and paleo-environmental investigations in Craven Canyon indicate that there is still much to be learned about post-Pleistocene deposits and post-Pleistocene human activities (Sundstrom 2008). The affected environment is not limited to known archaeological sites. Instead, the affected environment also includes areas suspected to contain stratified deposits on Long Mountain (Sundstrom 2008).

From an archaeological standpoint, the rock art sites in Craven Canyon are a highly significant cultural resource. They have yielded, and continue to yield, information about ideology, aesthetics, technology, and social organization not found in other types of archaeological sites (Sundstrom 1993; Sundstrom 2004).

In addition, recent investigations by Fredlund (1996), and Sundstrom and Fredlund (2007) indicate that rock shelters and lithic scatters in Craven Canyon contain intact and deeply stratified deposits and intact paleosols not found elsewhere in the Black Hills. These sites have the potential to answer questions about paleoenvironmental conditions and human use of the Black Hills throughout the Holocene.

Traditional Cultural Use of Craven Canyon and the Importance of Viewsheds

The significance of Craven Canyon from a traditional use perspective is not limited to the rock art. Rather, Craven Canyon should be viewed as an Ethnographic Landscape. National Park Service Preservation Brief 36 defines an Ethnographic Landscape as "a landscape containing a variety of natural and cultural resources that associated peoples define as heritage resources" (NPS 1994: 2).

Some Lakota are more interested in Craven Canyon as a whole, and are not interested specifically in the rock art (Sundstrom 2008). For these individuals, the need for protection of Craven Canyon goes well beyond physical protection of the rock art, and includes a need for protecting the natural landscape features of Craven Canyon (Sundstrom 2008). For this reason, the affected environment is not limited to the physical protection of the rock art itself. The affected environment also includes a consideration of the viewshed of the natural landscape as seen from the most important rock art sites.

The importance of Craven Canyon from a cultural use perspective cannot be understated. For peoples' whose culture, history, values, morals, and beliefs are largely oral rather than written, *places* serve as "indispensable aids for remembering and imagining" (Basso 1996:7). Lakota, Cheyenne, Arapaho, Kiowa, and many other plains peoples regard the Black Hills as sacred (La Pointe 1976). These peoples have a special connection to rock art sites in the Black Hills because they are the descendants of the people who made them. The rock art sites in Craven Canyon, and indeed the canyon itself, continue to serve as repositories of history, beliefs, wisdom, and inspiration.

When one place or one rock art site is damaged or altered, the corresponding piece of history, moral value, or belief is also threatened because the particular place which served as the heuristic devise for remembering is no longer intact. Thus, any adverse effect in

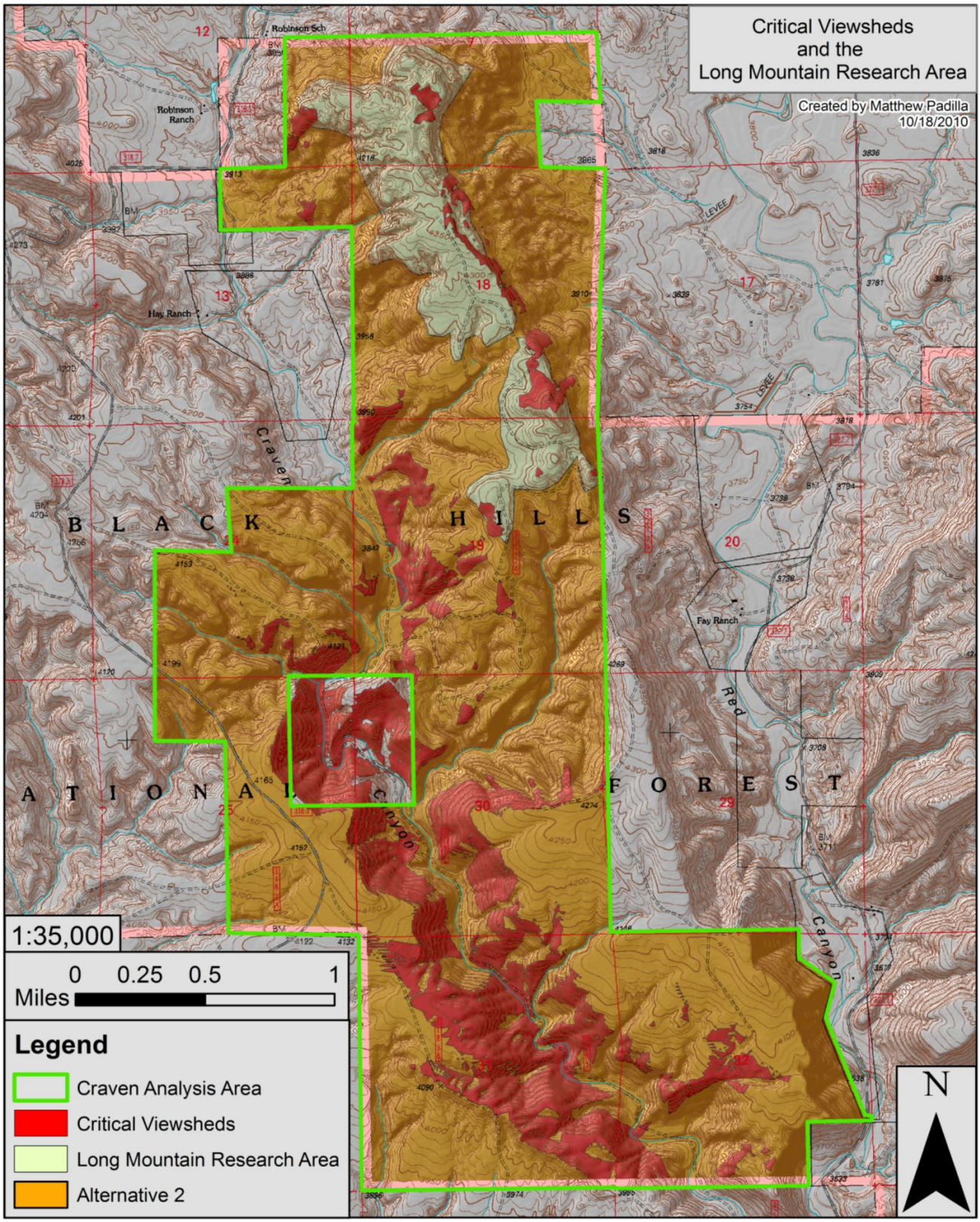

Figure 7. Culturally Significant Viewsheds

Craven Canyon is viewed by Plains Native Americans as an affront to their culture and Indigenous human rights.

Environmental Effects

This section compares the effects of all alternatives on Heritage Resources. This comparison includes an analysis of archaeological sites, research areas, spiritual-use, and the viewsheds from the most important rock art sites.

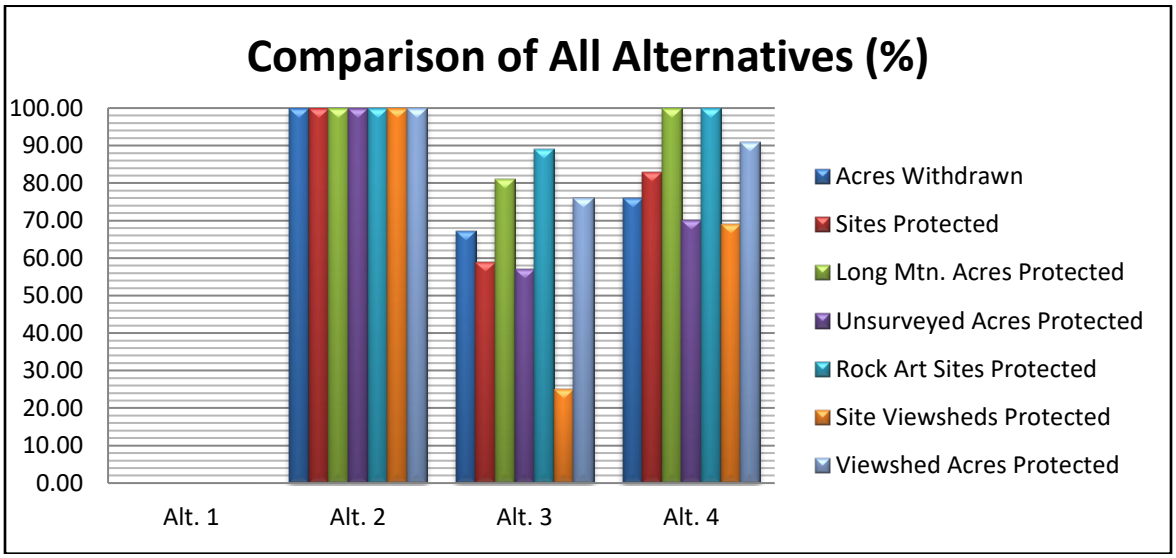

Figure 8. Comparison of All Alternatives on Heritage Resources

Summary of Effects from all Alternatives	Alt. 1		Alt. 2		Alt. 3		Alt. 4	
	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)
Acres Withdrawn	0	0	3957	100	2649	67	3009	76
Archaeological Sites Protected	0	0	46	100	27	59	38	83
Acres of the Long Mountain Research Interest Area Protected	0	0	386	100	313	81	386	100
Unsurveyed Acres Protected	0	0	2780	100	1574	57	1933	70
Culturally Significant Rock Art Sites Protected	0	0	9	100	8	89	9	100
Culturally Significant Rock Art Site Viewsheds Protected	0	0	16	100	4	25	11	69
Culturally Significant Rock Art Viewshed Acres Protected	0	0	621	100	473	76	563	91

Table 5. Summary of Effects from All Alternatives on Heritage Resources.

Alternative 1: No Action

Under the No Action Alternative, potential impacts to cultural resources due to mining activities such as hard rock uranium extraction could occur. However, before mining activities could begin, a Plan of Operations must be submitted and any activity would be subject to laws and requirements under the Archeological Resources Protection Act (ARPA) and the National Environmental Policy Act (NEPA), regulated through the Forest Service 36 CFR 228 mineral regulations.

Archaeological resources are non-renewable, and ethnographic landscapes cannot be recreated. Taking no action would allow all 3,957 acres of the analysis area open to new mining claim locations and mineral exploration and development, and places archeological resources at risk of damage if mining is not properly mitigated and administered. At risk are 46 known archaeological sites, 386 acres of the Long Mountain Archaeological Research Interest Area, 9 rock art sites of traditional cultural significance, and the viewshed from these sites.

Under the No Action alternative the existing 160 acre withdrawal (PLO 1232, partially revoked) would remain in place for the protection of significant rock art sites within a portion of Craven Canyon. However, as discussed above in the affected environment section, there are a total of 46 archaeological sites in the current analysis area, whereas there are only 9 archaeological sites in the previously withdrawn area. Furthermore, the current analysis addresses more than just the physical protection of known archaeological sites. There is also consideration of viewsheds of traditional cultural importance, areas where no cultural resource inventories have been conducted, and areas where preliminary studies suggest a great deal of archaeological and paleoenvironmental potential--all of which would not have the added protection that a withdrawal can provide if the no action alternative is chosen.

Under the No Action alternative, mining regulations outlined in 36CFR228 could be effective in protecting the archeological sites from physical harm, however, there are 19 archaeological sites located within known claims that would require mitigation. Furthermore, the affected environment includes more than just the physical boundary of the 46 archaeological sites. It includes areas with high potential for future research, areas without previous adequate survey, and viewsheds from culturally significant rock art sites--all of which would remain unprotected under the no action alternative.

Alternative 2: Proposed Action

Alternative 2 would result in the withdrawal of the entire analysis area (3,957 acres) from mineral entry and development. Withdrawal would prevent any new claims from being filed, and would require existing claims to submit a Plan of Operations, subject to a Valid Rights Determination, prior to any ground disturbing activities.

Under this alternative, all archaeological sites, all areas of the Long Mountain Archaeological Research Interest Area, all areas without previous archaeological survey, all culturally significant sites, and the viewsheds from these sites will be protected from mineral exploration and development. This alternative meets all aspects of the purpose and need.

Summary of Alternative 2	(n)	(%)
Acres Withdrawn	3957	100
Archaeological Sites Protected	46	100
Acres of the Long Mountain Research Interest Area Protected	386	100
Unsurveyed Acres Protected	2780	100
Culturally Significant Rock Art Sites Protected	9	100
Culturally Significant Rock Art Site Viewsheds Protected	16	100
Culturally Significant Rock Art Viewshed Acres Protected	621	100

Table 6. Summary of impacts to Heritage Resources under Alternative 2. This alternative proposes the withdrawal of the entire analysis area from mineral entry and development. (Subject to the rights of existing valid claims)

Alternative 3

Alternative 3 would withdraw all areas of the current analysis area with the exception of areas with existing mining claims. Alternative 3 would result in 2,649 acres being withdrawn.

Summary of Alternative 3	(n)	(%)
Acres Withdrawn	2649	67
Archaeological Sites Protected	27	59
Acres of the Long Mountain Research Interest Area Protected	313	81
Unsurveyed Acres Protected	1574	57
Culturally Significant Rock Art Sites Protected	8	89
Culturally Significant Rock Art Site Viewsheds Protected	4	25
Culturally Significant Rock Art Site Viewshed Acres Protected	473	76

Table7. Summary of impacts to Heritage Resources under Alternative 3. This alternative would withdraw all areas of the current analysis area except areas with existing mining claims.

Under this alternative 67% of the Analysis Area would be included in the withdrawal. This would protect 59% of the Archaeological Sites. Approximately 81% of the Long Mountain Archaeological Research Interest Area would be protected under this alternative, 57% of the area without previous archaeological survey would be protected, and 89% of the culturally significant sites would be protected. This alternative would protect the viewshed for 25% of the culturally significant sites totaling 76% of the total viewshed acres. This is the least favorable alternative for Heritage Resources because it achieves the lowest amount of cultural resource protection, and does not fully meet the purpose and need.

Alternative 4

Alternative 4 emphasizes protecting the physical location of archaeological sites. The alternative was not developed with explicit consideration of the setting or viewshed at culturally significant sites. Under alternative 4, existing claims that have the potential to physically damage archaeological sites are included in the withdrawal. Existing claims that do not have the potential to physically damage archaeological sites are not included

in this alternative. Alternative 4 would result in 3,009 acres being withdrawn. This alternative is subject to the rights of existing valid claims.

Summary of Alternative 4	(n)	(%)
Acres Withdrawn	3009	76
Archaeological Sites Protected	38	83
Acres of the Long Mountain Research Interest Area Protected	386	100
Unsurveyed Acres Protected	1933	70
Culturally Significant Rock Art Sites Protected	9	100
Culturally Significant Rock Art Site Viewsheds Protected	11	69
Culturally Significant Rock Art Viewshed Acres Protected	563	91

Table 8. Summary of impacts to Heritage Resources under Alternative 4. This alternative would withdraw all areas of the current analysis area and claims that have the potential to physically damage archaeological sites.

Under this alternative 76% of the Analysis Area would be included in the withdrawal. This would physically protect 83% of the archaeological sites. All (100%) of the Long Mountain Archaeological Research Interest Area would be protected under this alternative. Approximately 70% of the areas without previous archaeological survey would be protected, and all (100%) of the culturally significant sites would be physically protected. This alternative would protect the viewshed for 69% of the culturally significant sites totaling 91% of the total viewshed acres. It does not protect the viewsheds at all culturally significant sites, though it achieves full physical protection for sites of both archaeological and cultural significance. Protecting only 70% of the unsurveyed areas leaves a considerable chance that undocumented cultural resources will not be protected from mining activities. Since this alternative protects only 91% of the significant viewshed acreage, selecting this alternative means that the remaining 9% of the viewshed acreage would require consideration under guidance from the 36 CFR 228 subpart A regulations.

Cumulative Effects

Archaeological resources are non-renewable. The cumulative effect of taking no action to provide additional protection to this area from mineral exploration and development is that more archaeological sites could be impacted if mining activity were to occur. It is possible that in order for future mining to occur, some archeological sites may have to be mitigated by complete removal from the landscape. The result would be fewer archeological resources in their original context from future studies to learn about past human life-ways. Fewer places would be available for the Lakota and Cheyenne to seek wisdom and inspiration. Eventually, Craven Canyon could lose some of its essential character as a place of significant Native American history and inspiring natural beauty. That character would be replaced with industrial activity until mining and reclamation is completed. Even then, reclamation cannot totally replace the natural beauty and human history that currently exists.

Mineral Resources

Affected Environment

The area proposed for withdrawal is in Fall River County, South Dakota, on the Hell Canyon Ranger District of the Black Hills National Forest about 7 miles (11.3 km) north of the town of Edgemont, South Dakota. The withdrawal is from location and entry under the United States mining laws for a period of 20 years, subject to valid existing rights. There are 295 active lode mining claims within the same two townships as the proposed withdrawal area with 72 of those claims occurring in or partly within the subject withdrawal area. The subject area occurs mainly over outcrops of Early Cretaceous Inyan Kara Group sedimentary rocks with an underlying sequence of Mesozoic and Late Paleozoic sedimentary rocks. The Inyan Kara Group is known for hosting deposits of uranium and because of such, has been mapped in detail. It has been divided into the Lakota and Fall River Sandstone and further into several members and units. Massive fluvial sandstone from the Chilson Member of the Lakota Formation form high vertical cliffs in Craven Canyon. Craven Canyon lies in the heart of the Edgemont uranium mining district. Mineralization is roll-front-type uranium and vanadium deposits. Several past producing uranium mines occur in and adjacent to the proposed withdrawal area. Those to the east of the canyon occur in fluvial unit 1 of the Lakota Formation and those to the west occur in the lower unit of the Fall River Sandstone. Several mining companies are actively seeking uranium resources in the area. One company is currently conducting exploration drilling just west of National Forest System land near Dewey, South Dakota. Another two companies have approached the Forest Service about exploration and the potential impacts to their mining claims from the proposed withdrawal. None have submitted a Notice of Intent or Plan of Operations. A field investigation conducted for this proposed withdrawal confirmed the presence of uranium mineralization and past mining within the subject area.

Locatable Minerals

Locatable minerals in this report refer to minerals that typically are obtained by the public through filing mining claims on public domain land. The subject proposed withdrawal area is covered by mineral potential designations provided in DeWitt and others (1986). DeWitt has four different mineral potential designations in the general area of the proposed withdrawal labeled M2, N1, O3, and O5. M2 represents large (>10,000,000 tons) bedded sedimentary deposits (high-calcium limestone) in the Minnekahta Limestone. N1 represents medium (100,000 to 1,000,000 tons) bedded sedimentary deposits (gypsum) in the lower part of the Spearfish Formation and the lower part of the Gypsum Spring Formation. M2 and N1 both are listed as high resource potential (H/D). O3 represents a high potential (H/D) for medium (10,000 to 50,000 ton) stratabound roll-front deposits of uranium and vanadium in the Inyan Kara Group rocks. O5 represents moderate potential (M/C) for medium to large stratabound roll-front deposits of uranium and vanadium in the deeply buried Inyan Kara Group rocks that could be exploited by solution mining (in-situ mining).

The Craven Canyon proposed withdrawal area is covered mostly by Inyan Kara Group sedimentary rocks; the majority of which is fluvial unit 1 of the Lakota Formation. The

middle unit of the Fall River Sandstone makes up the next largest exposure in the subject area. The presence of fluvial unit 1 of the Lakota Formation represents a favorable geologic setting (factor 1). The identification of visible carnotite mineralization in sandstone and the high scintillometer readings indicates roll-front mineralization of potentially economic concentrations (factors 2 and 3) occur within the subject area. Several adits and open pit glory holes occur where mineralization is evident and known production of uranium and vanadium came from these workings (factors 4 and 5). Lastly, DeWitt and others (1986) have given a mineral potential designation of O3 for the subject area (factor 6). O5 designations occur to the southwest of the subject area where upper Cretaceous sedimentary rocks overlie the lower Cretaceous Inyan Kara Group rocks. All six mineral potential determination factors exist for medium (10,000 to 50,000 ton) stratabound roll-front deposits of uranium and vanadium in the Inyan Kara Group rocks. The Minnekahta Limestone, Spearfish, and Gypsum Spring Formations deeply underlie the Inyan Kara Group sedimentary rocks exposed on the subject area. Due to the shallow southwest dip of the strata, their surface exposures occur several miles to the northeast of the subject area. Therefore, no mineral potential determination factors occur within the subject area for high-calcium limestone or gypsum. The Craven Canyon proposed withdrawal area has a high potential (H/D) for uranium and vanadium roll-front deposits hosted in fluvial unit 1 of the Lakota Formation. There is no indicated potential (O/B and C) for any other locatable mineral resource.

Leasable Minerals

DeWitt and others (1986) also identified mineral resource potential for leasable mineral resources. They have four different mineral potential designations in the general area of the proposed withdrawal labeled OG7, OG8, CO1, and CO2. OG7 represents a high potential (H/D) for small stratabound oil and gas deposits (<1,000,000 barrels of oil (BBL); <400,000 million cubic feet of gas (MCF)) in monocline and anticline structural traps within the Minnelusa Formation at the Barker Dome field. The Barker Dome field has produced from the Minnelusa Formation since 1955. OG8 represents a moderate potential (M/D) for medium-sized deposits of oil and gas (1,000,000 to 20,000,000 BBL; 400,000 to 5,000,000 MCF) in all subsurface Phanerozoic strata. Only 13 test wells on NFS land have been drilled in this zone. CO1 represents a low potential (L/C) for small deposits of subbituminous coal (<50,000 tons) in bedded sedimentary deposits within the Inyan Kara Group rocks. CO2 represents a moderate potential (M/D) for small deposits of subbituminous coal (<50,000 tons) in bedded sedimentary deposits within the Inyan Kara Group rocks where it has been produced from small mines and by local ranchers for heating.

The Craven Canyon proposed withdrawal area overlies several subsurface Phanerozoic sedimentary rock units with the early Cretaceous Inyan Kara Group representing the majority of the surface rock exposure. A moderate potential coal area is in Coal Canyon and extends eastward to about 1 mile west of the proposed withdrawal area. The Barker Dome structure, with a high potential for oil and gas, trends in a northwest-southeast direction terminating at the northwest corner of the proposed withdrawal area. Therefore, neither area designation (OG7 or CO2) applies to the Craven Canyon area. The Inyan Kara Group and the underlying strata do represent a favorable geologic setting (factor 1) for coal and oil and gas occurrences. DeWitt and others (1986) have designated a

moderate potential for oil and gas resources, and a low potential for coal resources for the area covered by the proposed withdrawal (factor 6). A field investigation indicated no surface evidence of any structural traps extending into the withdrawal area. In addition, there was no evidence of the basal fissile shale known to locally contain coal beds. Therefore, factors 2 through 5 do not apply to the subject area for potential leasable resources. Based on the available information and the field investigation the designations developed by Dewitt and others (1986) are correct. This area has a moderate potential (M/B) for oil and gas resources because of the close proximity to a known structural trap, and a low potential (L/B) for subbituminous coal resources.

Salable Minerals

Because the Cretaceous sedimentary rocks are known to contain silt and mudstone layered in with the sandstone, alluvium in drainages from these units are not considered favorable for sources of sand and gravel. Clay has been mined from the Fuson Member of the Lakota Formation but has generally been of marginal quality for refractory bricks and therefore this mining has been very limited. The Fall River Sandstone in Hot Springs, South Dakota has been quarried for building construction stone. Many areas of the Black Hills, both on and off the Forest, have a high mineral material resource potential. DeWitt and others (1986) show those areas with the best potential. None of those areas occur within the proposed withdrawal area.

Environmental Effects

Locatable minerals such as uranium will still be available under all alternatives on mining claims with valid existing rights. Regardless if under a withdrawal or not, operations on these subject mining claims will be managed under Forest Service 36 CFR 228 subpart A regulations. Both ARPA and NEPA would be invoked to provide special mitigation measures to protect significant archaeological resources and other significant resources.

In an area withdrawn from mineral entry, the only activity that can be conducted on a mining claim is the maintenance of claim corners. Any other mining related activities would require surface disturbance and the submission of a Plan of Operations. This would in turn trigger the requirement of a valid existing rights determination. There would be no mining related activities permitted on the claim during the valid existing rights determination, which could take up to one year or more. If the claim is not valid (minerals are not sufficient in quantity or quality), the proposed Plan of Operations would not be approved and the claim would be declared null and void for the term of the withdrawal. If the claim is valid, operations on the claim would be managed under Forest Service 36 CFR 228, subpart A regulations, which require special mitigation measures to protect significant resources, such as the rock art found in Craven Canyon.

Alternative 1, No Action

Under the No Action alternative, no changes are proposed to the existing opportunities for mineral exploration and development. Archeological resources are protected from adverse impacts caused by mining activities under existing laws and regulations. Where a mining proposal would violate an environmental law such as ARPA, the Forest Service

would not accept that proposal until such time as impacts to the resource of concern are shown to be reasonably mitigated.

Alternative 2, Proposed Action

Under alternative 2, approximately 3,957 acres are proposed for withdrawal from mineral location and entry. New claims could no longer be located. Existing claims would remain until contested or abandoned. Mineral development on any claim found to be valid may still occur. Mineral activity on the mining claims within the withdrawal area, including mineral exploration, would require a Plan of Operations under Forest Service 36 CFR 228, subpart A regulations. Before a Plan of Operations can be approved, valid existing rights must be verified for each mining claim on which the activity is proposed. Valid existing rights are verified through mineral examinations conducted by a government certified mineral examiner. If minerals have not been found in sufficient quantity and quality to constitute a valid discovery of a valuable mineral deposit on the subject claims as of the date of withdrawal, and any time afterwards through to the date of the examination, then those claims will be declared null and void, and would no longer exist. Also, undiscovered or economically unproven mineral resources would be impacted by remaining lost to future exploration and development during the term of the withdrawal.

Alternative 3

Under this alternative approximately 2,649 acres would be withdrawn from mineral entry. This alternative proposes to exclude all (approximately 72) existing mining claims from withdrawal. These claims would not have to show valid existing rights prior to exploration and development. Exploration to prove out new resources may still occur as always within the un-withdrawn areas. Operators would still be required to file a Notice of Intent or Plan of Operations where significant surface resource disturbance might occur and to conduct mitigation to protect those resources. Operators would still be entitled to reasonable access even if that access is across withdrawn areas, however, the Forest Service may change the access to avoid the withdrawn areas if that access is still reasonable.

Alternative 4

Under this alternative, approximately 3,009 acres would be withdrawn from mineral entry. This alternative proposes to exclude most (approximately 49) existing mining claims from withdrawal. This alternative represents a compromise between Alternative 2 (Proposed Action) and Alternative 3.

New claims could no longer be located within the withdrawn area, as described under Alterative 2. Existing claims (approximately 23) within the withdrawal would remain until contested or abandoned. Mineral development on any claim found to be valid may still occur. Mineral activity on the mining claims within the withdrawal area, including mineral exploration, would require a Plan of Operations under Forest Service 36 CFR 228, subpart A regulations. Before a Plan of Operations can be approved, valid existing rights must be verified for each mining claim on which the activity is proposed. Valid existing rights are verified through mineral examinations conducted by a government certified mineral examiner. If minerals have not been found in sufficient quantity and

quality to constitute a valid discovery of a valuable mineral deposit on the subject claims as of the date of withdrawal, and any time afterwards through to the date of the examination, then those claims will be declared null and void, and will no longer exist. Also, undiscovered or economically unproven mineral resources will be impacted by remaining lost to future exploration and development during the term of the withdrawal.

Those claims located outside of the withdrawn area would not have to show valid existing rights prior to exploration and development. Exploration to prove out new resources may still occur as always within the un-withdrawn areas. Operators are still required to file a Notice of Intent or Plan of Operations where significant surface resource disturbance might occur and to conduct mitigation to protect those resources.

Cumulative Effects

Mineral resources are non-renewable and are also commodity resources that contribute to the socio-economics of the region. Locatable minerals refer to minerals that are typically obtained by the public through filing mining claims on public domain lands, such as gypsum, uranium and vanadium. The proposed withdrawal area has been mapped as having a high mineral resource potential for uranium and vanadium, which are both considered important to national security. Renewed exploration for uranium in the Craven Canyon area is foreseeable if mining industry's interest for U.S. uranium resources continues to be strong. If all or part of the project area is withdrawn from mineral entry, over time there could be a reduction of available claims. As validity is determined, those claims that are determined to be invalid would become null and void. As technology improves, should there be new ways to extract minerals without damage to surface resources, or if what is considered invalid today becomes valid in the future, those opportunities to retrieve that mineral resource would be lost.

Leasable minerals refer to oil and gas, and coal deposits. Based on field investigations, the proposed withdrawal area has a moderate potential for oil and gas resources, and a low potential for coal resources. Because other areas with much higher potential for these minerals exist elsewhere, it is not likely that mining these resources within the project area would occur in the near future.

Salable minerals refer to minerals found in sedimentary rock such as clay, silt, sand and gravel. Because of the likely unsuitability of this mineral material, the remoteness of the subject area from markets, and the abundance of suitable resources in other areas of the Black Hills, including areas much closer to potential markets, there is unlikely to be an interest to extract mineral material from the subject area other than an occasional small amount for local personal use. Furthermore, because of the potential for archeological resources to occur in Quaternary sediments, the Forest is unlikely to allow mineral material excavations in this area. The potential for occurrences of suitable mineral material resources in Craven Canyon is low (L /C) with the potential for any commercial development being equally low.

Wildlife Resources

Affected Environment

The Craven Canyon area contains a diverse mix of habitats. There is an upper plateau above the sharply dissected canyon ravines. This has open meadow, ponderosa pine, with rocky mountain juniper. Some of the pine stands are dense, mature (old growth) in character. In the canyon bottom, plains cottonwood, green ash, and other riparian associated species (e.g. rushes) occur. Understory species include: common juniper, currants, silver sage, and cactus. A variety of grasses are present including grammas, needle grasses, bluegrass, buffalo grass, and brome grasses.

The Craven Canyon area provides habitat for a variety of mammal, bird, amphibian and reptile species. Some of these species use the area for breeding as well as foraging habitat. District records list prairie falcons and golden eagles nesting in the steep cliff habitat of Craven Canyon. Spade-foot toads have been recorded breeding in the intermittent ponds that occur after spring rains. The riparian habitat in the canyon bottom contains mature cottonwood trees which provide nesting and roosting habitat for species like Lewis woodpecker, northern flicker, and hoary bat. The scattered stands of mature, dense ponderosa pine provide habitat for the fringed myotis, brown creeper and northern goshawk. Other species that occur in the Craven Canyon vicinity include: prairie dog, badger, various species of bats, hawks, owls, swallows, grasshopper sparrow, meadow lark, rock wren, bobcats, coyote, mule deer, turkey, red squirrel, busy tailed woodrat, and other small mammals.

Environmental Effects

Effects common to all Action Alternatives

Threatened, Endangered, and Sensitive Species

The Fish and Wildlife Service (USFWS) lists identify no T&E species for Fall River County, South Dakota. There are a number of Rocky Mountain Region (R2) Sensitive Species that are known to occur or have suitable habitat in the project area. A separate Biological Evaluation would accompany this report. Since there would be no ground disturbing activities associated with this (administrative) project there would be 'No Impact'. However, allowing additional mining claims in the project area could result in a loss of habitat if mining were to occur.

Species of Local Concern (SOLC)

The four bat species and the bighorn sheep (R2SS) are known or strongly suspected to be present in the project area. Since there would be no ground disturbing activities associated with this (administrative) project there would be 'No Impact'. However, allowing additional mining claims in the project area could result in a loss of habitat if mining were to occur.

Management Indicator Species (MIS)

Black Hills National Forest has selected nine (9) Management Indicator Species (MIS) to monitor effects of projects. They are: beaver, brown creeper, white-tailed deer, ruffed grouse, golden-crowned kinglet, song sparrow, grasshopper sparrow, black-backed woodpecker, and mountain sucker. Of these only the grasshopper sparrow has suitable habitat that could be affected by the project. Alternatives that withdraw acres from mineral entry would maintain the upland grassland habitat used for nesting and foraging habitat by the grasshopper sparrow. Alternative 2 (proposed action) would be expected maintain the best situation for the grasshopper sparrow of all alternatives. Alternative 1 (no action) could allow future mining operations that would likely result in a reduction of grassland habitat in the project area.

Migratory Birds

Historic information has both golden eagles and prairie falcons nesting within the project area. Due to lack of suitable habitat the red-napped sapsucker is not suspected to occur in the Craven Canyon Mineral Withdraw Project Area. Alternative 2 would provide the best outcome for these migratory birds by protecting cliff nesting habitat. Alternative 1 (no action) could allow mining activities to reduce habitat and create human (noise) disturbance.

Botany/Range/Weeds Resources

Affected Environment

Rangeland Resources

The Craven Canyon Mineral Withdrawal Analysis Area includes portions of the Basin, Robinson Flats and Long Mountain grazing allotments (Figure 6).

The area is currently grazed as follows:

Allotment	Unit	Number of livestock	Average length of time	Grazing system
Basin	Red Canyon	65 cow/calf pairs	40 days	2-unit deferred rotation
	North Red Canyon	65 cow/calf pairs	79 days	2-unit deferred rotation
Robinson Flats	Coal Canyon	71 cow/calf pairs	55 days	2-unit deferred rotation
	Elbow Canyon	126 yearlings	90 days	2-unit deferred rotation
	Gravel Pit	126 yearlings	30 days	2-unit deferred rotation
Long Mountain	South	30 cow/calf pairs	43 days	2-unit deferred rotation
	North	30 cow/calf pairs	47 days	2-unit deferred rotation

Table 9. Grazing Allotments within and adjacent to Craven Canyon.

The area is predominately stony hills, shallow and silty range sites, as defined by the Natural Resource Conservation Service (NRCS) with numerous rock outcrops. Rangeland vegetation is a mixture of mid and short, warm and cool season grasses. Typical cool season grasses include needleandthread (Hesperostipa comata) and western

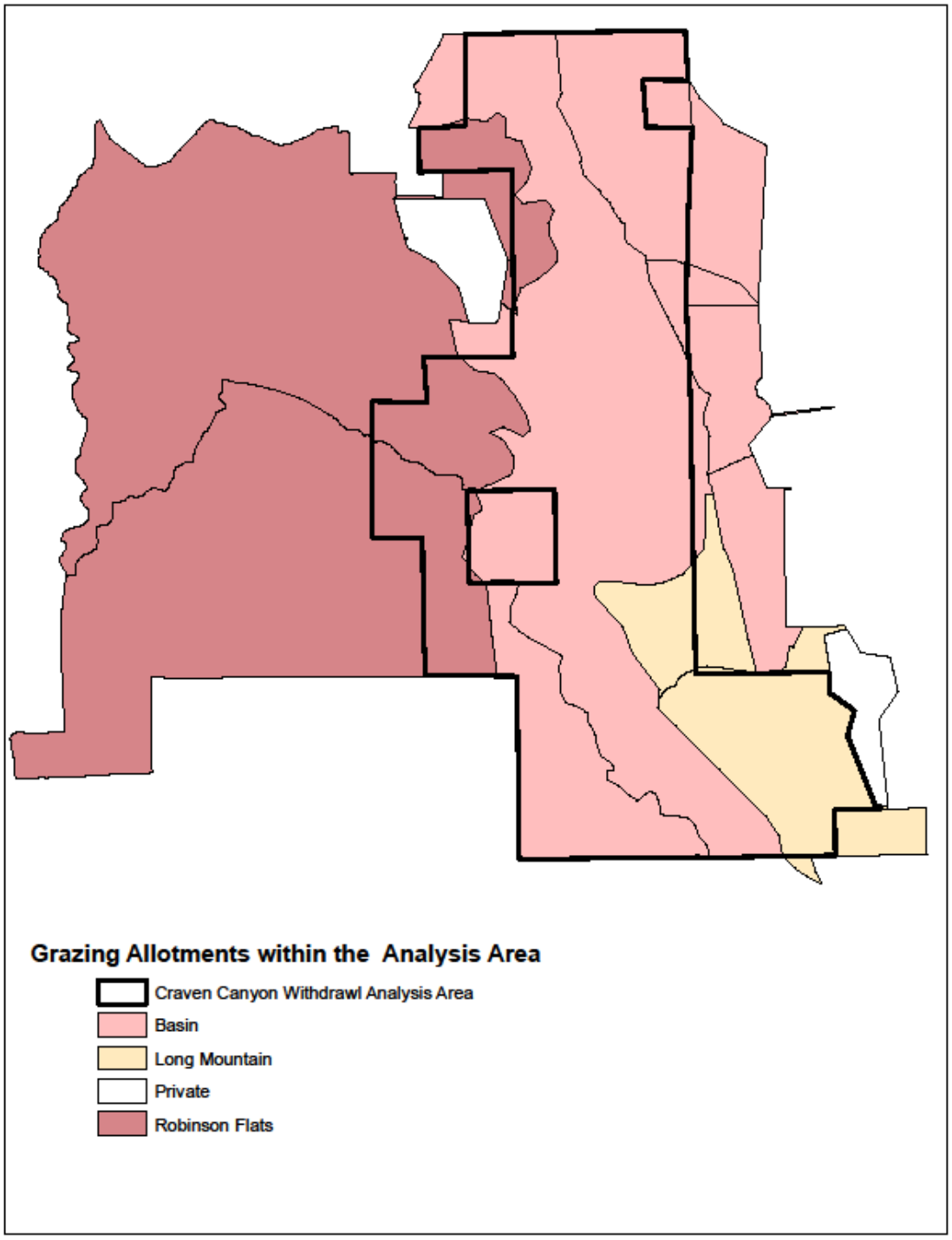

Figure 6. Grazing Allotments

wheatgrass (Pascopyrum smithii). Warm season grasses include little bluestem (Schizachyrium scoparium) and gramas (Bouteloua spp.). Forbs such as sageworts (Artemisia spp.) and scurfpeas (Psoralea spp.) are common. Ponderosa pine (Pinus ponderosa) and Rocky Mountain juniper (Juniperus scopulorum) are scattered throughout the area. Shrubs such as skunkbush sumac (Rhus trilobata) are present, but are not dominant.

Noxious Weeds

There are some known locations of Canada thistle (Cirsium arvense) in the draw bottoms, but in general, noxious weeds are not currently a problem throughout the analysis area. However, they do have the potential to become an issue with disturbance of the area.

R2 Sensitive and Species of Local Concern

R2 Sensitive Plant Species - R2 sensitive species are species identified by the Regional Forester for which population viability is currently of concern, as evidenced by significant current or predicted downward trends in population numbers or density, or by significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution (USDA Forest Service 2009). Appendix A lists the R2 sensitive plant species that are known to occur or are likely to occur on the Black Hills National Forest.

The Forest Service has established direction in the Forest Service Manual to guide habitat management for proposed, endangered, threatened, and sensitive plant species. The direction establishes the process, objectives, and standards for conducting a Biological Evaluation. This process ensures that these species receive full consideration in the decision making process.

Based on the conditions present (i.e. – elevation, community types, soil types, xeric conditions, etc) in the project area and the fact that most R2 sensitive plant species found in the Black Hills are associated with higher elevations and moister conditions, there are no areas present within the project area that would be considered habitat for most of the current list of R2 sensitive plant species. The exceptions to this generalization are Iowa moonwort (Botrychium campestre) and narrowleaf grapefern (Botrychium lineare).

Rangewide Iowa moonwort is considered a grassland species, associated with sandy grassland habitats in prairies, dunes, railroad sidings, and fields over limestone. The north end of the project area is located within the Red Valley Region. Some of the soils in this region may have formed from limestone parent material.

Typical habitat descriptions for narrowleaf grapefern are problematic because known sites are so different across its currently known range. This species may be a habitat generalist since habitat across the range for narrowleaf grapefern is quite variable and its range stretches from sea level in Quebec to approximately 10,000 feet in Colorado. In the Black Hills area, this species is often found growing in the same locations as Iowa moonwort. No individuals of these two species have been located within the project area.

Plant Species of Local Concern (SOLC)

Species of Local Concern are species that do not meet the criteria for sensitive status. These could include species with declining trends in only a portion of Region 2, or those

that are important components of diversity in a local area. The local area is defined as NFS lands within the Forest. (FSM 2620.5 Black Hills Supplement 2600-2005-1).

Forest Service Manual 2622.01 directs us to consider species of local concern during project design and to evaluate the effects to the species from alternatives considered through the National Environmental Policy Act (NEPA) process. Based on known conditions of this project area, it is believed that suitable habitat is lacking for all Black Hills plants species of local concern.

Environmental Effects

Alternative 1: (No Action) – Direct and Indirect effects

Under the no action alternative the area would remain available for mineral entry under the General Mining Law, as amended. If the area remains available to mineral entry and mineral exploration and development occur in the area, there is a potential for decrease in forage available for grazing, increase of noxious weeds as soil is disturbed, and potentially a loss of probable habitat for the two R2 sensitive species which may have habitat in the area. However, all these potential impacts would be addressed as plans of operation for mining are issued for each entry.

Alternative 2: (Proposed Action) – Direct and Indirect effects

Under Alternative 2, if the area is withdrawn from mineral entry there would not be the potential for mining to impact rangeland vegetation in the future as roads are built for exploration and uranium extracted from the area; there would not be the potential for noxious weeds to become an issue due to soil disturbance from exploration and/or mining; and there would be no impacts from exploration and/or mining on the potential suitable R2 sensitive species habitat.

Alternative 3: Direct and Indirect effects

If implemented, Alternative 3 would have the same effects on the rangeland resources, noxious weeds and R2 sensitive species habitat as Alternative 2 except as follows:

Under this alternative 2,649 acres would be withdrawn from mineral entry, so 1,319 more acres have the potential of being impacted from mining and/or exploration (those impacts would be addressed as plans of operation are approved).

Alternative 4: Direct and Indirect effects

If implemented, Alternative 4 would have the same effects on the rangeland resources, noxious weeds and R2 sensitive species habitat as Alternative 2 except as follows:

Under this alternative 3,009 acres would be withdrawn from mineral entry, so 948 more acres have the potential of being impacted from mining and/or exploration (those impacts would be addressed as plans of operation are approved).

Cumulative Effects

The cumulative impact area for this analysis is the Craven Canyon Mineral Withdrawal Project area; activities beyond the project area have a diminished effect on the rangeland vegetation, noxious weeds and rare plant habitat within the project area. The timing limit

for the cumulative effects analysis is estimated at 20 years, ten years prior to present and ten years in to the future, which allows for an adequate length of time to record vegetative changes.

Past, present and reasonably foreseeable activities within the Craven Canyon Mineral Withdrawal project area include wildfire, grazing, temporary road construction and maintenance, noxious weed control, wildlife habitat improvement projects, and dispersed recreational use on both the public land and private land in the area.

Any past, present or foreseeable future activity that causes soil disturbance has the potential to introduce and increase the rate of spread of noxious weeds and other exotic plants. This can be detrimental to rare plants and native rangeland vegetation, as invasive species have the ability to out-compete desired native plants. The herbicides used in noxious weed control can also be detrimental to rare plants if the individuals are inadvertently exposed to the herbicides.

When properly managed, livestock grazing can have positive impacts on the rangeland vegetation. The grazing in the Craven Canyon Mineral Withdrawal project area would continue as identified in the Allotment Management Plans for the Basin, Long Mountain and Robinson Flats Allotments.

Aside from the direct impact on the vegetation (i.e. – removal of vegetation, soil compaction and introduction of invasive species), road construction has the indirect impact of making formerly inaccessible areas available to both humans and grazing animals. Opening a new area to grazing can have a positive impact, by helping to distribute grazing animals. It can also have a negative impact by allowing access to areas that may be rare plant habitat. The likelihood of gates being left open (which increases the chance of livestock being in unauthorized areas) increases as the number of roads increase.

In the Craven Canyon Mineral Withdrawal area, the primary impacts from recreational use to the rangeland vegetation and rare plant habitat are the negative direct impacts to the vegetation (i.e. – removal of vegetation, soil compaction, introduction of invasive species) that may result from recreational use. Recreational use in an area increases the likelihood of plant collecting which can have an impact on rare plant populations.

All of the above uses are limited in intensity and duration and therefore when combined with the alternatives analyzed, including the no action alternative, do not result in cumulative impacts to the rangeland vegetation, or to the rare plant habitat.

Economics

Affected Environment

The Black Hills has a rich history of mining and this area is no different. The first discovery of uranium (carnotite) in Fall River County was in Craven Canyon in June 1951. Soon deposits of uranium had been found in the Inyan Kara Group extending from Dewey (about 14 miles (22.5 km) northeast of Craven Canyon) to Chilson Canyon (about 7 miles (11.3 km) southeast of Craven Canyon). The Edgemont mining district was

organized in the late 1950's. Uranium and vanadium were produced from this district until the 1970's. The project area is within the Edgemont uranium mining district. Possible locatable mineral deposits in the Edgemont area include uranium and vanadium roll-front sandstone hosted deposits, and sedimentary rock units containing high calcium limestone and gypsum. Possible leasable mineral deposits include oil and gas in structural traps and minor deposits of subbituminous coal.

Production has come from a number of mines in the Edgemont area many of which were small, one-man operations. The Forest Service has begun reclaiming open pits but essentially little reclamation has been done on the numerous open pits, underground mines, and associated overburden and waste dumps occurring in the area.

Based on BLM's LR2000 mining claim data, Forest Service System lands are blanketed with hundreds of active lode mining claims on Inyan Kara Group sandstones from Deadhorse Canyon (4.5 miles (7.2 km) northeast of Edgemont) northwestward to Dewey. Claims are held by both companies and private citizens, and have been recently located starting in 1998 but mostly from 2002 to 2008. The companies are uranium companies and include Powertech Uranium Corp., Strathmore Minerals Corp. and Great Bear Uranium Corp., Tournigan USA Inc., Neutron Energy, and NCA Nuclear Inc. This increase in recent uranium mining claims has occurred throughout the western U.S. likely in response to both increased uranium metal prices and a changing U.S. energy policy. It appears this resurgence in uranium claims was primarily focused in areas of historic uranium activity prior to any new exploration activity.

In addition to the mining industry, there is also interest in the interpretative (recreational) opportunities associated with Craven Canyon. Some individuals have expressed interest in commercial endeavors (tours) that would provide public opportunities for gaining historical knowledge about Craven Canyon and opportunities for viewing the rock art within the canyon.

Environmental Effects

Under all action alternatives withdrawal of National Forest System lands could reduce opportunities for exploration and development of the mineral resources. This could in turn have some impact to local economies. However, mineral exploration and development could also result in adverse environmental impacts as discussed above. In Fall River County, income from mining activities makes up less than 1% on the total income for the county (Bureau of Economic Analysis, U.S. Department of Commerce).

Alternative 1 would have the least economic impact as it pertains to development and extraction of the mineral resources since all areas, except the existing withdrawal, would be available for mineral development subject to the protection and mitigation measures in 36 CFR 228 subpart A regulations. All of the action alternatives would have some impact to the potential development of mineral resources and therefore to the local economies.

Under all Alternatives, each of the existing claims within areas withdrawn from mineral entry, including the existing mineral withdrawal (PLO 1232 - 160 acres, after partially revoked) would be subject to a Valid Existing Rights Determination by a government certified mineral examiner. The cost to the government for validity testing of claims

within the withdrawal area could range from $40,000 to $60,000 per case estimate. Additionally, the claimant would be required to wait for the validity determination and any associated environmental analysis before any operations could commence. This wait time could range from 1 to 3 years, or more.

Cumulative Effects

There are approximately 77,354 acres withdrawn from mineral entry on the Black Hills National Forest. Most mining in the Black Hills occurs on private lands. The Forest Plan EIS (USDA Forest Service 2005) cited very little in the way of expected mineral development in Fall River County or the Black Hills. Mineral development on the Forest was expected to have "little if any effect on the local or national economy" (ibid). Mining operations occurring on private lands in Fall River County and other areas in the Black Hills are likely to have a much larger effect on the economy.

Watershed and Soils

The FEMA DFIRM database was consulted for information on floodplains. The USFWS Wetlands Online Mapper (http://wetlandsfws.er.usgs.gov/wtlnds/launch.html) was consulted for information on wetlands in the project area. There are no floodplains and no wetlands in the project area. There are no ground disturbing activities proposed and no construction associated with this proposed mineral withdrawal.

CHAPTER 4. LIST OF PREPARERS, AND AGENCIES AND PERSONS CONSULTATED

The Forest Service consulted the following individuals, Federal, State, and local agencies, tribes and non-Forest Service persons during the development of this environmental assessment.

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Yankton Sioux Tribe

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