

# RATTLESNAKE FOREST MANAGEMENT PROJECT

## PROJECT AREA DESCRIPTION AND PROPOSED ACTION

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### PROJECT AREA

The Rattlesnake Project area is in eastern Crook County, Wyoming, approximately 10 miles east of Sundance (Figure 1). It extends from the Black Hills National Forest boundary on the north and west to the South Dakota state line on the east and Calvert-Sacket draw on the south. Landmarks in the project area include Cement Ridge, Sand Creek, Boundary Gulch, Rattlesnake Canyon, and Cold Springs Creek. Legal description is shown in Table 1.

Table 1—Project area legal description

Township/Range	Section
50 North/60 West	4-9, 16-18
50 North/61 West	1-4, 9-16, 21, 24, 26, 27
51 North/60 West	4-9, 16-21, 28-33
51 North/61 West	1-3, 10-15, 21-28, 33-36
52 North/60 West	19, 20, 28-33
52 North/61 West	24-26, 35, 36

*Sixth Principal Meridian*

The project area contains approximately 42,171 acres of National Forest System (NFS) lands and 3,935 acres under other ownership. Elevation ranges from 6,647 feet at Cement Ridge to 3,920 feet at the north end of Sand Creek. The northern two-thirds of the project area is characterized by steep canyons and flat ridgetops, with valley-to-ridge elevation change of up to 750 feet. The southern third is more gently rolling with hills around 300 feet high.

Towns within 10 miles of the project area include Sundance and Beulah, Wyoming, and Spearfish, South Dakota. There are two seasonal residences in the project area. Adjacent populated areas include the Red

Canyon Estates subdivision, Sand Creek Country Club, Riflepit Road, and Tinton.

### Historic Uses

The Rattlesnake area has a long history of human use. The ridges and springs were sites of prehistoric camps and quarries. One site shows evidence of use at least 9,000 years ago. Many American Indian tribes have long considered the Black Hills sacred.

Euro-American settlement began to affect the project area in the 1870s. An early account (Graves 1899) blames careless hunters for large areas of severely burned forest. Small mining towns developed at Welcome and Mineral City, though they have all but disappeared. Timber harvest took place in most of the accessible parts of the project area. Private interests developed Ranch A on Sand Creek just outside the project area.



*Cold Springs Canyon (USFS photo)*

### Current Uses

The Forest Service manages NFS lands in the project area for multiple uses, including recreation, production of wood fiber and forage, water, wildlife habitat, and botanical

resources. Privately owned lands are used for livestock grazing, timber production, mineral exploration, and seasonal residences. The state of Wyoming acquired Ranch A and uses the facility for education.

**Regulatory Framework**

The National Forest Management Act (NFMA) provides much of the basis for management of NFS lands. NFMA requires development of Land and Resource Management Plans (Forest Plans), which in turn spell out specific goals and standards for forest management. Other laws such as the Clean Water Act, Endangered Species Act, and National Historic Preservation Act also guide management actions.

The Black Hills National Forest Plan, as amended, designates a management emphasis for each part of the National Forest. NFS lands in the Rattlesnake Project area are assigned to six of these “management areas” (Table 2; Map 5).

Table 2—Forest Plan management areas and acreages in the Rattlesnake project area

Management Area	Emphasis	Acres
3.1	Botanical areas	2,146
3.7	Late successional forest landscapes	6,346
4.1	Limited motorized use and forest products	4,726
5.1	Resource production	18,386
5.4	Big game winter range	8,022
5.6	Forest products, recreation, and big game	2,546

**Sand Creek Roadless Area**

The Sand Creek inventoried roadless area is located in the middle of the project area (Map 1). In 1967, the Forest Service began identifying roadless areas, including Sand Creek, that could be eligible for recommendation to Congress for designation as wilderness. Only Congress can designate a wilderness. The 1984 Wyoming Wilderness Bill released Sand Creek from wilderness

consideration, but required that its wilderness suitability be reconsidered when the Forest Plan was revised. When the Forest Plan was revised in 1997, the Forest Service determined that Sand Creek was not suitable for inclusion in the National Wilderness Preservation System.

In 2001, the national Roadless Area Conservation Rule prohibited most timber harvest and road construction in roadless areas. The 2001 Rule has been litigated several times. In 2007, a Federal court upheld the Rule, but on August 12, 2008, a different Federal court permanently enjoined it. Further litigation is pending.



Roadless Area/Management Area 3.7 (USFS photo)

**Resource Conditions**

**Fuels**

Since 1970, the project area has experienced an average of about three fires per year. Most of these have been less than an acre in size, with the largest exceptions being the Cement Fire of 2005 (3,003 acres) and the Boundary Fire of 1985 (1,200 acres).

Analysis of fire scars recorded in the rings of trees in the project area suggests that fires of varying intensity historically occurred every 15-35 years. At the studied sites, no fires had occurred in nearly a century. Fuels have accumulated as a result. Timber cutting has mitigated this effect in some areas, but much of the project area has not seen recent management.

Current fuel loadings in the project area are light to moderate for down material less than

three inches in diameter. Small-diameter fuels such as these are the primary carrier of surface fire. Heavy loading of larger fuels is found in parts of the roadless area and in concentrations of storm damage.

Under most weather conditions, a wildfire would be likely to stay on the ground in about 70 percent of the project area. In the remainder, fuel conditions could allow a fire to reach the tree crowns. A fire that spreads through tree crowns is much more difficult to control than a fire that stays on the ground. If a fire did climb into the tree crowns, models indicate that it would have low potential to spread in the southern part of the project area, due mostly to the prevalence of aspen and birch and lighter fuel loadings (Map 7). In the northern part of the project area, a crown fire would generally have a moderate to high potential for spread.

### Forest Vegetation

The Rattlesnake project area is forested mainly with ponderosa pine intermixed with other vegetation types (Table 3; Map 5).

Table 3—Summary of vegetation cover type in the Rattlesnake project area

Cover Type	Acres
Ponderosa pine	34,926
Quaking aspen	4,002
Paper birch	1,411
Grass	1,331
Bur oak	410
Shrubs	56
Willow	14

Though dominated by ponderosa pine, vegetation on this landscape is more diverse than in most other areas of the Black Hills. Quaking aspen, paper birch, and bur oak dominate some stands but are also common in the understory of many pine-dominated stands. The largest areas of aspen and birch are found near Cement Ridge, while oak is a major component north of Sand Creek. Oak in this area is generally characterized by a brushy growth form. In some pine stands,

oak brush occurs in dense thickets that inhibit pine regeneration and herbaceous cover.



Bur oak brush in ponderosa pine stand (USFS photo)

Ninety-four percent of the pine-forested acres are dominated by mature trees (Table 4; Map 6). Of these mature pine stands, about 16 percent are densely forested (structural stage 4C). Another 50 percent of the mature pine stands are moderately dense (stage 4B). Only six percent of the pine is in the early stages of forest development.

Table 4—Summary of ponderosa pine structural stages in the Rattlesnake project area

Structural Stage	Acres
1 (grass/forb)	522
2 (seedling/sapling)	60
3A (young forest, less than 40% crown cover)	135
3B (young forest, 40-70% crown cover)	732
3C (young forest, more than 70% crown cover)	617
4A (mature forest, less than 40% crown cover)	10,867
4B (mature forest, 40-70% crown cover)	16,118
4C (mature forest, more than 70% crown cover)	5,298
5 (late succession)	577

Young pine trees in the seedling and sapling size classes dominate the understory of many mature stands. This prolific regeneration under mature ponderosa pine is typical in the Black Hills and is true on this landscape with the exception of oak-dominated areas.

Dense ponderosa pine stands can be especially susceptible to infestation by mountain pine beetle. Large infestations of these beetles can have negative effects on timber quality and quantity and cause landscape-scale changes to forest structure and composition. Approximately 65 percent of pine acres in the project area are at high risk of infestation and another 33 percent are at moderate risk (Map 8). No large areas of infestation are known to exist in the project area, though large concentrations have been detected less than five miles to the southeast.

According to stand inventory data, there are 577 acres of pine meeting the Forest Plan definition of structural stage 5 (late succession forest). Numerous additional stands meet the diameter component of the definition but are less than the minimum 160 years old.

One timber sale is active in the project area. The Wish sale overlaps the southwest corner of the project area and has harvested timber on 175 acres, with 128 acres still to be cut. Precommercial thinning is scheduled to take place over the next five years on about 658 acres in this sale.

Cutting of commercial timber occurred in parts of the project area between about 1940 and 1990. Most cutting appears to have used commercial thinning and seedcut prescriptions. Due to the absence of recent activity, commercial and non-commercial treatments would be silviculturally appropriate in many stands.

#### *Wildlife and Fish*

The Wyoming Game and Fish Department considers the northern part of the project area to be critical winter habitat for mule deer. Higher elevations provide summer habitat for mule and white-tailed deer, elk, and turkeys. The area burned by the Boundary Fire provides high-quality big game habitat. Mountain lions are found throughout the area.

A number of rare species have been documented in the project area. There are several

northern goshawk (*Accipiter gentilis*) territories. Black-backed woodpeckers (*Picoides arcticus*), which specialize in burned trees, use the Cement Fire area. Old pine stands are home to brown creepers (*Certhia americana*). Black Hills redbelly snakes (*Storeria occipitomaculata pahasapae*) are found in the higher elevations. Finescale dace (*Phoxinus neogaeus*) have been documented in Spotted Tail Creek. American marten (*Martes americana*) sometimes use the Sand Creek drainage, apparently on a transitory basis.

#### *Rare Plants*

The project area contains two botanical areas (management area 3.1): Dugout Gulch and Upper Sand Creek. These areas are managed to maintain or enhance the botanical values for which they were designated.

Seven plant species designated as “sensitive” are known to occur in the project area, including narrowleaf grapefern (*Botrychium lineare*), foxtail sedge (*Carex alopecoidea*), lesser yellow lady’s slipper (*Cypripedium parviflorum*), stiff clubmoss (*Lycopodium annotinum*), groundcedar (*Lycopodium complanatum*), northern hollyfern (*Polystichum lonchitis*), and American cranberrybush (*Viburnum opulus* var. *americana*). Appropriate habitat for most of these species is found on relatively moist soils on north-facing slopes, near springs, and along perennial streams.

#### *Invasive Species*

Invasive species in the form of noxious weeds can be found in scattered locations throughout the project area. Infestations of noxious weeds can be found in disturbed areas such as roads, trails, and old log landings, and along drainages. Soil disturbance can contribute to the spread of noxious weeds. Weed species documented in the project area include spotted knapweed, St. Johnswort, common mullein, houndstongue, common tansy, Canada thistle, Scotch thistle, absinth wormwood, and leafy spurge.

### *Rangeland*

There are eight term grazing permits authorizing livestock grazing on all or portions of six grazing allotments in the project area. Cattle make little use of steep slopes and dense timber stands. They generally use the meadows, drainages, and open forest, and are in parts of the project area from June into October.

Management plans for two of the allotments are currently being revised. A decision on the North Zone Range 08 project is expected in September 2008.

### *Recreation*

Recreational uses include hunting, fishing, dispersed camping, riding off-highway vehicles and snowmobiles, hiking, and sightseeing. There is one developed non-motorized trail. Cement Ridge is a popular sightseeing destination.



*Cement Ridge lookout (USFS photo)*

Five areas encompassing 12,844 acres are closed to motorized vehicle use except on roads designated open: Dugout Gulch botanical area, Upper Sand Creek botanical area, North Sand Creek, Sand Creek Roadless Area, and Hamilton. Vehicles enter these areas illegally at times.

In the southwest corner of the project area, closed roads are open to use by all-terrain vehicles.

The Black Hills National Forest is currently developing a travel management plan. A decision on the plan is expected in 2009.

### *Water and Soils*

Most streams in the project area are intermittent or ephemeral. Perennial streams include parts of Sand Creek, Cold Springs Creek, Surprise Gulch, Spotted Tail Gulch, Idol Gulch, Dugout Gulch, Hospital Gulch, and Red Canyon. These streams have reaches that are intermittent or flow underground due to porous limestone bedrock.



*Tributary to upper Sand Creek (USFS photo)*

The Forest Plan considers the Sand Creek and Shepherd Gulch watersheds to be in “condition class 3”, indicating that the watersheds may be sensitive to impacts from management activities. Projects that take place in condition class 3 watersheds need to improve watershed health.

The state of Wyoming classifies Sand Creek in the project area as Class 1 (outstanding). Cold Springs Creek and Spotted Tail Gulch are considered Class 2AB (fisheries and drinking water). The state has not identified any stream in the project as impaired and considers all to be meeting their assigned beneficial uses.

The majority of the soils in the project area formed under timber, except in grassy valleys and on some ridgetops. Lower-elevation soils show evidence of forming under both timber and grass, indicating transitions between prairie and forest over time.

### *Minerals*

There are 75 mineral claims in the project area, most of which were filed within the

last 10 years. Since 2006, two mineral exploration holes have been drilled in the Welcome area, with one more planned. No additional plans of operation have been filed.

### *Lands and Special Uses*

Several small parcels near Tinton are being considered for a Small Tracts Act case, in which isolated NFS lands may be sold.

There is a proposal to exchange 945 acres of NFS lands (319 acres in the project area) for 739 acres of private land (19 acres in the project area). These parcels are all in the southwest corner of the project area.

The private land near Sand Creek Crossing may be developed and the owner has requested year-round access using roads that are currently closed in winter.

## **PROPOSED ACTION**

### *Proposed Activities*

Proposed activities are summarized in Table 5 (page 10).

#### *Thinning*

Thinning increases the space between trees in pine stands by cutting some of the trees and retaining a given density of the best-formed and generally largest trees. In addition to reducing the potential for crown fires, thinning provides more resources for the remaining trees. This reduces the risk of mountain pine beetle infestation and allows increased growth. Post-treatment conditions generally consist of moderately spaced pine with a fairly even distribution over the stand.

Commercial thinning would occur where most of the trees are at least nine inches in diameter. Cut trees would be removed and sold as sawtimber. Residual basal area in commercially treated stands would generally be 50 to 60 square feet per acre (or an average of about 25 feet between trees 12 inches in diameter).



*Even-age pine stand with potential for thinning (USFS photo)*

Trees five to nine inches in diameter would be thinned to a 16- to 18-foot spacing, and cut trees would be sold as products other than logs (POL thinning) or as biomass. Precommercial thinning would take place where trees are less than five inches in diameter. These treatments may take place manually or using machinery.

### *Shelterwood Regeneration Treatments*

These treatments are part of the shelterwood silvicultural system, in which a pine stand is regenerated to form a new stand. In the seedcut step, the best-formed mature trees are retained as a seed source while the rest of the trees are cut to provide space for seedlings. This is followed by the overstory removal step, in which the remaining mature trees are cut to make all of the site's resources available to the new stand. These treatments produce sawtimber and set the stage for future production of timber and biomass.

Because few stands are completely homogenous, the proposed action includes various combinations of seedcut and overstory removal. Stands where seedcut is proposed are characterized by mature ponderosa pine in larger diameter classes with patchy regeneration in the understory. About 30 square feet of basal area would be retained in most of the stand, or an average of about 50 feet between trees 16 inches in diameter. Where sufficient pine regeneration exists, all overstory trees would be removed. Post-treatment conditions would generally consist

of widely spaced mature trees with patches of pine seedlings or saplings.

Overstory removal is proposed in stands with abundant pine regeneration. Most of the overstory trees would be removed, with seed trees retained in areas without sufficient regeneration. Thinning of pine seedlings and saplings would take place following the commercial treatment. Post-treatment conditions would generally consist of pine seedlings and saplings two to 20 feet tall with occasional patches of widely spaced mature trees.



*Pine regeneration in Surprise Gulch (USFS photo)*

### *Uneven-age Treatments*

Most forest management in the Black Hills uses even-age silvicultural methods. These methods produce a stand of trees that are all in one or two age and size classes. Uneven-age management produces stands with a variety of ages and sizes. These stands provide contribute diversity to wildlife habitat, scenery, and within-stand structure.



*Uneven-age pine stand (USFS photo)*

The Rattlesnake project proposes to use two uneven-age silvicultural methods: group selection and individual tree selection. These treatments would reduce fire hazard and risk of beetle infestation, diversify stand structure, enhance winter range, and produce both sawtimber and smaller material.

Group selection is proposed in winter range in stands that have a pine overstory and a dense understory of oak brush. Although deer and elk will browse oak brush, it is not a preferred winter forage. It also hinders establishment of pine seedlings. To promote regeneration of preferred forage species and pine, group selection would be applied in several stands. Pine would be cut in one- to three-acre patches scattered across each stand. This would focus disturbance in small patches with the objective of setting back the oak enough to allow grasses, forbs, desirable shrubs, and eventually pine seedlings to take hold. Oak would remain a component of the stand but would not completely dominate the understory. The total area cut in the groups would be about a third of each stand. The area between the cut groups would be thinned if needed. Slash would be concentrated in the cut groups and burned.

Unven-age individual tree selection would take place in management areas 5.1 and 5.4. This treatment would generally be applied where several age and size classes already exist in a stand. Trees would be removed from all size classes as necessary to maintain or produce an uneven distribution.

### *Shaded Fuel Breaks*

The proposed action includes shaded fuel break treatments in two areas. This treatment would reduce fuels in strategic locations. The larger area is along the north side of NFSR 804 in Rattlesnake Canyon. Mature pine would be thinned to about a 50-foot spacing to create or increase space between tree crowns. Smaller trees would be thinned to a 12- to 16-foot spacing. The treatment also would reduce understory fuels through thinning or chipping. This

would decrease the likelihood of a fire climbing through flammable vegetation from the surface to the treetops. Shaded fuel breaks would result in both sawtimber and smaller material. Aspen and birch, which are naturally less flammable than pine, would be retained where they occur within the fuel break.

The second shaded fuel break would be placed along and near NFSR 852, adjacent to the northeast side of MA 3.7. The placement of this fuel break is intended to reduce the risk of a wildfire moving into or out of MA 3.7.

#### *Manual Thinning and Piling*

Manual thinning and slash piling is proposed in two locations near inhabited private land. One is along the National Forest boundary across NFSR 863 from the Red Canyon Estates subdivision. Because this area is in MA 3.7 and on a steep, unroaded slope, removal of timber is not appropriate or possible. Crews using chainsaws would thin smaller-diameter pine to about 14-foot spacing, pile the slash, and burn it. This would produce an area with low fuel loading that may decrease the likelihood of a wildfire moving across the boundary.

The other location is along NFSR 863 south of the Dugout Gulch trailhead. Small pine and oak would be thinned to decrease crown fire hazard and increase the road's safety as a potential escape route.

#### *Meadow Treatments*

In the Black Hills, many historically open areas have become overgrown with pine. Loss of meadows reduces diversity of vegetation and value of wildlife habitat, particularly in winter range. Openings in the forest canopy can also serve as fuel breaks. The proposed action includes cutting of encroaching pine in meadows, both riparian and on ridgetops. Cut trees would generally be small and slash would be scattered or piled and burned.

Montane grasslands are unique vegetation communities limited to high-elevation sites. A montane grassland is found on Cement Ridge. To perpetuate this grassland, small encroaching pine would be cut. Broadcast burning would take place in part of the grassland.

#### *Aspen and Oak Treatments*

Without disturbance, aspen stands may be invaded by pine. Aspen is an important habitat component for white-tailed deer, ruffed grouse, and other species, and forms natural fuel breaks. The proposed action includes cutting of small pine where needed in aspen stands, primarily in MA 5.6.

Cutting of small pine is also proposed in one stand of oak. In this stand, burned by the Boundary Fire, oak has attained tree size. The objective of the treatment is to reduce pine encroachment to retain the stand's value as wildlife habitat.

#### *Prescribed Fire*

Black Hills vegetation communities evolved with fire and need occasional disturbance to stay within their historical range of variability. Fire has been absent from most of the project area for decades, with the exception of the Boundary and Cement Fire areas. Burning can be a practical way to reduce fuels in areas where timber harvest and other mechanical treatments are not possible. Burning also can be an effective means of increasing forage quality and quantity.



*Three years after understory burn (USFS photo)*

The proposed action includes broadcast burning with a variety of objectives. Where possible, the burn blocks are designed to use existing roads as control lines to minimize additional ground disturbance.

One of the largest proposed burn blocks is in the old Boundary Fire area. Vegetation in the burn area is a mixture of aspen, oak, shrubs, and forbs, making excellent habitat for big game. The proposed action includes re-burning this area to maintain the habitat and establish a fire return interval closer to historic conditions.

Four burn blocks are located in MA 3.7 and the Sand Creek roadless area. The objective of these burns is to maintain and diversify late succession conditions in MA 3.7. Proposed burns would begin the process of reintroducing fire to the landscape after a century-long absence. Fire would create small openings and increase the number of snags. A decrease in competition from smaller pine would allow large trees to use more of the site's resources. As a secondary benefit, these changes may reduce the threat of a single severe wildfire burning a large percentage of the late succession landscape. Topographic features would be used for control where possible. Where additional control features are necessary, only manually constructed control lines (hand lines) would be allowed. Existing roads would not be improved. Due to the hazards of working on steep slopes, aerial ignition would be used in much of the area.

Burning is proposed elsewhere in the project area to reduce fuel accumulations, improve forage, and increase the resistance of pine stands to wildfire.

#### *Watershed Improvement Projects*

Identified conditions negatively affecting watersheds in the project area are mainly associated with roads or trails. Certain roads are in problematic locations or have inadequate drainage, which has led to ruts, erosion, and sedimentation. Specific concern areas this project would address are associated with roads or trails in Pole Cabin

Gulch, Washington Gulch, Roena Gulch, Cummins Gulch, Spotted Tail Gulch, the east fork of Dugout Gulch, Manhattan Gulch, and Hospital Gulch, and near Welcome and Guidinger Spring. In general, actions would consist of disconnecting sediment sources from the drainage network. This may be accomplished through road reconstruction, repair or installation of drainage structures, road decommissioning, revegetation, access management, and other activities.

#### *Timber Harvest Methods*

Most of the proposed commercial timber harvest would take place using ground-based systems. Where slopes are generally over 40 percent or other limitations apply, logs would be removed from the site using partial- or full-suspension cable yarding systems.

#### *Connected Activities*

The following activities would take place in support of the proposed action.

#### *Road Construction and Improvements*

Construction of four new NFS roads (a total of 2.7 miles) would be necessary for removal of merchantable timber. New roads would be closed following use. Thirteen existing non-NFS roads would be improved and added to the National Forest road system (6.3 miles).

Reconstruction of 114 miles of NFS roads would take place. Most (109.5 miles) would require only minor reconstruction. Another 4.5 miles would require major reconstruction, such as replacement of drainage features. Twenty-five miles would require minor maintenance, such as grading.

Acquisition of an easement across private land may be necessary for proposed activities in township 51 north, range 61 west, sections 3 and 10. The existing NFS access route in Black Haw Gulch is located in the canyon bottom, adjacent to an intermittent stream.

Most proposed vegetation management activities would result in slash, either in piles or scattered across the treated areas. Piles would be burned, chipped, or otherwise disposed of, and the pile sites rehabilitated.

Table 5—Summary of proposed and connected activities

Proposed Activities	Acres
Commercial thin	4,347
Commercial/POL thin	394
Precommercial thin	4,080
Shelterwood seedcut	1,823
Overstory removal	2,495
Group selection (uneven-age)	471
Individual tree selection (uneven-age)	1,523
Shaded fuel break	487
Thin/pile (manual)	38
Pine from meadow (manual)	606
Pine from aspen (manual)	363
Pine from oak (manual)	62
Prescribed broadcast burn	5,650
<i>Total commercial timber harvest</i>	<i>11,540</i>
<i>Total area treated</i>	<i>17,453</i>
Connected Activities	Miles
Road construction—System	2.7
Road construction—Non-system road conversion	6.4
Road construction—Temporary	2.2
Road reconstruction—Major	4.5
Road reconstruction—Minor	109.5
Road maintenance	25.5

Cable yarding would be used on an estimated 950 acres.

## ADDITIONAL INFORMATION

### *Responsible Official*

The responsible official for the Rattlesnake Project is Steve Kozel, Bearlodge District Ranger.

### *Forest Plan Amendments*

The proposed action would not require amendment of the Forest Plan.

### *Planning Process*

Public involvement is a key element of the land management planning process. Public input at this point in the process will help identify issues associated with the Rattlesnake Project and guide development of alternatives to the proposed action.

Foresters, biologists and others will analyze the effects of the proposed action and alternatives on the physical, biological, and social environment. This analysis will be presented in a draft Environmental Impact Statement scheduled to be circulated for public comment in the spring of 2009. Based on the analysis and public input, the Forest Service will prepare a final Environmental Impact Statement, and the responsible official will decide which alternative to implement.

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## MAPS

1. Proposed Vegetation Management and Road Work (north)
2. Proposed Vegetation Management and Road Work (south)
3. Proposed Prescribed Fire and Watershed Improvements (north)
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