Environmental Assessment for the Establishment of the Bangtail Botanical and Paleontological Special Interest Area

Gallatin National Forest
Bozeman Ranger District
March 30, 2007

Chapter 1.0 Purpose of and Need for Action

1.1 Contents of Chapter

This environmental Assessment (EA) has been prepared to document the environmental effects of establishing the proposed Bangtail Botanical and Paleontological Special Interest Area (Bangtail SIA) on the Bozeman Ranger District of the Gallatin National Forest near Bozeman, Montana (Figure 1). The proposed Bangtail SIA is located about 22 miles by road northeast of Bozeman in the Bangtail Mountains. A special interest area is a Management Area designated in the Forest Plan and managed for the protection of its special resource values. Chapter 1 contains information related to the purpose of and the need for the project, objectives of the project, the decision to be made, and laws and regulations that influence this analysis. The schedule for implementation of the proposal is June of 2007.

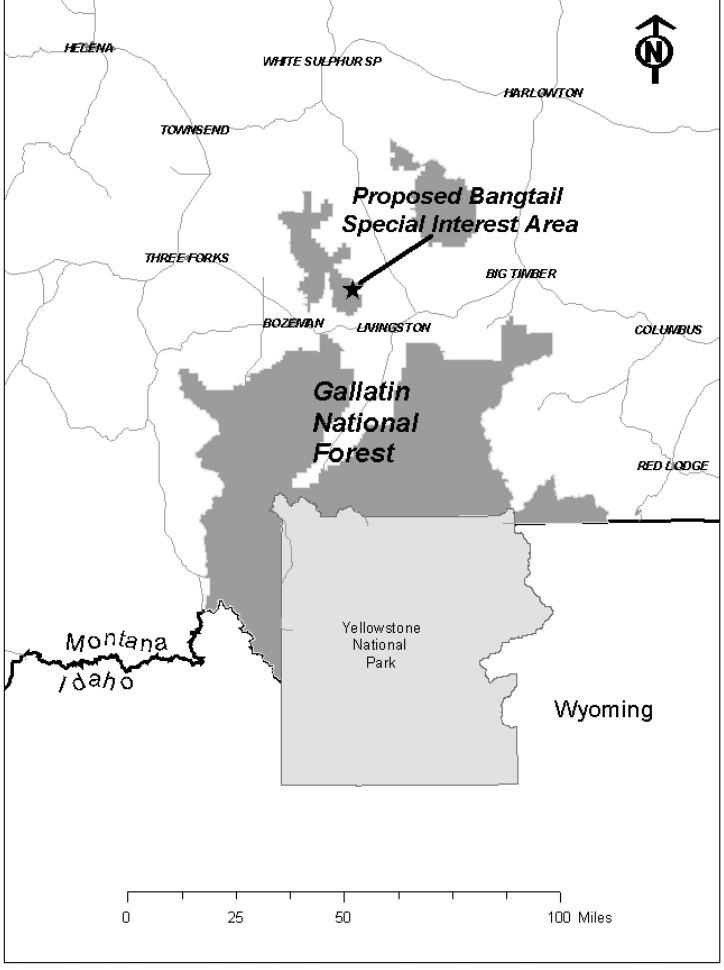

Figure 1. Vicinity map displaying the general location of the Proposed Bangtail Special Interest Area.

Figure 1.0. Vicinity Map of the Proposed Bangtail Special Interest Area.

1.2 Purpose of and Need for Action

The purpose for the Bangtail SIA is to provide long-term protection to an area for scientific research opportunities on mountain meadow and sub-alpine ecosystems, and to provide research sites for important paleontological resources of North America (Houde 1981).

A special interest area status is needed because the area would provide an excellent opportunity for vegetative research and interpretation of important paleontological finds. The area is unique in that it is representative of landscapes that extend from central Wyoming (Knight 1994) to northern Montana (Habeck 1987), and is comparable to bunchgrass ecosystems of Asia and the Andes. It is also unique because it is accessible and has supported thirty years of research, thus providing valuable baseline data for present and future studies. Its accessibility and history make it well suited for gathering information on natural resource management issues. Designation of the Bangtail SIA would help maintain the ecological integrity of the site for present and future research studies, and would serve to protect high-quality examples of these grassland habitats (Bangtail Botanical and Paleontological Special Interest Area Establishment Record 2007).

The paleontological sites are very important in that recent finds indicate the area supports important and unique fossils of Paleocene animals and their evolutionary patterns. Entire skeletons are preserved here which make this site unique (Boyer 2005). The area is part of the Crazy Mountain Basin that contains rock formations preserving one of the longest continuous records of Paleocene terrestrial and freshwater life (approximately 55-65 million years ago). The basin is rich in fossil mammals including the 10 million years closely following the demise of the dinosaurs and appearance of mammals. Studying fossils in the area is critical to understanding mammalian evolution and the evolution of climate and global ecosystems through the beginning of the Cenozoic era.

It is important that the paleontological work continue without having to compete with other management activities for two main reasons. First, mapping the deposition of rock provides a more accurate timeline of the evolution of fauna than what is currently available. Secondly, beyond merely increasing the number of points in time represented, the exceptional preservation of fossils in the Bangtails makes each new discovery add exponentially to the understanding of the animals from this time (Boyer and Bloch 2003).

The Gallatin Forest Plan manages the area with emphasis on forest management and livestock grazing. Some of the management areas promote forest management and livestock grazing with emphasis on the maintaining forage and cover for wildlife. The activities of livestock grazing and forest management could alter the unique characteristics of the landscape. Logging often requires ground disturbance such as building roads, skidding logs, and the construction of skid trails and landings all of which could damage paleontological sites and vegetative studies. Livestock grazing could compromise decades of scientific studies related to vegetation and could harm important paleontological resources. To protect the unique character of the area the Gallatin Forest Plan management emphasis needs to be amended to a Special Interest Area.

1.3 Proposed Action

The proposed action is to amend Forest Plan Amendment #20 that established Research Natural Areas and Special Interest areas on the Gallatin National Forest in 1997 (Gallatin Forest Plan Amendment #20 1997). The amendment would be updated to include the Bangtail Special Interest Area. Management direction for the Bangtail Special Interest Area is defined in the Bangtail Establishment Record in Appendix 1. The total area would be about 3,366 acres in size (Figures 1 and 2).

1.4 Objectives of the Proposed Bangtail SIA

Objectives described in the Forest Service Manual 2360 for the establishment of special interest areas

include the area's protection and, were appropriate, foster public use and enjoyment of areas with scenic, historical, geological, botanical, zoological, paleontological, or other special characteristics. The objectives also include classifying areas that possess unusual recreation and scientific values so that these special values are available for public study, use or enjoyment.

One criteria for the establishment of this area is to not conflict with decisions in the Forest Travel Plan. The type of public access allowed in the proposed Bangtail SIA has been decided in the Forest Travel Planning EIS Record of Decision (2006).

1.5 Decision to be Made

Based on the effects documented in this EA the Forest Supervisor will decide whether the Forest Plan would be amended to establish the Bangtail SIA or if the Forest would continue the current management of the area as described in the Gallatin National Forest Plan. If the EA identifies effects that may have a significant affect on the human environment, the Forest Supervisor may decide to conduct further analysis by preparing an environmental impact statement or to drop the proposal. If effects are not significant, the Forest Supervisor would select one of the alternatives presented in this EA. That decision would then be documented in a Decision Notice and Finding of No Significant Impact.

1.6 Related Laws and Authority to Establish the Bangtail SIA

Classification of areas of National Forest for special management such as a special interest area is authorized under the Code of Federal Regulations, 36 CFR 294.1.

Amending the Forest Plan is authorized under National Forest Management Act (NFMA) regulations at 36 CFR 219.10(f) (1982) as provided for in the NFMA regulations at 36 CFR 219.14 (d)(2) (January 2005).

Chapter 2.0 Alternatives Including the Proposed Action

2.1 Contents of Chapter

Chapter 2 contains documentation of the relevant issues that were identified during the scoping process, the description of the proposed action, alternatives to the proposed action that were formulated based on the environmental issues, issues and alternatives eliminated from detailed evaluation, and a summary of the environmental effects associated with each alternative.

2.2 Project Scoping

Thirty-four letters were sent to a variety of organizations, local grazing permittees, Montana Fish Wildlife and Parks and members of the public. Five letters were received during the scoping process. An interdisciplinary team (ID Team) composed of natural resource specialists reviewed these letters. The ID Team identified the relevant issues with the help of the deciding official. These issues were then used to identify needed mitigation and modify the proposal to reduce adverse effects and increase beneficial effects.

2.3 Issues Eliminated from Further Evaluation

An essential part of the environmental analysis process is to identify those issues that are significant to the project being evaluated and those that are not significant (40CFR 1501.7). It is the job of the ID Team in consultation with the deciding official (Forest Supervisor) to complete this step.

After reviewing the letters received from the public, the ID Team concluded that the proposed Bangtail SIA is not highly controversial. Neither the ID Team nor the public identified many potential issues. This is because the proposal has a limited geographic extent, and when comparing current management activities to those activities proposed to take place in the Bangtail SIA, not much change is proposed. There are several reasons for this. For example, there is limited potential for commercial forest management activities (Chapter 3 - Vegetation), grazing use could be managed without changes to the current grazing permit (Analysis File - ID Team Meeting Notes) and issues related to travel management have been decided in the Travel Plan Record of Decision.

Letters received from the public all suggested that the Forest's Travel Plan consider limiting motorized use within the Bangtail SIA. These letters suggested that all forms of motorized use could damage research plots and vegetation in general in a special interest area. After reviewing these concerns, the ID Team agreed that the environmental analysis being conducted for Forest Travel Planning was the most appropriate place for travel management to be decided for the Bangtail SIA. These travel management concerns were passed along to the Travel Planning ID Team. Therefore, the issue of travel management is not evaluated in the analysis and this issue was eliminated from consideration. Designation of the Bangtail Special Interest Area would not result in environmental effects on travel management in the area.

There was potentially an issue related to the extraction of oil and gas resources in sections T. 1N. R. 7E., Sec 36; T. 1N. R. 8E., Sec. 30 and T. 1S., R. 8E., Sec 6 (figure 2). These sections have been leased for oil and gas. In a court decision, Conner v, Burford, the court ordered the Forest Service to suspend oil and gas leases until it complied with NEPA and the Endangered Species Act. NEPA has never been completed and suspended leases are present in these sections. No plans are proposed in the foreseeable future to complete NEPA on these sections. While there is the potential for mining of oil and gas the likelihood it would happen is very low.

2.4 Issues

The Interdisciplinary Team with consultation of the Forest Supervisor reviewed the issues identified during scoping. Issues that were determined to be relevant to the analysis were identified. These are used in Chapter 4 to

evaluate the environmental effects. Along with the issues are indicators that are used to evaluate and measure environmental effects.

2.4.1 Issue: Reduction in Acres Suitable for Timber Production

Discussion: Some of the forested land within the proposed Bangtail SIA is used to calculate the level of sustainable harvest estimated in the Gallatin Forest Plan. This is the Forest's allowable annual cut or allowable sale quantity. Redesignating the area to Management Area 21 would reallocate those lands tentatively suitable for timber production to a non-regulated component. This could mean a reduction in the level of allowable sale quantity (harvest) for the Forest. It does not mean that forest management activities would be excluded but that the lands would not used to estimate the level of forest products that could be produced on a sustained yield basis. It does mean forest management activities in the area could be substantially reduced.

Indicator: Acres of tentatively suitable land changed to non-regulated component

2.4.2 Issue: Establishment of the Bangtail SIA and associated scientific studies could affect management of grazing allotments and visa versa.

Discussion: Establishment of the Bangtail SIA could alter livestock management in the area. This could affect the economic livelihood of the permittees operating under Forest Service permit. Also, livestock grazing can have positive and negative effects on the development and composition of plant communities. Grazing of native (and non-native) plants can alter how plant communities develop over time allowing early successional plants to be more common. Grazing can also advance the successional development of plant communities by altering the rate of encroachment and in-growth of conifers such as Douglas-fir and other species (Belsky and Blumenthal 1997).

Indicator: Discussion of how establishment of the Bangtail SIA might affect the livestock grazing permits and scientific studies

2.4.3 Issue: Noxious weeds and invasive species in general could affect how the Bangtail SIA is managed.

Discussion: Noxious weeds are a problem throughout the National Forest System and have been identified as a threat to the health of National Forests nationwide. The Bangtail Mountains have many infestations of plants on the Montana Noxious Weeds List. Most infestations are only a few plants and most are located along roads. Noxious weeds could threaten the integrity of the native plant communities within the proposed Bangtail SIA.

Indicator: Discussion of the risk of non-native species compromising native plant communities and how establishment of the Bangtail SIA might affect how weeds are managed in the area.

2.5 Alternative Development Process

Issues received from the public and issues identified by the ID Team were used to modify the proposal sent out to the public during scoping. The modifications are designed to refine the proposal and to reduce the potential for adverse environmental effects and increase beneficial effects.

2.5.1 Alternatives Eliminated From Detailed Study

One alternative that was considered but eliminated by the ID Team was to include an evaluation of travel management for the proposed Bangtail SIA. It was determined that travel management decisions, while important to the integrity of the Bangtail SIA, are not within the scope of this analysis and would be best evaluated in the Forest travel planning process.

Other alternatives eliminated included several alternative boundary configurations. After reviewing the boundaries in the field and by using computerized mapping (GIS) it was determined that the boundary would be best if located along section lines and along portions of sections rather than geographic features. This is because the ID Team could not logically fit a boundary to the geographic features of the area. The ridge top

location and mixed land ownerships for example did not allow boundaries to follow ridges or draws associated with watersheds (Figure 2).

2.5.2 Description of Alternatives A (Proposed Action)

Alternative A would manage an area about 2,202 acres under a Land Use Plan Management Area designation 21. Management area 21 would provide for non-manipulative research, observation, and study. Designation of the area as Management Area 21 would require a Forest Plan Amendment (Appendix 2). This would likely be considered a non-significant amendment to the Gallatin Forest Plan. The determination of non-significant would be made in the Decision Notice.

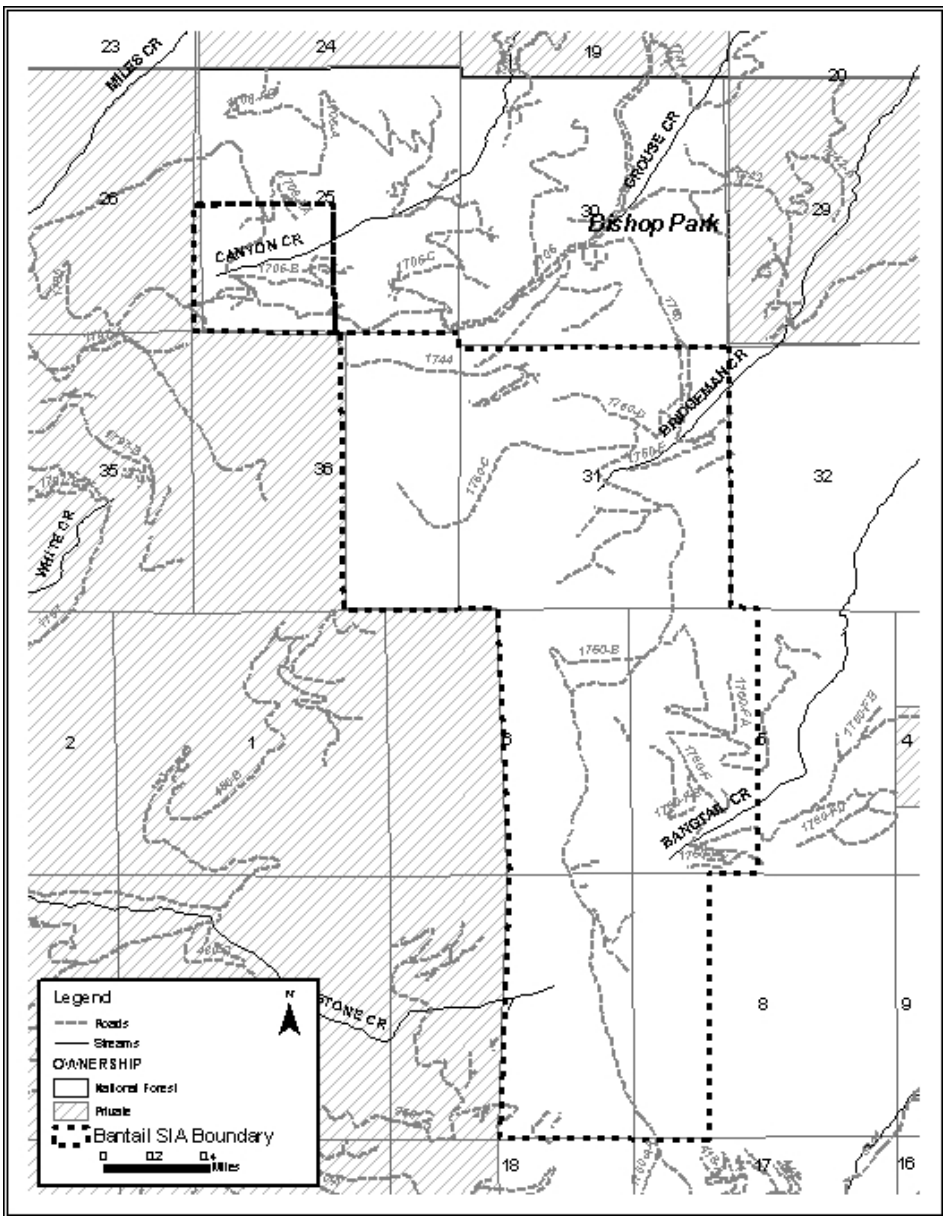

Figure 2.0. Map of Alternative A the proposed action.

A number of activities specific to the Bangtail SIA are proposed. Activities evaluated in this

analysis include minor amounts of fencing of up to a few acres in size to exclude livestock use in research plots. Activities would also include staking and flagging that would normally be associated with the identification and monumenting of these research plots.

Establishment of the Bangtail SIA would allow for limited excavation of paleontological resources. This would include the excavation of slit trenches by hand digging to explore for fossils and limestone formations. It is estimated trenches would be approximately 40 feet long one foot wide and 2 feet deep (Krause 2003). The number of trenches authorized would be restricted to about five per year although it is anticipated that trenches would not be needed each year but only on an occasional basis to map the limestone formations. Excavation of fossil finds would require areas up to 10 feet in diameter excavated by hand. Hand excavation using shovels, and other hand tools and wire mesh to sift excavated soils would be allowed. All areas would be rehabilitated including reseeding of native species of vegetation. Removal of fossils and rock for research purposes would be permitted.

Amending the Forest Plan means the area would not be included in the suitable timber base, or counted as suitable rangelands. Activities related to forest and rangeland management activities would only be compatible with the management direction of a special interest area. This means forest management, prescribed burning, livestock grazing would still occur but would be done in a manner that would be compatible with maintaining the overall integrity of the Bangtail SIA.

Travel designations within the proposed Bangtail SIA are identified in the Forest Travel Plan (2006). This includes a motorized ATV route through the Bangtail SIA.

All activities associated with paleontological and scientific studies in the proposed Bangtail SIA would be reviewed by the District Ranger and only authorized under special use permits. If it is determined by the District Ranger that proposed activities related to SIA exceed what has been documented in this environmental analysis, then additional analysis, documentation and disclosure to the public would be required.

Roadside interpretive signing would be placed in the Special Interest Area to provide information to the public about its establishment and function.

2.5.3 Description of Alternative B

Alternative B would increase the area of the SIA to 3,366 acres. The increase is a response to comments received during the public scoping process. Comments from researchers indicated the paleontological studies and studies related to vegetation would benefit by adding more area on the north end of the proposed Bangtail SIA. Therefore, all of section 25 and 30 would be included in Alternative B (Figure 3).

Management of the area would be the same as Alternative A except the level and disturbance associated with various research projects would be slightly higher. Alternative B would allow a certain activities to be carried out without having to go through a formal public involvement, environmental analysis and appeal process each time a scientific study is proposed. This is intended to avoid having to conduct an environmental analysis every time a scientific study is proposed.

Alternative A states “Management area 21 would provide for non-manipulative research.” Alternative B would include the use of light machinery for paleontological excavation, and some prescribed fire and removal of timber to implement scientific studies of vegetation.

Disturbances related to paleontological research would be approximately 40 feet long one foot wide and 2 feet deep. The number of trenches authorized would be restricted to about five per year although it is anticipated that trenches would not be needed each year but only on an occasional basis to map the limestone formations. Areas up to 10 feet in diameter would be allowed for fossil excavations. These would be excavated by hand. Hand excavation using shovels, and other hand tools and wire mesh to sift excavated soils would be allowed. As in Alternative A, all soil

disturbances would be rehabilitated including reseeding of native species of vegetation. Removal of fossils and rock for research purposes would be permitted subject to authorization.

Activities related to scientific studies of vegetation would allow for prescribed burning of up to three acres over a three year period and the manipulation of forest vegetation (not clear cutting) of up to 3 acres over a three year period. Exceeding these levels would require further public involvement, environmental analysis, and documentation. Documentation would include the preparation of an environmental assessment (EA), a decision memo (DM), or in the case of a large controversial project an environmental impact statement (EIS).

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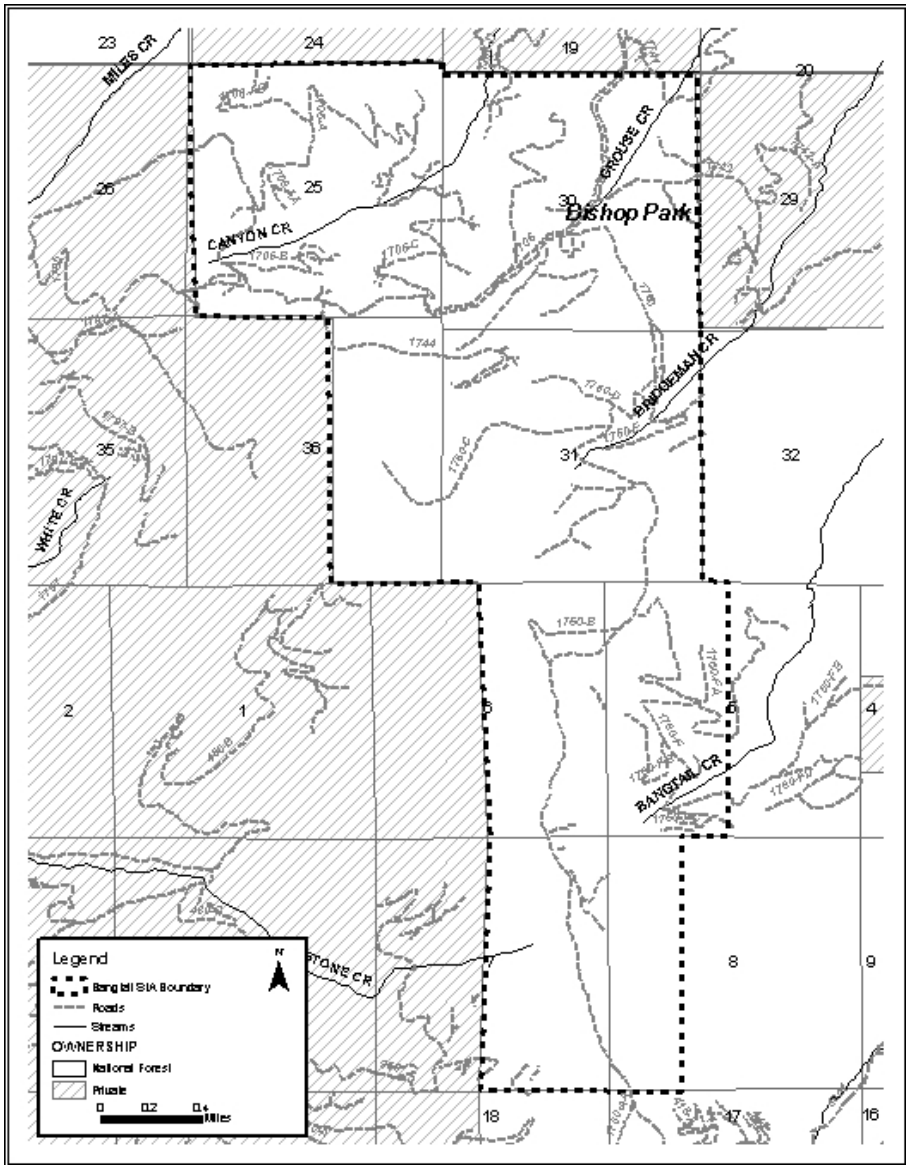

Figure 3. Map of Alternative B.

The Forest Plan Amendment would be worded as described in Appendix 2.

Roadside interpretive signing would be erected in the Special Interest Area to provide information to the public about its establishment and function.

The location of the sign would be determined later but would be located to provide information to the public about the Bangtail SIA.

Travel designations within the proposed Bangtail SIA are identified in the Forest Travel Plan (2006). This includes a motorized ATV route through the Bangtail SIA.

2.5.4 Detailed Description of Alternative C (No Action)

Alternative C would continue current management for the area. Table 1 lists the current management of the areas described in the Gallatin Forest Plan for the 3,310 acre described in Alternative B (Gallatin Forest Plan Chapter III). Several management areas are included in the area.

Table 2.0. Gallatin Forest Plan Management Areas within the proposed Bangtail SIA.

Management Areas	Acres	Management Area Emphasis
1	33	Visitor sites and potential developed sites
10	615	Forest management and livestock grazing
11	455	Big game forested habitat
16	245	Livestock grazing
17	62	Livestock and wildlife forage production
99	1956	Unclassified lands recently acquired by the Gallatin

Recent land exchanges have left gaps in the Management Area designations (Table 2.0, MA 99). The intent of the land exchange was to have those areas exchanged take on the MA designation of the National Forest Lands adjacent to it. However, there are frequently up to three Management Areas adjacent to some of the acquired lands. Therefore, it is possible that up to three different management prescriptions could be placed on various portions of the acquired lands. Exactly which management prescriptions would be assigned to which portions of the acquired lands has not been decided. The Forest Plan is scheduled to be revised in 2008.

Activities such as studies related to research of rangeland and forest plant communities would continue under annual special use permits approved by the District Ranger. Paleontological excavations would also continue under special use permit.

Other activities would also continue. The tentatively suitable forestlands would be scheduled for sustained yield forest management practices as directed in the Forest Plan. Activities such as non-commercial thinning of regenerated forests would be scheduled depending upon the growth of the regenerated stands.

Livestock grazing would continue at the current levels unless changes are made during the upcoming allotment management plan updates scheduled for 2008.

2.5.5 Project Design Features and Mitigation Common to all the Alternatives

1) Each of the alternatives would be compatible with the Forest Travel Planning decision. (Responsible officials: District Ranger and District Law Enforcement Officer)

2) All reclamation work related to the excavation of paleontological sites would include the use a weed-free native seed mix if seeding is required. In many instances, adjacent vegetation would regenerate the disturbed site. (Responsible officials: Gallatin National Forest Rangeland Ecologist and District Invasive Species Coordinator)

3) All motor vehicles and heavy equipment used in association with scientific studies and used to excavate trenches, etc. for paleontological research would be washed to remove weeds and soil possibly contaminated with weed seeds prior to

coming onto the Forest. (Responsible officials: Forest Geologist, District Invasive Species Coordinator)

4) Noxious weeds would continue to be suppressed annually under the District's Integrated Weed Management Plan (2004) and direction from the Gallatin's Noxious Weed EIS (2005). (Responsible officials: Gallatin National Forest Rangeland Ecologist and District Invasive Species Coordinator)

5) All trails would continue to be signed directing the public to stay on designated routes with motorized vehicles. (Responsible officials: District Ranger and District Resource Assistant for Recreation and Special Uses)

6) Areas identified for vegetation or paleontological or other studies would be reviewed for threatened, endangered or sensitive plants and animals prior to approval of each special use permit. If species are found, either the project would be modified to avoid adverse effects or the project would be dropped. (Responsible official(s): District Ranger, District Wildlife Biologist, and Forest Sensitive Plant Coordinator)

7) Areas identified for studies of vegetation and all sites excavated for inventories related to paleontology would be reviewed for historic and cultural resources prior to approval of the special use permit. If historic or cultural resources are discovered, the project would be modified to avoid damage to the site or the project would be dropped (Responsible official(s): Gallatin National Forest Heritage Program Manager, and District Ranger)

8) Scientific studies would typically be designed to not disturb more than one acre in any one year. There would be minor amounts of excavation associated with paleontological work of less than one acre per year. Excavations would occur over short time intervals of a few weeks to up to two months. (Responsible officials: District Ranger and District Resource Assistant for Recreation and Special Uses)

9) All activities associated with scientific studies in the proposed Bangtail SIA would be reviewed by the District Ranger and only authorized under the appropriate type of permit. If the District Ranger determines that proposed activities related to SIA exceed what is documented in this environmental assessment, then additional analysis, documentation and disclosure to the public would be required. This additional analysis would be documented in an environmental assessment (EA), an environmental impact statement or a decision memo. (Responsible official: District Ranger)

10) Forest management activities would be scheduled and designed to not conflict with scientific studies in the Bangtail SIA.

Table 2.1. Comparison of Environmental Effects of the Alternatives.

Comparison of Alternatives			
Issue	***Alternative A (Proposed Action)***	***Alternative B (Alternative to the Proposed Action)***	***Alternative C (No Action)***
Reduction in Acres Suitable for Timber Production.	1,268 acres or 0.4 % of the Forest Total. It is estimated that this is not an appreciable amount. However, as other areas are removed from the suitable base there may be more substantial reductions in the suitable base.	2,134 acres or 0.7 % of the Forest Total. It also estimated for Alternative B that this is not an appreciable amount. However, as other areas are removed from the suitable base there may be more substantial reductions in the suitable base.	No Change in acres of suitable timber lands. No timber sales are proposed in the reasonably foreseeable future.
Establishment of the Bangtail SIA and associated scientific studies could affect management of grazing allotments and visa versa.	2,202 acres of allotments No changes proposed in grazing but some minor limitations due to fenced study plots. Limitations could create slight economic and logistical impacts on the grazing permittees. Annual monitoring indicates the allotments are in compliance with the Forest Plan and their Annual Operating Plans.	3,366 acres of allotments No changes proposed in grazing but some minor limitations due to fenced study plots. Limitations could create slight economic and logistical impacts on the grazing permittees. Annual monitoring indicates the allotments are in compliance with the Forest Plan and their Annual Operating Plans.	No effects above what is currently happening established with studies. Past adverse impacts have been minor.
Noxious weeds and invasive species in general could compromise the ecological integrity of the area.	2,202 acres of Special Interest Area at risk to weeds, increased vigilance, more persons with plant identification skills in the area looking for weeds-designation may make the area more attractive for priority funding opportunities and grants.	3,366 acres of Special Interest Area at risk to weeds, increased vigilance, more persons with plant identification skills in the area looking for weeds-designation may make the area more attractive for priority funding opportunities and grants.	Weeds would continue to be treated along roadsides and away from roadsides as they are detected. There may be less detection effort concentrated in the area since the area would no have special designation and an SIA.

Chapter 3.0 Chapter 3.0 - Affected Environment

3.1 Contents of Chapter

The Affected Environment describes the existing environmental conditions of the areas that would affect or that would be affected by the proposal. This description establishes the baseline conditions against which the decision maker and the public can compare the alternatives. Each resource area has a "geographic extent" described for it. This is the size of the land area that was reviewed to evaluate the environmental effects. Along with the "geographical extent" the "temporal extent" of the potential environmental effects was also evaluated. Projects that could happen within the next five years are included in the analysis.

3.2 Resources Eliminated from Detail Review and Discussion

3.2.1 Minerals, Geology

There is extensive information recorded on the soils, minerals, geology, and the climate of the proposed Bangtail SIA found in a number of papers (USFS and NRCS 1996, Buchanan 1972, Weaver et. al. 1970-1974, and Buchanan 1968-1969). Information relating to climate and soils are not reiterated here. This is because no issues were identified during the scoping process that required the ID Team to conduct an in-depth evaluation of the effects on these resources.

3.2.2 Terrestrial Wildlife

There is an abundance of law, policy and direction applicable to wildlife habitat considerations relative to resource management on National Forest lands. The Endangered Species Act (ESA) of 1973 mandates that the effects of land uses and management activities be evaluated as part of the biological assessment process for listed species. The National Forest Management Act (NFMA) of 1976 requires that the US Forest Service maintain sufficient habitat to sustain viable populations of native species. The National Environmental Policy Act (NEPA) of 1969 requires an assessment of the impacts of human activities upon the environment. Forest Service Manuals (FSM 2670) provide policy under which Forest Service projects are designed to maintain viable populations of sensitive species and to ensure that those species do not become threatened or endangered due to Forest Service actions. Ultimately, the Gallatin Forest Plan provides specific direction for management of wildlife habitat by various management emphasis areas (MAs).

The area supports numerous birds and large and small mammals including habitat for the endangered Canada lynx. Deer, elk, black bear, pine marten, and possibly wolverine use the area. Although occupied habitat exists within a reasonably close distance to the south, there have been no confirmed reports of grizzly bears in this area. The general surrounding area has an extensive road system.

Forest raptors such as the goshawk would use the area for foraging and possibly nesting. Surveys were conducted for goshawks in the general vicinity in the spring of 2003. No goshawks were detected during these surveys, although incidental sightings have been reported in the Bangtail Range.

The area is identified as part of a north south wildlife habitat linkage that connects the Greater Yellowstone Ecosystem to other habitats to the north. Interstate 90 to the south is identified as a possible barrier to migration (Walker and Craighead 1997, A. Craighead, Roberts and F.L. Craighead unpublished report). Proposed land acquisitions by the Forest Service, a proposed land donation to the Forest and proposed conservation easements north of the Interstate could improve the areas potential as a migration corridor. The problem of wildlife movement across the Interstate is being evaluated (Walker and Craighead 1997, A. Craighead, Roberts and F.L. Craighead unpublished report). This may lead to over and underpasses being constructed at

some time in the future but no timeline has been set.

Several wildlife inventories have been conducted in the area. Pac, Mackie and Jorgensen have summarized long-term studies of deer and elk presence on the Bangtails. (1991). Surveys of small mammals have been conducted by Haglund (1972) and Weaver and Haglund (1974). Weaver and Haglund (1974) have surveyed birds. Weaver and Haglund (1974) surveyed insects and Smolik and Weaver (1987) examined nematode populations.

Birds commonly nest in the area and are typically done nesting by about July 15 (Hutto and Young 1998). Because the area is mostly along the ridge top, riparian habitat is minimal.

Proposed activities under all the alternatives are expected to be minimal. Project Design Features and Mitigation Common to all the Alternatives are intended to keep potential adverse environmental effects to a low level. Proposed fencing associated with scientific studies, prescribed burning and forest management activities would all be subject to onsite inspections for threatened, endangered or sensitive wildlife prior to any activities occurring and prior to issuance of a special use permit (Project Design Features and Mitigation Common to all the Alternatives, Chapter 2.5.5). Activities proposed under all the alternatives are expected to impact individual animals but would not contribute to a measurable adverse or beneficial affect on wildlife. The establishment of the Bangtail SIA could potentially reduce the potential for additional fragmentation of forest cover and wildlife security by logging and road construction. This is because overall less forest management activities would likely take place. However, even with this reduction, effects on wildlife are expected to be minimal. Therefore, and in-depth evaluation of the effects on wildlife was not conducted in Chapter 4 as part of this environmental analysis process (Analysis File – Wildlife).

3.2.3 Aquatic Wildlife

Canyon, Bridgeman, Bangtail, and Stone Creeks all have their headwaters in the proposed Bangtail SIA. Bangtail Creek contains Yellowstone cutthroat trout. The area's ridge top location limits the amount of aquatic habitat. Ground disturbing activities are expected to be very minimal. Very small areas would be disturbed with scientific studies related to forest management. Only three acres over a three year period could be disturbed by burning. Also, very little disturbance of the soils is anticipated to paleontological excavations. Therefore, no beneficial or adverse environmental effects on aquatic resources are anticipated (Analysis File-Wildlife).

3.3 Resources Reviewed in Detail

3.3.1 Vegetation

Production of grasslands were measured nearly every year between 1969 and 2000 (Weaver and Haglund 1974, Weaver per. com. 2000). Grasslands of deep-soil sites are of the Idaho fescue type (Mueggler and Stewart 1980). The Establishment Record contains a preliminary list of species of vegetation present in the proposed Bangtail SIA.

Several forest habitat types (Pfister et. al. 1977) have been identified (Weaver pers. con.). Primarily they are sub alpine fir/dwarf huckleberry and sub alpine fir/elk sedge. Rockier and more wind-swept sites, especially those with south and west aspects contain a strong limber pine component. Limber pines are infected to varying extents with white pine blister rust (Weaver pers. com. 2000). Douglas-fir/elk sedge forests occupy southwest slopes. Deep soil grassland sites with reduced wind support tree rings and ribbon forests (Billings 1969, Buchanan 1972).

The proposed Bangtail SIA contains numerous forest cover types including commercial and noncommercial forests. The Gallatin Forest Plan identifies about 320,000 acres of forestland as tentatively suitable commercial forests (Forest Plan EIS II-75). According to the Forest's Geographic Information System (GIS) database,

the area within proposed action Alternative A contains about 1,468 acres of forest cover types in the area with not all qualifying as suitable commercial forests. Much of it is high elevation sub alpine fir or very scattered areas of forest with low productivity, shallow soils, and steep slopes. Approximately 1,268 acres appear to be tentatively suitable based on GIS queries. About 484 acres of this total have been harvested (mostly clearcut) and are restocked with seedling and sapling-sized Douglas-fir, sub alpine fir, and lodgepole pine trees. There are about 200 acres of mature forest (Analysis File-Vegetation).

Much of the adjacent private lands have been harvested using a seed-tree cutting practice that left 15-25 trees per acre. These forests are very open. Non-forest types consisting of grasslands and forb communities make up about 727 acres (Gallatin GIS Databases).

Forest productivity in the area is lower than some other sites on the Forest. It is mostly higher elevation forests of sub-alpine fir and lodgepole pine and drier Douglas-fir. Most forested sites would meet the minimum requirements for suitable timberland (FSH 2409.13). However, other important resource considerations such as retention of big game hiding cover, maintenance forest cover suitable for raptor nesting would reduce the amount of area available for intensive forest management activities. Additionally, much of the surrounding private and National Forest has been logged. Adjacent logging also influences activities on the National Forest from a cumulative effects standpoint.

3.3.2 Sensitive plant species

A preliminary plant list has been complied for the area (Bangtail SIA Establishment Record). To date no sensitive plants were found. Unless further field examinations find sensitive plant species it is not anticipated that, any of the alternatives would have an impact on sensitive plants. Project Design Features and Mitigation Common to all the Alternatives in Chapter 2.5.5 describes mitigation associated with the implementation of any of the alternatives. Surveys for sensitive plants would be completed prior to any activities taking place (Analysis File – Vegetation).

3.3.3 Noxious weeds

Noxious weeds are identified as one of the main threats to the health of the National Forests. Costs to treat noxious weeds using a variety of methods are increasing. Each year more resources and strategies are directed toward the problem of invasive species. There are not extensive weed populations in the general area. Most weeds are found immediately along the roads. Houndstongue, Canada thistle and musk thistle are the most common noxious weeds. Bangtail weeds are usually sprayed on an annual basis but this can depend upon the dollars available and other priority areas needed for treatment on the District. There are small populations of sulfur cinquefoil along the Olsen Creek Road several miles from the area. One plant of Dalmatian toadflax was found a few miles from the proposed Bangtail SIA along the main road leading to the area in 2004 (Montana Noxious Weed List 2005). Small populations of spotted knapweed are found in a several places in the Bangtail Mountains (Gallatin Noxious Weed GIS Database 2005).

Logging, road construction, livestock, recreationists, and wildlife, etc. have introduced species not formerly present, especially Canada thistle. It is possible that noxious weeds and other invasive species could adversely affect vegetation studies. The last large-scale effort of weed control was conducted in summer of 2004 when many of the roads in the Bangtails were sprayed. Some spraying of high priority sites was completed in 2005 and 2006. Prior to 2006 a Forest Service crew and a contractor conducted weeds spraying in the Bangtails. While at this point weeds are not expanding greatly they are expanding. Weeds in the Bangtails are scheduled and funded to be sprayed again in 2007.

3.3.4 Livestock Grazing

The area north of the existing exclosure at Bangtail Mesa was overgrazed in the 1930's. This resulted in areas of erosion. Sheep and cattle use of the 1960's was reduced in the early 1970's to allow recovery from over use (District Range

Files). Cattle grazing essentially ceased around 1973 and sheep grazing ceased in about 1982. Thus, wild ungulates have been the principle grazers in recent time. Livestock utilization of less than 30 percent is now achieved by salting, watering, and herding techniques.

Insects, small mammals, and ruminants have grazed the area since pre-Columbian times. Thus, an appropriate level of grazing is important to the area's maintenance and proper function.

Three allotments make up the majority of area within the proposed Bangtail SIA: Stone Creek (561 acres), Canyon (1028 acres), and Bangtail (609 acres). Less than four acres of the Willow Creek Allotment is also included but effects would be insignificant so it is not evaluated in detail. The Canyon allotment was combined with the Stone Creek allotment in 2001 because only a small portion of National Forest remained in the allotment after the recent Gallatin Land Consolidation Act of 1998 (Public Law 105-267). Currently, the Canyon Allotment is permitted to two grazing permittees for a season of July 1 through October 2 for 104 cow-calf pairs. The Bangtail Allotment is permitted to one permittee for a season of July 1 through September 30 for 150 cow/calf pairs. Most of the cattle use occurs in sections five, six and eight (Figures 2 and 3).

Figure 3. Bangtail SIA Vegetation. This photo displays examples of the vegetation typical of much of the area.

Utilization on the proposed Bangtail SIA that is part of the Canyon and Stone Creek allotments is generally low to no use. The Bangtail allotment has received use in the past of ranging between 50 to 55 percent utilization during some years in the area adjacent to the Montana State University research plots known as the horse pasture. Cattle have occasionally gotten into the research plots through breaks in the fence or because gates were left open.

The potential exists for cattle grazing to impact research plots that might be established in areas outside the horse pasture. If researchers determine that hoof disturbance or grazing by livestock would be detrimental to research areas would need to be fenced.

3.4 Activities Considered in Cumulative Effects Analyses

Numerous past, present and reasonably foreseeable activities are associated with the proposed Bangtail SIA.

Table 3.0. This table lists many of the activities presently occurring and activities that have occurred in the past.

Resource Area	Activity	Discussion
Public Access	Past Road Construction	The bangtail mountain range has been extensively roaded over the last several decades. Logging roads and roads to access subdivisions have been the primary reason for roading.
	Recent Road Decommissioning	In May of 2006 the Bangtail Road Decommissioning and Trail Obliteration Project was approved and implemented. This project will decommission 46 miles of old logging road and 1.2 miles of user-built motorized trails not part of the proposed Travel Plan.
Scientific Studies	Paleontology	Each year some excavation work is completed under special use permits.
	Vegetation	Long-term vegetation studies continue to be monitored by researchers. No additional studies are scheduled at this time.
Recreation	Sightseeing, camping, mountain biking, non-motorized winter recreation, hiking, ATV, etc.	This area receives extensive recreation use in the form of motorized and non-motorized uses. The Travel Plan includes designation of a motorized trail that bisects the SIA and emphasize the use of OHVs on other designated trails.
	Snowmobiling	Snowmobiling use is expected to continue and may increase depending upon snowfall.
Livestock Grazing	Cattle Grazing	Livestock grazing is expected to continue at current levels to proposed changes in grazing levels are proposed at this time. The environmental effects of grazing on these allotments is scheduled to be evaluated in 2008.
Forest Management Activities	Commercial timber sales	No commercial timber sales are currently on-going or proposed over the next five years.
	Fire Suppression	Fire suppression would continue as it is currently implemented. No areas approved for wildland fire use occur in the area.
	Prescribed Burning	Some prescribed burning outside the proposed SIA is occurring to the north on Grassy Mountain. This is a fuel reduction project that included felling of conifers that have become established in sagebrush. The burning is expected to be completed over the next year.
	Non Commercial Thinning	No noncommercial thinning of regeneration is proposed over the next five years.
	Personal use forest products	Public firewood gathering would continue under permit along roads open to automobiles.
	Noxious weed management	Noxious weeds will continue to be managed as part of the Districts regular program of work.
Lands	Land Exchanges road Right of Ways, etc	No additional land exchanges or additional private rights of ways are proposed at this time within the proposed SIA.
Conservation	Conservation Easements	Conservation easements continue to be established by conservation organizations working with private landowners. The most recent proposed easement north of I 90 at Bozeman Pass.

Chapter 4.0 Environmental Consequences

4.1 Contents of Chapter

This chapter discusses the environmental effects that would occur with the implementation of the alternatives described in Chapter 2. Direct and indirect effects of each alternative are presented by resource. Cumulative effects are displayed at the end of each discussion. The following discussions form the scientific and analytical basis for the comparing the environmental effects of each alternative.

4.2 Scope of the Environmental Analysis

The geographical extent of the analysis for direct and indirect effects is the proposed Bangtail SIA boundary. The geographical and temporal extent of cumulative effects differs slightly depending upon the alternative and the resource being evaluated. There are no connected actions that would result from this proposal that were not evaluated.

4.3 Overall consistency with the Gallatin Forest Plan

Alternatives A and B would both require a Forest Plan amendment. Current management direction is for a range of uses including such things as livestock grazing, timber cutting, motorized and non-motorized use.

4.4 Resource Affects Analysis

4.4.1 Issue: Reduction in Acres Suitable for Timber Production

Indicator: Acres of tentatively suitable land changed to non-regulated component.

Alternative A: Based on the information provided in Chapter 3.3.1, about 1,268 acres of tentatively suitable forestlands are located within the boundaries of Alternative A (accounts for recent land exchanges). Based on the Forest total of tentatively suitable acres of 320,000 (prior to recent exchanges) from the Forest Plan, a reduction of 1,268 acres would amount to 0.4 percent reduction of the total.

There are an estimated 784 acres of mature forest within the boundaries of the proposed Bangtail SIA in Alternative A. Because much of the surrounding area has already been harvested it is not likely the entire 784 acres could be logged in the near future. This is because many forested areas need to be deferred from logging for the protection of wildlife habitat, water quality, etc. There are no timber sales planned at this time. If all 784 acres were available for harvest, this amounts to about 0.2 percent of the 320,000 acres.

Designating the Bangtail SIA would not preclude activities such as timber harvesting from happening but it would remove the forested lands in the area from the suitable timber base that was used to calculate the Forest's annual allowable cut (36 CFR 219.28). If a timber sale were to be proposed in the Bangtail SIA that is not within the scope of environmental effects evaluated in this analysis, it would have to undergo further environmental analysis and public disclosure as either an environmental impact statement, environmental assessment, or a decision memo.

Public removal of firewood would continue as long as it does not compromise any scientific studies that are underway. Since most of the area is closed to pickup trucks very little of the area would be open to firewood cutting.

Alternative B: Based on the information provided in Chapter 3.3.1, about 2,134 acres of tentatively suitable forests are located within the boundaries of Alternative B. Based on the total tentatively suitable acreage of 320,000, an acre reduction of 2,134 would amount to 0.7 percent of the total (accounts for recent land exchanges).

There is an estimated 1,107 acres of mature forest within the boundaries of Alternative B. As in Alternative A, the entire 1,107 acres would not be harvested in foreseeable future and no harvesting is proposed. The total 1,107 acres equates to

about 0.3 percent of the 320,000 acres to tentatively suitable lands on the Forest.

Public removal of firewood would continue as long as it does not compromise any scientific studies that are underway. More of this area would be open to public firewood gathering since Section 25 and 30 are both roaded and accessible by the public.

Alternative C: Under Alternative C no change in the status of forested lands would occur.

Cumulative Effects: The geographic and temporal extent for cumulative effects is discussed at the local community scale for the next five years. This scale was chosen because forest products are harvested by local contractors and processed at local mills and other wood processing facilities. While forest management is a long-term proposition, it is hard to estimate what is planned for these areas past the next five years.

Cumulative effects related to this issue include the gradual reduction in those lands classified as suitable for the commercial and sustained production of forest products. Even though the percentage of reclassified tentatively suitable timberlands under Alternative A and B is very small, 0.4 and 0.7 percent respectively, there is a perception among some of the public that any reduction is not acceptable. It is perceived as a gradual eroding away of traditional commodity uses of the National Forest. The question of timber production on the Gallatin is part of the Forest Service Land Management Planning process. The Gallatin Forest Plan Revision is scheduled to begin in 2008. The issue of land suitable for sustained timber production is to be evaluated in detail at that time. Chances are, changes in the suitable timber base will be far larger and have much more effect that the very small changes proposed in this project.

No proposed timber sales are scheduled within or adjacent to the proposed Bangtail SIA over the next five years.

4.4.2 Issue: Establishment of the Bangtail SIA and associated scientific studies could affect management of grazing allotments and visa versa.

Indicator: Discussion of how establishment of the Bangtail SIA might affect the livestock grazing permits and scientific studies.

Alternatives A, B and C: No changes are proposed in the level, duration or timing of livestock grazing. Therefore, the establishment of the area as a special interest area would not directly affect the grazing of livestock including the operating costs to the permittee. It is possible that if areas are fenced there could be some minor amount of reduction for forage for livestock. However, based on the size of past studies this is expected to be minimal. If a more ambitious study is undertaken then grazing permittees could possibly experience increases or decreases in the number of livestock permitted. This would depend upon the type of study being undertaken. A complete environmental analysis of livestock grazing in the Bangtails is tentatively scheduled for 2008. At that time livestock grazing numbers, type of livestock grazed and the timing and duration of grazing is scheduled to be evaluated. In the meantime, if a scientific study is proposed that would require the permittee to reduce their livestock by more than just a few head then additional environmental analysis and public disclosure would be required as either an environmental impact statement, environmental assessment, or a decision memo.

Table 4.0. Grazing Allotments. This table displays the acres within each grazing allotment that would be affected by establishment of the Bangtail SIA.

Allotment	Acres Affected in Alternative A	Acres Affected in Alternative B	Acres Affected in Alternative C (No Action)
Stone Creek	561	561	0
Canyon Creek	1028	2136	0
Bangtail Creek	609	609	0
Willow Creek	<4	<4	0

Totals	2202	3310	

In the past, there have been minimal conflicts with livestock grazing and the scientific studies that have been conducted it the area (Weaver pers. com.). However, the potential does exist. Livestock grazing can cause changes in plant community composition (Belsky and Blumenthal 1997, Jones 2001). This could be a positive effect or a negative effect. It could be positive if a scientific study is evaluating how livestock influence plant communities and a negative affect if livestock get into a fenced study area where grazing is being excluded. Many plants have evolved to either tolerate some level of grazing or may actually benefit from grazing. Livestock are a known vector for the transportation of noxious weeds (Sheley 2002). Most introductions of nonnative plants would be viewed as a negative affect. Alternative B proposes 1,108 acres of additional acres within the proposed special interest area. Therefore, it is possible that livestock grazing could affect a higher number of scientific studies of vegetation and paleontological excavations. Still the overall effects are expected to be minor.

Cumulative effects: The geographical extent of cumulative effects extends to the local livestock industry and businesses that rely upon it for their livelihood. The temporal extent of the cumulative effects analysis is the next five years. Livestock grazing permittees that graze on public lands are required to follow an increasing number of measures to reduce the adverse effects of livestock grazing on natural resources. Over time, this adds up and often results in increased costs and reduced profits to the permittee. The establishment of the Bangtail SIA would affect 2,202 acres on four allotments in Alternative A and 3,310 acres on four allotments in Alternative B. The 1,108 acre increase between Alternative A and B only affects the Canyon Creek Allotment. Although no additional studies are proposed a this time that would require fencing or changes in the grazing systems, it is possible that it could happen some time in the future.

Future restrictions could result in additional costs to the permittee related to herding and perhaps fence maintenance. However, there are no additional studies related to vegetation (or other resources except paleontological studies) scheduled over the next five years. Based on the fact that conflicts with livestock grazing within and around the established scientific studies has been minimal it is not likely that either of the action alternatives would result in the permittee experiencing financial hardships or be required to reduce livestock numbers.

4.4.3 Issue: Issue: Noxious weeds and invasive species in general could affect how the Bangtail SIA is managed.

4.4.4

Indicator: Discussion of the risk of non-native species compromising native plant communities and how establishment of the Bangtail SIA might affect how weeds are managed in the area.

Alternatives A, B and C: Establishment of the special interest area may not increase the cost of treating weeds on the District but it may require the District to concentrate more weed management efforts into the area. Ordinarily, the proposal area would not receive a higher emphasis than any other area of the district. Perhaps even less because the District is currently concentrating much of its efforts in the Gallatin-Big Sky Weed Management Area in Gallatin Canyon and the Bozeman Municipal Watershed. Designation of the area as special interest could require the District to redirect some funding to the Bangtails.

There is the threat that noxious weeds and other invasive species of vegetation could compromise the integrity of a special interest area. Mitigation included in Chapter 2.5.5 would help reduce the possibility of further noxious weed problems in the area but would not eliminate the threat. The main difference between the action alternatives and Alternative C (no action) is that special interest area designation could actually improve the chances of financial and human resources being directed to the area for weed suppression. For example, funding through grants could be

made easier. This is because typically those areas viewed as more important to protect get more funding. Noxious weed funding would likely become a higher priority for the Forest. Therefore, Alternative C may actually contribute less to noxious weed suppression.

Cumulative Effects: The geographical extent of the cumulative effects of weeds can cover tens of miles in any direction. Weeds have very efficient methods of transportation. The temporal extent of cumulative effects is for the next five-year period. Beyond this, it is hard to estimate the effects. Many normal landscape functions and human activities contribute toward the weed problem. Wildfires, recreationists, wildlife, livestock, logging, road construction even wind and water contribute to the dissemination of weed seeds. The largest contributors at this point appear to be road construction and logging which disturbs soils and removes native vegetation. Seeds are then transported to the disturbed sites by logging equipment, motor vehicles in general and livestock that often use the roads and open areas to access grazing. Logged areas eventually become covered with forest and this usually shades out weeds that are shade intolerant. In this specific area of the Rocky Mountains, over the long-term, most areas of forest that have been cut will not be weed sites. The roads would however continue to be a problem and seeds from roadside weeds would continue to be transported to other areas by a variety of carriers.

It could be expected that new weed species would show up in the Special Interest Area over time. Weeds located in entirely different counties or even different states may eventually make their way into the area. Also, species that are not currently listed as noxious weeds could become listed. This could threaten the integrity of the Special Interest Area.

Over the next five years it is anticipated that if funding remains constant weed infestations would still continue to expand although roadside weed treatments are expected to continue. While roadside spraying treats 90 percent of the known infestations, there would be some infestations away from roads that would not be found in time to eradicate. As those undetected infestations become established they would be costly to treat. Canada thistle it an example where this species is so widespread that it is typically only sprayed in certain situations such as at trailheads, campgrounds, gravel sources, or in association with other weeds.

Overall, it is estimated that weed treatment in the Special Interest Area would be feasible under current funding. The area is comparatively small, accessible, and the weed infestations are mostly along roadsides making treatment easier. Establishing the Special Interest Area would also create more oversight. It is more likely weeds would be detected and scheduled for treatment with more people looking at the area. Knowing these facts we can conclude that while weeds would be a threat to the ecological integrity of the Special Interest Area, this should not preclude establishing the Bangtail Special Interest Area. Also, establishment of the Bangtail Special Interest Area would not compound the current weed problem and may provide opportunities to be more effective with weed treatment funding.

4.4.5 Irreversible and Irretrievable Commitments

No irreversible losses of natural resources or changes in the human environment would occur. There would be some long-term irretrievable commitments of reduced timber volumes by converting the area to non-suitable forestlands. This is because some loss in the production of forest products would occur over time (chapter 4.4.1).

No conflicts with other Plans and Policies of other Jurisdictions were identified during the environmental analysis process (ID Team Notes).

4.4.6 Environmental Justice

Executive order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations, directs federal agencies to integrate environmental justice considerations into federal programs and activities. Environmental justice means that, to the greatest extent practicable and permitted by

law, all populations are provided the opportunity to comment before decisions are rendered on, are allowed to share in the benefits of, are not excluded from, and are not affected in the disproportionately high and adverse manner by, government programs and activities affecting human health or the environment (E.O. 12898 and Departmental Regulation 5600-2).

None of the alternatives would have a discernible effect on minorities, American Indians, or women, or the civil rights of any United States citizen. No alternative would have a disproportionate adverse impact on minorities or low-income individuals.

4.4.7 Energy Requirements and Conservation Potential of Alternatives

None of the alternatives requires an unusual commitment of energy since little equipment would be used to implement any of the proposed activities.

4.4.8 General Conclusions

Beneficial and adverse impacts are documented in Chapter 4.0. The ID Team evaluating this project found impacts to be very minimal from the social environmental, and economic aspect. Affects on the grazing permittee would only occur if fencing of scientific studies excludes livestock from large areas of the allotments. Past studies have not required this and no foreseeable studies are proposed that would require this to happen.

No issues related to public health or safety were identified during scoping or the analysis process. Chapter 5.0 lists those persons and agencies contacted.

The area has unique characteristics in the form of paleontological resources and the area is unique from the standpoint of its location and utility as a research area. Both of which establishment of the Bangtail SIA are designed to protect. No roadless, wilderness or other special resources would be affected by the proposal.

Only a few letters were received from the public during scoping and no controversial issues were generated during the effects analysis process. An editorial in the Bozeman Chronicle was very complementary of the project and drew no adverse comments that we know of. Special interest areas have been established in other areas of Region 1 and their establishment does not appear to be a highly controversial.

Many of these areas have been established over the years. We know well what the effects are going to be. Very little uncertainty exists.

Establishment of the Bangtail SIA would not be precedent setting for future actions. No future decisions were identified during the analysis process that would likely occur based on this decision that would be highly controversial.

Cumulative impacts appear to be minimal.

The area has been reviewed for the presence of heritage resources. No actions associated with this proposal would affect these resources.

The analysis provided documentation related to the effects on wildlife and very minimal effects are predicted to occur. No adverse affects on threatened or endangered wildlife are predicted to occur if the project is implemented.

A review of applicable Federal, Montana State and local laws required for the protection of the environment was conducted. The project complies with these laws.

Chapter 5.0 List of Preparers and Persons and Agencies Contacted

List of Preparers

John Councilman	Interdisciplinary Team Leader
Mary Beth Marks	Gallatin National Forest Geologist
Reggie Clark	Bozeman District Rangeland Management Specialist
Bev Dixon	Bozeman District Wildlife Biologist
Rachel Feigley	Gallatin National Forest Research Natural Area Coordinator
Mary Manning	Regional Ecologist
Steve Shelly	Regional Botanist/Research Natural Area Coordinator

List of Persons and Agencies Contacted

Alliance for the Wild Rockies
American Wildlands
Bozeman Daily Chronicle
Montana Wildlife Federation
Ron Carlstrom
Bozeman Chamber of Commerce
National Wildlife Federation
Defenders of Wildlife
Montana Department Natural Resources and Conservation
Ecology Center
Ecosystem Defense
Gallatin County Commissioners
Gallatin Wildlife Assn
George Reed Jr. Crow Cultural Education Committee
Greater Yellowstone Coalition
Forest Guardians/FCC
Montana Fish, Wildlife and Parks
Wind River Shoshone Cultural
Brent Foster
Ham Ranch LLC
Robinson Ranch INC
RF Bar Ranch
Harms Livestock
Montana DNRC
MT Dept Environ Quality
MT Ecosystem Defense Council
MT Environmental Info Center
MT Wilderness Association
Northern Rockies Preservation
Native Ecosystem Council
Native Forest Network
Predator Conservation Alliance
Rep Dennis Rehberg
Senator Conrad Burns
Senator Max Baucus
Sierra Club, MT Office
Tad Weaver, Montana State University
The Nature Conservancy
Tony Incashola Director, Salish Culture Committee
Dept of Earth Sciences, Montana State University
Wilderness Society

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Appendix 1 Establishment Record

Appendix 2

Research Natural and Special Interest Areas Amendment #28

Introduction

Gallatin Forest Plan, MA 21, pg. III-62 and Management Area Map was amended July 29, 1997 through a Regional Forester decision to establish various Research Natural Areas throughout Northern Region Forests. For the Gallatin National Forest this was completed under Forest Plan Amendment #20. Bangtail SIA Amendment #28 would amend #20 as follows:

The introduction to Amendment #20 will be changed to the following:

> The Gallatin National Forest Land and Resource Management Plan (Forest Plan) was approved on September 23, 1987. Changes affecting the Gallatin National Forest since that time have required periodic amendments to the Forest Plan to keep it current. This amendment pertains to the Research Natural Areas and Special Interest Areas within the Forest. On July 29, 1997 the Regional Forester designated seven sites as Research Natural Areas and one site as a Special Interest Area on the Gallatin National Forest. On February 20, 2007 the Forest Regional Forester added one additional Special Interest area to the Gallatin National Forest; the Bangtail Botanical and Paleontological Special Interest Area.

Changes to Amendment #20

Chapter III, Management Area 21 (page III-62 of the Forest Plan):

> Replace the acreage listed at the top of the page with "10,046" acres.

The last sentence of the introductory paragraph changed in Amendment #20 is changed to read:

> SIAs are for the protection of unusual or uncommon botanical and paleontological values for study and public enjoyment.

Amendment #20 added the following paragraph to the end of the table at the bottom of the page:

> "An analysis of candidate areas was completed in 1997. This resulted in the description of seven Research natural Areas from the candidates listed in Table 1, plus one botanical Special Interest Area which was a new proposal."

The following sentence will be added to that paragraph:

> On February 20, 2007 the Forest Regional Forester added one additional Special Interest area to the Gallatin National Forest; the Bangtail Botanical and Paleontological Special Interest Area.

Amendment #20 added a "Table 2" to the management direction in Management Area 21. Add the following to Table 2:

Area	Characteristic Features	Acres
Bozeman Ranger District: Bangtail Botanical and	Subalpine forests and mountain meadows, unique	3366

Paleontological SIA	paleontological resources	

Chapter III, Management Area 21 section (page III-63 of the Forest Plan):

Amendment #20 added the following sentence to the first paragraph to describe the management area goal for Special Interest Areas:

> "Special Interest Areas provide protection for unusual or uncommon features, such as rare plants or plant communities, and are designated for study and enjoyment."

That sentence will be changed to read ad follows:

> "Special Interest Areas are designated for study, enjoyment and protection for unusual or uncommon botanical and paleontological features."

Appendix 3

Plant Species List

Field reconnaissance of the Bangtail Proposed Botanical SIA was conducted on July 28, 2004. The following partial species list was compiled by Steve Shelly, with assistance from Rachel Feigley, Tad Weaver (MSU), Mary Manning, and Reggie Clark.

TREES
Abies bifolia (= A. lasiocarpa)
Juniperus communis
Pinus contorta
Pinus flexilis
Pseudotsuga menziesii

SHRUBS
Artemisia ludoviciana
Artemisia michauxiana
Artemisia tridentata ssp. vaseyana
Rosa gymnocarpa

FORBS
Achillea millefolium
Agastache urticifolia
Agoseris aurantiaca
Agoseris glauca
Allium cernuum
Anaphalis margaritacea
Anemone multifida
Anemone patens
Antennaria corymbosa
Apocynum androsaemifolium
Arenaria congesta
Arnica fulgens
Arnica latifolia
Astragalus miser
Besseya wyomingensis
Bupleurum americanum
Campanula rotundifolia
Castilleja sp.
Chaenactis douglasii
Cerastium arvense
Cirsium arvense
Clematis hirsutissima
Collomia linearis
Cymopterus sp.
Delphinium bicolor
Delphinium occidentale
Douglasia montana
Epilobium angustifolium
Epilobium sp.
Erigeron speciosus
Eriogonum flavum
Eriogonum ovalifolium
Eriogonum umbellatum
Frasera speciosa
Gaillardia aristata
Galium boreale
Geranium viscosissimum
Geum triflorum
Heterotheca villosa
Heuchera sp.
Lewisia rediviva
Linum lewisii
Lupinus sericeus
Mimulus guttatus
Mimulus lewisii
Oxytropis lagopus
Oxytropis sericea
Penstemon sp.
Phacelia hastata
Polemonium sp.
Polygonum sp.
Potentilla gracilis
Potentilla hippiana
Rudbeckia occidentalis
Sedum lanceolatum
Senecio integerrimus
Senecio canus
Silene sp.
Taraxacum officinale
Thlaspi arvense
Townsendia parryi
Zigadenus venenosus

GRASSES AND GRAMINOIDS
Bromus carinatus
Carex microptera
Carex petasata
Dactylis glomerataDanthonia intermedia
Festuca idahoensis
Koeleria macrantha
Melica bulbosa
Phleum alpinum
Poa pratensis
Pseudoroegneria spicata
Stipa occidentalis