

Chapter 3

Affected Environment and Environmental Consequences

I. Introduction

Chapter 3 describes the physical, biological, and human resources of the environment that may be affected by the alternatives presented in Chapter 2, and the environmental effects that the alternatives may have on those resources. Affected Environment and Environmental Effects have been combined into one chapter to give the reader a more concise and connected depiction of what resources exist in the project area. The analysis of the effects to those resources forms the scientific and analytic basis for the comparison of alternatives shown in Chapter 2 (p. 2-9). Unless otherwise noted, the boundary of the analysis area is the allotment boundary.

II. Past, Present, and Reasonably Foreseeable Future Activities

The Council on Environmental Quality (CEQ) regulations implementing NEPA require that federal agencies consider three types of actions: (1) *connected actions*, which are two or more actions that are dependent on each other for their utility; (2) *cumulative actions*, which when viewed with other proposed actions may have cumulatively significant effects, and should therefore be analyzed together; and (3) *similar actions*, "which when viewed with other reasonably foreseeable or proposed actions, have similarities that provide a basis for evaluating their environmental consequences together." (40 CFR 1508.25(a)). These actions help identify a range of alternatives.

Historical Activity and Uses

Livestock grazing has occurred in the allotment area for over 100 years. Until 1954, both sheep and cattle grazed the area. Approximately 32% of the suitable range included in the Crazy Allotment is National Forest land. The remainder of the suitable range is private land, which is owned by the current permittee. The majority of the lower elevation suitable range is privately owned.

Current Activity and Uses

The Crazy Allotment is being used for summer cattle grazing and is an integral part of the permittee's livestock operation. The allotment is currently being grazed by a total of 403 cow/calf pairs (158 National Forest and 245 off/on-private), with a season of 7/1-9/15 annually. The allotment is grazed under a deferred-rotation system on one pasture. Distribution is managed through riding and salting.

There are several trails on the allotment on public and private land but none are accessible to the general public without landowner permission due to checkerboard

ownership. There are private roads, access roads, and private logging roads on the allotment. Public access requires landowner permission to cross private land. There are some private leases allowing camping, fishing, and hunting. Timber has been harvested from private land. The surrounding National Forest land is being utilized primarily for livestock grazing and wildlife habitat.

Potential Future Activity and Uses

The reasonable foreseeable future includes any currently proposed projects and those projects that may be proposed within approximately the next five years. The known projects on National Forest land in the allotment are limited to grazing and occasional weed treatments. The Forest Service has no plans for any timber harvest, road building, or other developmental activity. Prescribed burning may be proposed in the future. Grazing is proposed to continue under the conditions described in the proposed action. Weeds will continue to be treated. Recreation in the form of fall hunting will likely continue.

Private land activities in the future may include road building, road maintenance, timber harvest, weed treatment, rotovating, ORV use, hunting and camping, and possibly controlled burning in conjunction with Forest Service prescribed burns. The private landowner will likely continue to provide leases for campers on his land.

III. Affected Environment

This section describes the environment surrounding the Crazy Allotment, which may be affected by the proposed action. It includes a discussion of natural resources, Forest Plan goals and objectives, and other management activities.

Vegetation

The Crazy Allotment consists of approximately 8,430 acres (4,137 acres National Forest land and 4,293 acres of private land) located on the eastern outslope of the Crazy Mountains northwest of Big Timber, Montana. Of these total acres, approximately 1,680 acres (532 National Forest acres and 1,148 acres) are considered suitable for livestock grazing, and 3,605 National Forest acres and 3,145 private land acres are too steep, rocky, forested or otherwise unsuitable for livestock.

Lands are classified as suitable range, (FSH 2209.14, R1) if they satisfy the following criteria:

- Capable of producing more than 100 pounds per acre (air dry weight) of palatable livestock forage.
- Accessible to cattle under practical management.
- Vegetation and soils capable of being grazed without damage.
- Located within one-half mile of a water source.
- Slopes are generally less than 30%.

Suitable vegetation types on the Crazy Allotment include open grasslands and timber/grasslands (see Map 3, Suitable Range). Vegetative classification (1998) lists 532 National Forest acres and 1,148 private land acres of suitable livestock range within the allotment. Suitable vegetation types in the Crazy Allotment are as follows:

Table 3-1 National Forest Acres included in the Crazy Allotment

Type	Acres	% of suitable	Habitat type
Grassland	240	45%	Idaho fescue-Bluebunch wheatgrass, Timothy-Idaho fescue, Idaho fescue/Douglas fir, Kentucky bluegrass-Timothy
Shrub/Grass	163	30%	Shrubby cinquefoil/Timothy, Sagebrush/Bluebunch wheatgrass-Idaho fescue
Forest/Grass	129	25%	Douglas fir/Timothy, Douglas fir/Timothy-Kentucky bluegrass, Douglas fir/Sagebrush/Idaho fescue

Table 3-2 Private Land Acres included in the Crazy Allotment

Type	Acres	% of suitable	Habitat type
Grassland	470	41%	Bluebunch wheatgrass-Idaho fescue, Idaho fescue-Bluebunch wheatgrass, Timothy-Idaho fescue, Idaho fescue-Timothy, Timothy-Idaho fescue/Douglas fir, Timothy-Kentucky bluegrass, Kentucky bluegrass-Timothy, Bluebunch wheatgrass-Idaho fescue, Idaho fescue/Douglas fir
Shrub/Grass	174	15%	Sagebrush/Timothy, Shrubby cinquefoil/Timothy
Forest/Grass	243	21%	Douglas fir/Timothy, Douglas fir/Timothy-bluegrass, Douglas fir/Timothy-Kentucky bluegrass, Douglas fir, Douglas fir/Sagebrush
Transitory Range (harvested forest)	261	23%	Douglas fir/Timothy, in various stages of tree regeneration.

The majority of suitable range consists of grassland or Douglas fir forest with an herbaceous understory. Sixty to seventy percent forest cover is common in forested areas.

Timothy, (*Phleum pratense*), is the major livestock forage species at lower elevations. Although it is not native to Montana, timothy is considered to be naturalized and to have reached stasis with the elements of the ecosystem. It is likely that timothy was introduced to North America during colonial times. Timothy is highly successful and able to outcompete native grasses, given favorable habitat conditions.

Timothy is widespread throughout primary ranges on the Crazy Allotment. This grass species is palatable to cattle early in the grazing season, but loses palatability as the season progresses. When timothy begins to cure, cattle turn to native forage species. Stands of timothy may be showing low levels of use, while preferred upland native species and bluegrass riparian areas are being excessively grazed. Plant composition in some upland range areas indicates past or present disturbance. These indicators include a prevalence of low seral species, weedy species, and non-native plants such as cheatgrass.

Suitable range was analyzed in 1981. At that time the trends were measured as follows: 28 acres (1%) in excellent condition with an upward trend (upward trend meaning improving or moving toward climax); 770 acres (46%) good condition with an upward trend; 665 acres (40%) good condition with a static trend; 59 acres (4%) good condition with a downward trend; 121 acres (7%) fair condition with an upward trend; and 37 acres (2%) fair condition with a static trend. The remaining 6,750 acres are unsuitable for livestock grazing because they are too steep, rocky, far from water, forested, or are otherwise generally not suitable for cattle.

In 1998, an extensive review of the allotment was conducted. Each habitat type was field reviewed for consistency with the above determination. Following are the updated trend summaries: 28 acres (1%) in excellent condition with upward trend, 472 acres (28%) in good condition with upward trend, 540 acres (32%) in good condition with static trend, 466 acres (28%) in good condition with downward trend, 64 acres (4%) in fair condition with upward trend, 67 acres (4%) in fair condition with static trend, and 43 acres (3%) in fair condition with downward trend.

Several things have occurred since the 1981 and prior surveys. Approximately 350 acres of private land timber harvest has occurred on the allotment in three different sections. Timber harvest involved clearcutting merchantable trees, constructing roads, skidding logs over the ground, and decking logs preparatory to hauling. Slash was piled and burned. Following harvest activities, some of the disturbed areas became heavily infested with weeds, primarily houndstongue, musk thistle, and Canada thistle. The understory of these harvest units is typically timothy, however, most of the units are partly or mostly regenerated with conifer saplings. Once reforested, these areas are no longer suitable as “transitory range”, since canopy closure limits forage production. With “transitory range” no longer a factor, the

introduction and spread of weeds becomes one of the primary reasons that the allotment shows a greater percentage of acres in a downward trend than was observed in the 1981 survey. Harvest areas that continue to produce an adequate amount of palatable livestock forage are included in the suitable range calculations.

An unknown area of grassland and shrubland was rotovated in the 1970s and 1980s. Rotovating consists of chopping and shredding all shrubs and trees up to four inches in diameter. The top 4-6 inches of topsoil and all vegetation are chopped and shredded, essentially plowing and mulching at the same time. Rotovating was intended to reduce or eliminate larkspur on primary grazing areas. Larkspur is a native plant poisonous to cattle. While most of the rotovating occurred on private land, some was approved and occurred on federal land. Rotovating to a depth of 4-6 inches disturbs shallow topsoils. On steeper slopes, erosion may increase because of bare soils and loss of rootmass. Bare soils are favorable to invasion by noxious weeds. This is less of a concern in agriculture because the tilling process is repeated each year, keeping weeds at low levels. A forest/range soil ecosystem can be changed enough with one application that non-native vegetation will dominate the site. Rotovated areas were not mapped after treatment and we (FS) do not know exactly where rotovating occurred. Some fairly level areas adjacent to roads currently indicate general soil and vegetation disturbance and are also weedy. These areas were mapped as declining in condition regardless of the cause.

Canada thistle and hound's-tongue, both Category I noxious weeds, are widespread throughout the allotment. Musk thistle and tall larkspur are also found throughout the allotment. There have been reports of sulphur cinquefoil, a Category I noxious weed, but these reports have not been confirmed at this time.

Conifers are encroaching onto grassland and meadow areas. An increase in the area occupied by trees is another factor contributing declining forage production on grassland soils. The "tree wall" or edge of the forest is moving into meadows as seedling conifers become established, grow and reproduce on what was once grassland habitat. On forested rangeland, canopy closure is reducing forage production. These changes in vegetative composition and structure are occurring throughout the West due to nearly one hundred years of active fire suppression.

Distribution of Livestock. The allotment is grazed as a one-pasture deferred rotation system. Cattle are brought onto the allotment along the eastern boundary and may enter through the north, middle or south gates as a partial control on where they graze first. Salting and the available water contribute to livestock movement and control. Since there are no water developments and no internal fences on the allotment, stock tend to concentrate along certain reaches of Devil Creek, the Middle Fork, and other riparian areas. This has resulted in damage to riparian vegetation, overgrazing of forage near accessible riparian areas, and severe hedging of riparian browse species in some areas.

Drought. Much of the western United States has experienced six to seven years of severe drought. Soil moisture is well below normal and some exceptionally high summer temperatures have sometimes occurred. Natural water sources have become intermittent or ceased to flow. Cattle use has concentrated near water sources especially during periods of high temperatures.

Riparian Utilization. Most riparian areas on the allotment are not accessible to cattle due to dense timber or other natural barriers. These areas are not being grazed by livestock. Observations in accessible riparian areas during 2002, 2003, and 2004 measured utilization at 50%, 60%, 75%, 75% (depending on location). In 2004, a stubble height transect along Devil Creek indicated an average stubble height below 3 inches. Many riparian areas on suitable primary range show impacts from long-term cattle grazing and trampling. The Gallatin Forest Plan sets riparian utilization standards for good condition riparian range, being managed under a deferred-rotation system, at a maximum of 50% and fair condition riparian range under a deferred rotation system at 40% (see FP MA 7, p. iii-20). See soils and fisheries for a further discussion of vegetation.

The South Fork of Big Timber Creek is currently in good condition. There is no mapped suitable range along this drainage and cattle can only access a very small portion of the creek on private land. The Gallatin Forest Plan standard of 50% utilization on good condition riparian ranges applies to the South Fork.

Upland Utilization. Grazing utilization monitoring indicates that forage use is quite variable on the allotment. There are upland areas of suitable range that are in nearly pristine condition. These areas receive very little grazing by cattle. Other suitable upland areas are typically grazed between 30% and 50% each year. Several key upland primary range areas were measured in 2003 and 2004 at 47%, 47%, 70%, 74% and 75% utilization. The Forest Plan allowable use level on uplands is 55%. In the past, extensions to the grazing season have been granted based on unmapped timber harvest units and the remaining timothy forage. Field visits confirmed that the majority of timber harvest units are not suitable cattle range as described above and that timothy grass is typically under utilized while native forage species are overgrazed.

Summary of Carrying Capacity and Permitted Use. Carrying capacity and permitted use have varied since record keeping began in 1938. In the early days, cattle and sheep were grazed together in an unfenced area which included checkerboard FS and private land. Historically, the allotment boundary included private lands that today are about one mile beyond the eastern allotment boundary. In 1957, the allotment was converted entirely to cattle and within a few years the existing eastern boundary was fenced. Private Section 7 was part of the allotment until 1989 when the fence was relocated on the section line between private land Section 7 and FS Section 8.

A review of file letters and carrying capacity estimates over the history of the allotment reveal that opinions differed between the early day permittee and a series of rangers. Forest Service range managers have estimated carrying capacity over the years. The estimates consistently found less available forage than the current permitted use.

The following summary of carrying capacity estimates for the Crazy Allotment is a little hard to follow because allotment boundaries and season of use have not been consistent through the years. In this information, 1 AUM is a measurement of average forage consumption by one cow and her calf for one month (1020 pounds dry weight). C/C pairs are the actual numbers of Cow/Calf pairs permitted.

Table 3-3 Summary of Historic Estimated Carrying Capacity**

YEARS	AUMs	TIME ON	OWNERSHIP	C/C PAIRS	RANGER
1959-1965	697	2 months	FS & PVT	348	Don Niven
1966-1967	800	2 months	FS & PVT	400	Thomas Ellis
1968-1975	396	2 months	FS	158	Robert Meinrod
1976	900	2.5 months	FS & PVT	360	William Jensen
1977-1979	1125	2.5 months	FS & PVT	450	William Jensen
1980-2004	944	2.5 months	FS & PVT	378	Tom Osen
2005 *	780	2.5 months	FS & PVT	312	Sally Orr

*Note: Does not include Private Section 7 or old timber units. Includes some non-forested portions of newer timber units.

** Please note that allotment boundaries and season of use have not been consistent during this timeframe.

As can be seen from the following information, permitted use has not always followed estimated carrying capacity:

Table 3-4 Historic Permitted Use on the Crazy Allotment

YEARS	AUMs	TIME ON	C/C PAIRS	REMARKS
1945-1956	1000			Sheep & Cattle
1957-1959		2.5 months	980	Unregulated use by a non-permittee
1960-1963				Non-Use
1964-1967	800	2 months	400	
1968-1970	900	2 months	450	
1971-1988	1125	2.5 months	450	
1989-2005	1007	2.5 months	403	

The change in numbers from 1988-1989 was due to removal of a portion of the private land from the allotment. Estimated carrying capacity v/s permitted and actual use should be noted.

A review of historic records over the last 60 years, indicate that grazing has been above estimated carrying capacity. Declining range and streambank conditions verify that management activities (the combined effects of private timber harvest, road building, and grazing on private and public land) are contributing to negative impacts on the condition of the allotment.

Impacts to vegetation are considered high. As discussed above, only a portion of these changes can be attributed to cattle. The proposed action was developed to address these and other issues.

Riparian and Fish Habitat

The following narrative describes the affected environment for aquatic resources within the Crazy Allotment. Streams were characterized according to physical attributes (e.g. habitat condition, channel type) and biological attributes (e.g., fish populations, macroinvertebrate assemblages).

Streams are not similar in terms of their inherent sensitivity to disturbance, the role that riparian vegetation plays in maintaining their stability, or their ability to recover from grazing induced damage. In other words, the response of streams to imposed change is not uniform among stream types. Some stream or channel types are inherently very stable and not susceptible to grazing impacts, while other channel types can be significantly altered. Thus, it is important to understand the sensitivity of individual streams in order to evaluate past, present, and future grazing affects on channel stability and fish habitat quality. The affected environment descriptions include a channel type and sensitivity analysis using the Rosgen classification scheme (Rosgen 1996).

The functioning condition of riparian-wetland areas is a result of interaction among geology, soil, water and vegetation. Proper functioning condition (PFC) is a qualitative method for assessing the condition of riparian-wetland areas that considers hydrology, vegetation, and erosion/deposition attributes processes. The method assesses how well these processes are functioning. The PFC technique evaluates these interacting natural forces to arrive at a "PFC" determination. PFC determinations were made for both Devil Creek and the Middle Fork of Big Timber Creek. If a riparian-wetland area is not in PFC, it is placed into one of three other categories:

- **Functional-At Risk** – riparian-wetland areas that are in functional condition, but an existing soil, water, or vegetation attribute makes them susceptible to degradation.

- Nonfunctional – Riparian-wetland areas that clearly are not providing adequate vegetation, landform, or large woody debris to dissipate stream energy associated with high flows, and thus are not reducing erosion, improving water quality etc...
- Unkown – Riparian-wetland areas that managers lack sufficient information on to make any form of determination.

In addition, stream channel stability was measured for certain stream reaches using the Pfankuch method. Pfankuch (1975) developed a system to rate channel stability. This technique evaluates the upper banks, lower banks, and channel bottom and can be used to indirectly assess streambank damage resulting from cattle grazing. Because different stream types have inherently different channel stabilities, the good, fair, and poor rating values using the Pfankuch (1975) method have been adjusted by stream type (see Rosgen 1996, page 6-29). Pfankuch evaluations were conducted at the same reaches as Proper Functioning Condition assessments and Rosgen classifications described above.

Depending on topography and vegetative patterns within the allotment, cattle may or may not use riparian corridors along various stream segments within the allotment. In some cases, the stream may be totally inaccessible due to steep topography. In others, the lack of suitable forage along stream reaches may avert cattle occupancy along riparian corridors. In other cases, the primary grazing areas may be within riparian corridors, or riparian corridors may be access routes to suitable rangeland. In order to evaluate potential grazing effects within an allotment, it is important to know what reaches of the stream in question receive continuous or intermittent use.

South Fork Big Timber Creek

Channel Type and Habitat Descriptions: The South Fork of Big Timber Creek is a second order tributary to Big Timber Creek. Within the allotment, the stream flows through a steep narrow canyon. The stream is high gradient and is characterized as an A2 (boulder dominated) channel type with frequent A1 (bedrock controlled) reaches. These channel types have a very low sensitivity to disturbance. No suitable rangeland exists along the riparian corridor of the South Fork of Big Timber Creek, and steep topography precludes cattle from accessing the stream. One trail crossing was found in the lower reach of Section 22, but because of the bedrock nature of the channel and high rock content of the banks, only minor impact was evident.

Based on visual observations, habitat conditions in the South Fork Big Timber Creek are pristine. Steep topography makes most of the drainage inaccessible so land use activities, including grazing, have had minimal influence on streambank and channel integrity. Because cattle impacts have not occurred in the South Fork Big Timber Creek, channel stability ratings, and PFC determinations were not made. It is assumed that Pfankuch ratings would be within FP standards and the stream is in properly functioning condition.

Fish Populations: Electrofishing surveys in the South Fork of Big Timber Creek were done in 1993 above the allotment boundary in section 20. Those surveys revealed that Yellowstone cutthroat trout (YCT) are the only fish species that inhabit the stream. Subsequent genetic analysis determined that the YCT found were genetically pure (verified by Leary 1993). Population densities were low, primarily because of the high gradient nature of the stream and limited pool habitat for juvenile and adult fish. An observational survey was done in 1997 to determine whether fish occupy lower reaches throughout the allotment. Although some pool habitat is available, no fish were observed throughout an approximate 1 mile reach in Sections 22 and 23.

Middle Fork of Big Timber Creek

Channel Type and Habitat Descriptions: The Middle Fork of Big Timber Creek is a perennial 2nd order tributary to Big Timber Creek and is characterized as a B2a/B3a boulder and cobble dominated channel type (Rosgen 1994) in National Forest section 14. Downstream on private land sections 13 and 18, the stream type is B3. These channel types have a low to very low sensitivity to disturbance, excellent recovery potential, low to very low sediment supply, low streambank erosion potential, and negligible to moderate riparian vegetation controlling influence on bank stability.

Because of the high gradient nature of the stream, pool frequencies are low, and habitat for adult and juvenile fish is limited. Most pools observed throughout an approximate one-mile reach surveyed in Section 14 were formed by large woody debris (LWD). High gradients and low base flows are likely the primary habitat factors limiting the fish population in upper reaches of the Middle Fork. Although habitat availability is limited and quality is poor, the main channel in Section 14 and above is considered to be in near pristine condition because factors causing instability are natural. No suitable forage or grazing exists along riparian corridors in upstream reaches in Sections 9, 10 or 16. Except for the lower most 1/4 mile, most of Section 14 is unsuitable for grazing and no grazing impacts occur. A few trail crossings are evident along a cattle access route to a meadow in Section 14 and some bank damage is occurring at the crossings. The functional rating for a PFC assessment for this reach in September, 2003 was "Proper Functioning Condition". Likewise, a Pfankuch channel stability rating for the reach was "good" with a zero point departure from an estimated pristine stability rating.

In private land sections 13 & 18, suitable forage is abundant along the riparian corridor and cattle use is high. Riparian over utilization has been noted in some meadow reaches on private land in Section 18. However, because of the inherently stable nature of streambanks for B3 channels, cattle induced bank erosion along the main channel is infrequent. Conversely, several springs and wetland areas adjacent to the stream were noted as having very high forage utilization with considerable hoof related damage. Riparian timber harvest has significantly reduced the amount of LWD available to be recruited to the channel. In-channel LWD frequencies are low, and pool habitat is limited. The lack of LWD for energy dissipation combined with

high flood flows has created alternating zones of channel aggradation and degradation. Riparian timber harvest and associated impacts were the primary factors resulting in a PFC determination in August, 2004 of “nonfunctional”. High grass and forb utilization also contributed to that call. A Pfankuch channel stability rating showed a 36 point departure from pristine, due primarily to channel changes and associated instability from lack of LWD and flood flows. Approximately 30 points of the departure were due to instability processes related to riparian harvest, and approximately six points of the departure could be attributed to grazing related impacts. Considering the high forage utilization rates, the relatively low stability departure due to grazing reflects the inherent stability of B3 channel types.

Another site was evaluated at the allotment boundary at the section 18 and 19 fence line. For this site, the PFC determination was also “nonfunctional”, for reasons described at the previous site, and because of high riparian utilization, altered species composition, and a short segment (approximately 100 feet) of increased stream width/depth ratios due to cattle trampling.

A road culvert in Section 23, which is also a developed cattle watering site, has plugged and caused overland flow through a meadow. The overland flow has initiated severe headcutting and gulying in the meadow, which contributes sediment to the Middle Fork of Big Timber Creek. High forage utilization and altered species composition exacerbates the problem and accelerates the headward migration of the newly formed gully.

Fish Populations: Based on electrofishing surveys done June 22, 1998 in Section 14 of the allotment, the Middle Fork of Big Timber Creek is inhabited by brook trout (*Salvelinus fontinalis*). Fish densities are low (e.g., 2 fish/500' surveyed) primarily because stream gradients are high, and the channel is unstable. Pool frequencies are low, and many pools electrofished were void of fish. No Yellowstone cutthroat trout were found. The two fish found were adults (7 to 8 inches). No juveniles or young-of-the-year fish were observed.

Devil Creek

Channel Type and Habitat Descriptions: Devil Creek is a small second order tributary to Big Timber Creek, located in the northeastern portion of the allotment. Approximately 3 miles of Devil Creek are within the allotment. The stream is a B5/B6 type channel with predominately small gravel, sand and silt substrate. These channel types typically have a moderate sensitivity to disturbance with excellent recovery potential, moderate sediment supply, low to moderate streambank erosion potential, and moderate riparian vegetation controlling influence on bank stability. Meadow areas in Section 11 and the west 1/2 of Section 12 are easily accessible to cattle and bank trampling and channel widening has occurred. In the meadow, banks are comprised of finer textured soils, which make them more susceptible to trampling impacts. The stream in the east half of Section 12 is less accessible because of thick deciduous and coniferous riparian vegetation and downfall across the channel.

However, riparian cattle use is extremely high in areas where access is possible. Several cattle crossings and areas with shade trees next to the stream are completely void of vegetation and bank trampling is common. Channel width/depth ratios have increased, and instream sediment is high.

Devil Creek has a moderate frequency of complex pools formed by stream meanders and actively functioning woody debris. Debris frequency has been reduced along the stream in the private inholding in Section 12 because of past riparian harvest. Thus, existing habitat quality and availability (i.e., numbers of high quality pools associated with debris accumulations) is below its full potential. Riparian harvest has also resulted in accelerated bank erosion in some isolated locales, which tends to reduce pool habitat quality and increase sedimentation. Instream fine sediment accumulations are high throughout Sections 11 and 12, primarily due to cattle induced bank erosion, but also because of riparian harvest, roads, and a poorly installed culvert. Excessive fine sediment deposition in pools has reduced maximum pool depths and residual pool volumes.

A Pfankuch channel stability evaluation in 2002 determined the channel to be in poor condition. The procedure was repeated in September 2003, with similar results. The 2003 evaluation showed a 54 point departure from an estimated natural condition. A 20 point departure is considered to be a violation of Forest Plan standards. Departures were primarily related to loss of riparian vegetation, increased erosion, and sedimentation caused by cattle. Unlike the Middle Fork of Big Timber Creek, channel instabilities and departures from natural conditions in Devil Creek are primarily attributed to cattle grazing.

A PFC evaluation resulted in a “nonfunctional” rating due to direct cattle impacts on hydrology, stream channel dimensions, riparian vegetation and erosion and deposition processes.

Fish Populations: Population surveys in the lower portion of the allotment in Sections 7 and 12 in June 1998 revealed moderate densities (i.e., 21 fish sampled in 200' of stream) of eastern brook trout with several age classes represented. No Yellowstone cutthroat trout were found. An additional site was electrofished upstream of the road culvert and no fish were found. Because of its limited fish population, Devil Creek is also considered a Class C stream.

Aquatic macroinvertebrate populations:

Aquatic macroinvertebrates are often used to describe and monitor the biological condition or productivity of stream systems primarily because:

1. Macroinvertebrate communities are good indicators of localized conditions, and
2. Macroinvertebrate communities integrate the effects of short-term environmental variations.

The primary purpose for collecting macroinvertebrate data for this project was to determine whether land use activities have caused biological impairments. Common responses to elevated concentrations of sediment can include decreased total abundance, decreased number of species, and a shift from a community of sediment intolerant species to a community of sediment tolerant species. For Devil's Creek, biological integrity determinations were based on protocols specific to the state of Montana and presented in Bukantis (1998). Biological integrity was determined by comparing the integrity score to regional reference scores and water quality use/support standards and violation thresholds found in the Montana Water Quality 305b report.

Samples collected in Devil Creek in section 17 (USFS), were rated as non-impaired (81%) and fully supporting water quality standards (see McGuire 2004, Project File, Chapter 10-B-5). Scores greater than 75% are considered non-impaired. However, an unusually high density of tubificid oligochaetes in the samples indicated substantial fine sediment deposition. This finding is consistent with visual observations.

Determination of Desired Future Condition of Streams on the Allotment

More site specific DFC descriptions require:

- 1) Setting a Sensitivity Level that is commensurate with specific stream attributes and values.
- 2) Determining the inherent stability of the stream reach in question based on channel types and vegetation.
- 3) Describing desired vegetative conditions along riparian corridors.

Sensitivity Level. Often, streams within a watershed, landscape, or administrative unit exhibit a variety of values. For example, streams that contain threatened, endangered or sensitive fish species, popular sport fisheries, municipal water supplies, etc. would be considered to have higher values than streams that do not have these attributes. Because of these variations, some streams receive special management emphasis to either protect important values or move a stream that is not at PFC in that direction. Some of the considerations that can enter into a Sensitivity Level determination are: fisheries, soil sensitivity, stream type, recreation importance etc (see Bengeyfield and Svoboda, Project File, Chapter 11-2). To aid in that effort, streams within the allotment were stratified by Sensitivity Level by the ID team using criteria established by Bengeyfield and Svoboda. The "sensitivity level" is expressed as a percent of potential. The sensitivity level is used to help determine acceptable levels of streambank alterations.

Because neither the Middle Fork of Big Timber Creek or Devil Creek support TES fish species, important recreational fisheries, or other higher value attributes, both streams were given a Sensitivity Level II with a management goal of 80% of potential.

Inherent Stability. Channel type and sensitivity analyses are combined with knowledge of vegetative community types and the relative influence riparian vegetation has on streambank stability to determine "inherent stability". The inherent

stability determination recognizes that channels are seldom 100% stable under pristine conditions. The determination equates to the amount of stable streambank that would exist in a functional state. This provides a reference from which to set allowable bank stability goals. The final DFC for bank stability also incorporates established sensitivity levels (see above discussion) and other attributes to ensure Forest Plan standards are met (i.e., “manage riparian vegetation, including overstory tree cover, to maintain streambank stability and promote filtering of overland flows FP III-21).”

DFC for Middle Fork Big Timber Creek:

Because the Middle Fork of Big Timber Creek does not support TES fish species, important recreational fisheries, other higher value attributes, and the fact that the existing and potential stream type is B2/B3, the stream was given a Sensitivity Level of II. The management goal for streams with a Sensitivity Level II is to manage the stream at a level of at least 80% of its potential.

For the middle and upper reaches of the Middle Fork on National Forest where cattle access is limited, vegetative community types consist of open Douglas Fir/Spruce/Forb/Carex/Kentucky bluegrass that are producing vegetation at or near current potential. Inherent bank stability is estimated at 95% or more. Based on Pfankuch scores and PFC assessments, this reach is currently meeting DFC for bank stability (i.e., near 100% of potential) and is at Properly Functioning Condition. There is no reason to assume that future management will cause deviations from DFC.

Vegetative community types for the lower reaches of the Middle Fork in private land are similar to upstream reaches with an increase in forbs, carex, and grasses. Although cattle use is high for this reach, riparian utilization has minimal affect on bank stability because of the inherent stability of the B3 channel type. Some local areas of bank degradation from cattle exist, but channel instabilities are primarily associated with loss of riparian trees from harvest and high flood flows. Inherent stability for the channel/habitat type is estimated to be 95% or more. To determine allowable bank damage caused by cattle grazing the following formula is applied. 0.8 (manage for .8 of potential, from Sensitivity level II) multiplied by $.95$ (from inherent stability for that habitat type) equals 0.76 . Thus, to achieve DFC for bank stability, no more than 24 feet out of 100 feet of streambank could be altered via cattle induced impacts. Likewise, no more than 20 Pfankuch stability departure points could be attributed to cattle, and the minimal PFC determination would be “functioning at risk” with an upward trend. Cattle induced impacts would not be contributing to the “functioning at risk” call, which is currently primarily associated with riparian harvest. The DFC also includes goals specific to riparian forage utilization rates that are not currently being met. As such, riparian utilization standards are considered the limiting parameter for lower reaches of the Middle Fork.

DFC for South Fork Big Timber Creek:

Because the South Fork of Big Timber Creek supports Yellowstone cutthroat trout, a sensitive fish species, the stream was given a Sensitivity Level I. The management goal for streams with a Sensitivity Level I is to manage the stream at a level of at least 90% of its potential. Because the channel type is an A1/A2 the inherent stability is at least 95%. The South Fork Big Timber Creek currently meets DFC.

DFC for Devil Creek:

Because Devil Creek does not support TES fish species, important recreational fisheries, other higher value attributes the stream was given a Sensitivity Level II with a goal for managing for at least 80% of its potential.

The upper reach of Devil Creek upstream of the culvert crossing is B5/B6 channel type with primarily a carex and willow community. These types generally have a moderate to high stability rating ranging from 80% to 95%. Thus, a conservative rating of 90% is used. As such, $0.8 \times 0.9 = .72$. Thus, to achieve DFC, 72 feet out of every 100 feet need to be stable and 28 feet could be altered from cattle. The Pfankuch stability departure would be under 20 points and the minimal PFC determination would be “functioning at risk” with an upward trend, with a long-term goal of “properly functioning condition”.

The middle reach of Devil Creek from approximately the road culvert downstream to the FS boundary consists of open sagebrush and meadow types with Kentucky bluegrass and carex being the dominant vegetation. The inherent stability rating for that channel and vegetation type varies between 40 and 90% depending on relative abundance of Kentucky bluegrass. The long term DFC is for a predominately carex and willow community. For that reason, a conservative rating of 80% was used based on the sites inherent potential for a carex/willow community type. As such, to achieve DFC for bank stability, 64 feet out of every 100 feet need to be stable and 36 feet could be altered from cattle. The Pfankuch stability departure would be under 20 points and the minimal PFC determination would be “functioning at risk” with an upward trend, with a long-term goal of “properly functioning condition”. Width/depth ratios throughout would be consistent with undisturbed channel segments.

The lower reach of Devil Creek on National Forest is a B6 channel type consisting of Spruce and Doug Fir with a forb understory. These types generally have a high inherent bank stability rating with estimates of 84% to 96%. A conservative rating of 90% was used. Thus, to achieve DFC for bank stability, 72 feet out of every 100 feet would need to be stable and 28 feet/100 could be altered by cattle. The Pfankuch stability departure would be under 20 points and the minimal PFC determination would be “functioning at risk” with an upward trend. The long-term goal would be “properly functioning condition”. In addition, this reach is currently considered a B6 channel type with predominately silt/sand substrates and

areas of increased width depth ratios. The DFC for this reach would be a B5 channel with predominately gravel/sand substrates and width/depth ratios throughout consistent with undisturbed channel segments.

IV. Effects Analysis

1. Livestock Usage is Contributing to Impacts on Stream Function

Concern was expressed that grazing management methods designed primarily for upland areas have altered many riparian areas and their associated stream characteristics. Excessive grazing and trampling may cause direct mechanical damage to streambank soils and can change the dimension, pattern and stability of stream channels. Improper grazing can also change the composition of riparian vegetation and can reduce the effectiveness of vegetation in maintaining stream stability.

Alternative 1 - No Action (No Grazing) Alternative

Direct/Indirect Effects

It is anticipated that removal of livestock impacts (soil trampling and removal of herbaceous vegetation) would have a rapid positive effect on stream reaches accessible to cattle in the Middle Fork and Devil Creek and associated tributaries, seeps, and springs. Stream function (as measured by Proper Functioning Condition and bank stability ratings) would likely improve to within standards within 2 to 5 years. Areas impacted by road runoff and culvert maintenance problems would not be improved by removing livestock (such as Section 23 private land). The direct effect would be an increase in remaining herbaceous vegetation to catch and trap debris, sediment, and runoff.

An indirect effect would be the sprouting of aspen and willow and regeneration of these species in some areas currently impacted by high livestock use. This would contribute to streambank stability. However, aspen and willow will not be significantly affected by removing livestock because these species are being suppressed by a combination of factors including encroachment of conifers, water table changes, fire suppression, and drought. Indirect effects also include an improvement in habitat quality for aquatic species and riparian dependent species. There is not likely to be any effect, either positive or negative, in the South Fork of Big Timber Creek because grazing is not currently impacting this area.

Cumulative Effects

Grazing would continue on private land. The majority of the negative impacts on stream function are currently occurring on private land in the allotment. It is anticipated that one outcome of implementing the No Action Alternative could involve

fencing private land boundaries, at least where there is primary range. This could result in even more impact to streams and riparian areas located on private land.

Alternative 2 - Proposed Action (Adaptive Management Alternative)

Direct/Indirect Effects

South Fork Big Timber Creek:

Because cattle have limited access to the South Fork Big Timber Creek, and because of the A1/A2 channel type that has a very low sensitivity to disturbance, cattle grazing is not impacting the stream under the existing management plan. Thus, the proposed action will have no effect on Yellowstone cutthroat trout habitat or populations in that stream.

Middle Fork Big Timber Creek:

Under the existing plan, the primary grazing related concern for the Middle Fork Big Timber Creek is high forage utilization along segments of stream in private land sections 13 and 18. The DFC for upstream reaches where cattle access is limited is currently being met and the proposed action will not reverse that. For the downstream reach on private land, phase one of the proposed action may reduce utilization along the Middle Fork. However, because of the relatively narrow valley width, cattle will still concentrate in the riparian corridor. To meet Forest Plan utilization standards, monitoring and prompt cattle removal once utilization standards are met will be critical. Phases two and three would offer option to help control livestock timing and distribution that could facilitate quicker recovery of overutilized forbes along the Middle Fork and associated tributaries, seeps and springs.

Devil Creek:

Under the existing plan, the primary grazing related concerns for Devil Creek are high forage utilization and streambank degradation associated with bank trampling. High sediment loads associated with bank trampling is an indirect effect. Under Phase 1 of the proposed action, reduced cattle numbers may have some positive effect. However, improved conditions are highly dependent on meeting the established utilization standards. Improved cattle distribution will be necessary to meet the desired future condition. Because suitable forage is in close proximity to the stream, it will be difficult to keep cattle from concentrating along the riparian corridor. Riparian utilization standards will likely be met long before upland standards are met. Actions identified in phases two and three will further increase the ability to control livestock timing and distribution along the stream corridor. Five years would be the “allowable time frame” before phase two of adaptive management would be implemented.

Direct and indirect impacts to stream function would be expected to be very similar to those described above in the No Action Alternative, however, it would take longer to reach those goals. Recovery time frames increase with each phase of the alternative.

Cumulative Effects

Alternative 2 (proposed action) is expected to have a positive cumulative impact on stream function. If Phase One and Two of the adaptive management scenario are not successful, extensive fencing will be required. Under Phase 3, removing the private land in the Middle Fork Pasture from the allotment could result in increased grazing use and trampling impacts along the private land portion of this tributary.

The effect of the implementation of the proposed action is expected to result in positive effects for the major streams and tributaries on the allotment as well as on seeps springs and other wet areas.

Applicable Laws, Regulations and Guidelines

Alternative 2 (proposed action) has been designed to comply with the Clean Water Act and the Montana Water Quality Act, which provide overall direction for protection of water from both point and non-point sources of water pollution. The proposed action is intended to bring the allotment into compliance with Gallatin National Forest Plan standards, goals, and objectives for fish habitat. Alternative 1 (no action) would also bring the allotment into compliance with the above-mentioned Forest Plan direction over time, as well as comply with the Clean Water Act and Montana Water Quality Act. (See Table 2-1 for a comparison of alternatives).

2. Livestock Grazing and Trampling Is Contributing to the Alteration of Vegetative Composition Around Streams, Seeps, Springs, Meadow, and Upland Areas.

Concern was expressed that livestock grazing could result in changes in vegetative composition. The 1998 vegetation classification lists 1,680 acres of suitable range on the Crazy Allotment out of 8,430 acres. Of this vegetation, 710 acres (43%) consist of grassland, 337 acres (20%) consists of shrubland, 372 acres (22%) are forested rangeland, and 261 acres (15%) consist of transitory range or range where forage production increased following timber harvest. The area consists of a mix of upland and riparian with about 10% of suitable grazing areas being riparian and about 90% being upland. Upland refers to vegetation, which is "up" or away from water.

Alternative 1 - No Action (No Grazing) Alternative

Direct/Indirect Effects

The direct and indirect effects of removing livestock on stream function are described above and also apply to the effects on vegetation composition around springs and seeps. The cumulative effects of removing livestock on vegetation composition around springs and seeps are also described above. To summarize, all of these effects are expected to be positive under the No Action (No Grazing) Alternative.

The direct effects of the No Action Alternative (removing livestock) on meadow and upland areas are mixed. Removing livestock is expected to have a positive effect on native herbaceous vegetation, since many suitable native plant communities are currently overgrazed. The direct effect of not continuing to graze vegetation such as non-native timothy is likely to be negative. Timothy is a very well adapted and productive grass that grows 3-4 feet tall with a dense coverage. It is usually not highly desirable to elk or other wildlife species, except early in the season or as re-growth after livestock grazing in the fall. Removal of all livestock grazing would likely result in tall, dense stands of timothy that would likely mat down due to wind or snow. Matting would shade the ground and likely result in reduced productivity. It could suppress flowering herbaceous plants and other associated species within the allotment. An indirect effect of the increased coverage of timothy would be a reduction in preferred wildlife forage species.

Another indirect effect of the No Action Alternative would be the reduced spread of noxious weeds and undesirable non-native plant species. Some meadow and upland areas are currently grazed annually, with the desirable vegetation consumed and undesirable vegetation remaining. The undesirable vegetation goes to seed, and due to lack of competition, becomes readily established. Resting the areas from grazing would have a positive effect by creating greater competition from the desirable species.

There would be a small increase in the potential for wildfire or the rate of spread of a wildfire if all meadows and upland areas remain ungrazed. A wildfire could be beneficial from a biological perspective, since grasslands and woody riparian species are currently being suppressed by conifer encroachment.

Cumulative Effects

There are no other known negative biological cumulative effects of the No Action Alternative on meadows and upland areas, with the exception the effects of not grazing timothy described above.

Alternative 2 - Proposed Action (Adaptive Management Alternative)

Direct/Indirect Effects

The reduction in livestock impacts (grazing and trampling) would have a long-term positive effect on vegetation composition along stream reaches accessible to cattle in the Middle Fork and Devil Creek and associated tributaries, seeps, and springs. The proposal is to limit grazing to 40%, an amount approximately correlating to three-inch stubble height. This stubble height will be used as a monitoring tool and an annual utilization goal with PFC (Proper Functioning Condition) to be measured periodically to determine management effectiveness.

Direct and indirect impacts to stream function are expected to be very similar to those described in the No Action Alternative. It would, however, take longer to reach those goals. A direct effect would be an increase in herbaceous vegetation available following grazing to initiate re-growth in the fall and to trap debris, sediment, and runoff. Another direct effect would be some reduction in compaction of riparian soils and associated improved competitive ability of riparian grasses against clovers, medics, and other low seral species. Reducing grazing would directly impact upland areas. Since cattle generally prefer riparian areas, upland areas typically receive less grazing. If riparian grazing is reduced, upland areas would be expected to receive less grazing also.

Indirect effects include those discussed above; sprouting aspen and willow and regeneration of these species in some areas currently impacted by high livestock use. This would contribute to an improved age class distribution. However, woody species are suppressed by a combination of factors and reduced grazing is not likely to result in dramatic improvements. There is not likely to be any effect, either positive or negative, in the South Fork of Big Timber Creek since grazing does not currently impact this area.

Cumulative Effects

Cumulative effects of implementation of the Proposed Action Alternative on vegetation composition are not anticipated. Overall impacts are expected to be positive, (such as improvement in riparian conditions and habitat throughout the impacted area). However, if Phase One and Two of the adaptive management scenario are not successful in bringing streambanks to within PFC, then extensive fencing would be required. Impacts are unknown, but removal of the Middle Fork Pasture from the allotment (since it is all private land) would be expected to result in increased grazing along this tributary.

There are no other past, present or future activities that are likely to result in cumulative effects.

Applicable Laws, Regulations and Guidelines

The Forest Plan provides guidance for grazing of livestock on National Forest System Lands within the Gallatin National Forest. Overall goals stated in the plan include maintenance or improvement of the forage resource and contribution toward assuring that that favorable and sustainable rangeland conditions exist into the future. Alternative 1 (no action) would not provide any grazing opportunities or means to improve the forage resource. Alternative 2 has been designed utilizing adaptive management techniques to improve forage and sustainable rangeland conditions in order to be able to continue to provide grazing opportunities into the future.

3. The Occurrence of Weed Species within the Allotment is Increasing.

Concern was expressed that livestock grazing could reduce plant competition and allow increased density of noxious weeds, or that livestock grazing could result in new noxious weed species being introduced. There are no known infestations of leafy spurge or knapweed on the allotment. There have been reports of sulphur cinquefoil and this plant is becoming widespread in the vicinity. Yellow toadflax is also becoming common on public and private land in the adjacent Big Timber Canyon, although it has not been reported on the Crazy Allotment.

Canada thistle is widespread on the allotment. It was probably introduced during the sheep grazing period from the late 1800s to the 1950s. Canada thistle is well established and can be found in nearly all mesic habitats. An additional proliferation of Canada thistle may have occurred due to road building and timber harvest on private land since it is found along roadways and in all the timber cutting units. While Canada thistle is a Category 1, State Listed Noxious Weed, it is so widespread and prolific that treating infestations on the allotment would be physically impossible and very hard on the remaining native plants. Extensive treatments of Canada thistle would compete for limited financial resources with more pernicious weeds located elsewhere.

Houndstongue is a State listed Category I noxious weed. It is also widespread throughout the allotment, although densities are generally low. It is found in nearly all mesic habitats except timbered areas with relatively closed canopies. As with Canada thistle, houndstongue is so widespread that it would be impossible to treat manually or with chemicals. If a biological control agent becomes available, this area would be a good candidate for a bio-control release.

Alternative 1 - No Action (No Grazing) Alternative

Direct/Indirect Effects

Alternative 1, no action (removing livestock from public land) would likely result in the direct effect of increased competition among herbaceous species. While this may not decrease the weed coverage (especially of houndstongue and musk thistle), it may reduce the spread of these species by limiting ground disturbance, removing a

contributing vector (cattle) for seed dissemination, and providing more herbaceous competition for resources among species. Competition with grasses has been shown to reduce coverage of Canada thistle.

An indirect effect of the No Action Alternative (removing cattle) would be an increase in native vegetation. An increase in native species would help to limit noxious weed infestations currently on adjacent lands, from becoming established on the allotment. Yellow toadflax, knapweed, and leafy spurge are all found near, but not on the allotment. Another indirect effect, in many areas of the allotment, would be reduced soil compaction. Some invasive species such as Kentucky bluegrass and medicago spp. are better adapted to compaction than most native species. These species would be less likely to expand their presence. A negative effect of Alternative 1 would be that timothy biomass would tend to accumulate.

Elk, deer, moose, and various birds would still inhabit the allotment area year round and would still pick up and carry seed from place to place.

Cumulative Effects

There are no known cumulative effects of Alternative 1 on the occurrence of weed species within the allotment.

Alternative 2 - Proposed Action Alternative (Adaptive Management)

Direct/Indirect Effects

Alternative 2, the proposed action, was developed to address changes in species composition in upland and riparian areas on the allotment. Implementation would help to reduce the spread of noxious weeds, including those that are nearby but not yet on the allotment, by improving the competitive ability (health) of upland and riparian range areas. Alternative 2 will be unlikely to reduce the prevalence of weeds in the areas they currently infest, such as along roadsides and several riparian and upland areas. Although the rate of spread would be reduced under both alternatives, the Proposed Action Alternative is expected to be less effective in reducing weed infestation and spread than the No Action Alternative. Elk, deer, moose, and various birds would still inhabit the allotment area year round and would still pick up and carry seed from place to place.

Cumulative Effects

There are no known cumulative effects associated with the proposed action pertaining to the occurrence of weed species. The proposed action would be more protective than what is currently occurring on all habitats grazed by livestock and it would result in improvements to rate of spread regarding noxious weeds. Past management actions have contributed to the current weed situation on the allotment. Both Alternatives 1

and 2 would improve the ability of native and desirable non-native plant species to compete against invasive plant species.

Applicable Laws, Regulations and Guidelines

Alternative 1 would be in compliance with Executive Order 13112 because grazing activities would be discontinued. Adaptive management techniques associated with Alternative 2 would assure compliance with Executive Order 13112, which requires that federal agencies whose actions may affect the status of invasive species, identify such actions, prevent the introduction of invasive species, detect and respond rapidly to and control populations of such species, provide for restoration of native species and habitat conditions; and promote public education on invasive species. Additionally, federal agencies are directed not to carry out actions that they believe are likely to cause or promote the introduction or spread of invasive species.

V. Management Direction

Proposed grazing must be consistent with the Multiple Use Sustained Yield Act of 1960 (16 USC528), National Environmental Policy Act of 1969 (NEPA), the Federal Land Policy and Management Act of 1976 (FLPMA), and the Final Environmental Impact Statement and Land and Resource Management Plan (Forest Plan) for the Gallatin National Forest (Record of Decision signed 9/23/87). Several other laws, regulations, and guidelines are also applicable to this project and are listed below:

National Forest Direction

The Multiple-Use Sustained-yield Act of 1960 (16 U.S.C 528)

The Multiple Use Sustained Yield Act of 1960 states "it is the policy of the Congress that the National Forests are established and shall be administered for outdoor recreation, range, timber, watershed, and wildlife and fish purposes". Alternative 1 (no action) would not provide for grazing opportunities on National Forest land. Alternative 2 (proposed action) would provide for continued grazing opportunities and range improvement through adaptive management practices.

The National Environmental Policy Act of 1969 (NEPA)

NEPA establishes the format and content requirements of environmental analysis and documentation. The entire process of preparing this EA was undertaken to comply with NEPA.

The Federal Land Policy and Management Act of 1976 (FLPMA)

FLPMA authorizes the Secretary of Agriculture to issue permits for various uses on National Forest System lands. Part of the function of the Forest Service is to manage the grazing of domestic livestock and to keep their numbers in balance with the carrying capacity of the range (40 CFR 200.1 & 200.3). Volume 57, No. 182 of the Federal Register states NEPA analysis is required to analyze the potential site-specific effects of grazing on individual allotments, to determine what standards and guidelines should be incorporated in a renewed permit, and to consider whether the activity should be permitted to continue. Alternative 2 (proposed action) was developed to comply with FLPMA. Alternative 1 (no action) would discontinue the grazing permit on National Forest Lands within the allotment.

The Gallatin National Forest Land and Resource Management Plan (1987)

This project is designed to follow the direction provided by the Final Environmental Impact Statement (FEIS) and Land and Resource Management Plan (Forest Plan) for the Gallatin National Forest (USDA Forest Service 1987 PF 206 & 206(a)). The Forest Plan provides direction for all resource management programs, practices, uses, and protection measures for the Gallatin National Forest. The Gallatin Forest Plan sets goals and objectives for livestock grazing on the Forest and allocates portions of the land base to help achieve these goals (Forest Plan, pages II-1, II-4, & II-13).

The Forest Plan subdivided the forest into 26 management areas (MA's). These areas are described in detail in Chapter III. of the Forest Plan (FP, pp. III-2 through III-73). The Crazy Allotment falls primarily in Forest Plan Management areas MA 6 (undeveloped, dispersed recreation), MA7 (riparian), MA8 (timber management), MA10 (timber/livestock), MA12 (wildlife), and MA17 (livestock/wildlife) (see Map 2). Applicable resource management direction is identified for each of the affected MAs in Chapter 1 of this EA. Alternatives 1 & 2 would both be consistent with direction provided by the Forest Plan.

Adaptive Management (FSH 2209.13)

Adaptive management prescribes allowable limits for the timing, intensity, frequency, and duration of livestock grazing practices. These limits are represented as standards that are monitored to ensure that prescribed actions are being followed. Monitoring also determines if management changes are needed. Future administrative actions that adhere to the decision notice can be implemented without additional analysis.

Examples of administrative decisions include; determination of specific dates for grazing, specific livestock numbers, class of animal, grazing systems, and range readiness.

When implementation of a management option not considered in this environmental assessment is necessary, or when predicted effects of implementation exceed original predictions, a supplemental or new analysis effort and subsequent decision are required.

Building adaptive management flexibility into allotment management allows for decisions that are responsive to needed adjustments in permitted actions. Historically, decisions have been narrowly focused, such as deciding to authorize the number, kind, or class of livestock with specific on-and off-dates under a certain type of grazing system. These kinds of decisions restrict management flexibility in meeting desired conditions and project objectives.

Alternative 2 was designed to incorporate adaptive management strategies into the management of the Crazy Allotment. Alternative 1 would discontinue grazing on the allotment, so would not utilize adaptive management strategies.

Clean Water Act of 1977

The objective of this act is to restore and maintain the integrity of the nation's waters. This objective translates into two fundamental goals: (1) eliminate the discharge of pollutants into the nation's waters; and (2) achieve water quality levels that are fishable and swimmable. This act establishes a non-degradation policy for all federally proposed projects. Alternative 2 (proposed action) incorporates adaptive management in order to assure compliance with the Clean Water Act, which provides overall direction for protection of water from both point and non-point sources of water pollution. Alternative 1 (no action) would also comply with the Clean Water Act.

The State of Montana Water Quality Act (1969, 1975, 1993, 1996)

The State of Montana Water Quality Act requires the state to protect, maintain, and improve the quality of water for a variety of beneficial uses. Section 75-5-101, MCA established water quality standards based on beneficial uses. . The State has classified all waters within the allotment as B1 (ARM 16.20.604). The associated beneficial uses are drinking; culinary and food processing purposes after conventional treatment; bathing, swimming, and recreation; growth and propagation of salmonid fishes and associated aquatic life, waterfowl, and furbearers; and agricultural and industrial water supply.

No areas in the allotment are currently known or suspected to have sufficient concentrations of livestock along or through streams to result in water quality violations. Water quality standard violations by livestock grazing in Montana are usually associated with feedlots or corrals where livestock are heavily concentrated near streams. These situations do not occur on the allotment. See pp. 3-11 through 3-14 for a complete description of stream conditions.

Alternative 1 would comply with the Water Quality Act with the removal of cattle from the National Forest portion of the allotment. However, cattle could still graze on

private land within the allotment where the Forest Service would no longer have administrative control. Alternative 2 would utilize adaptive management practices throughout the allotment (private and National Forest land) in order to improve streambank stability in the problematic reaches, as well as improve overall riparian vegetative conditions.

Endangered Species Act of 1973

The purpose of this act is to provide for the conservation of endangered fish, wildlife, plants, and their habitats. Biological Assessments (BA) must be prepared to document possible effects of proposed activities on endangered and threatened species within the analysis area potentially affected by the project. A BA and Consultation Summary Sheet have been prepared and are located in the Project File (10-C-1 & 10-C-2). Appropriate coordination, conferencing, and consultation with the USFWS and NMFS has been completed for the project. The findings in the BA for the proposed action are “may effect but not likely to adversely effect the threatened grizzly bear and Canada lynx; “no effect” for the threatened bald eagle, and non-jeopardy for the experimental gray wolf.

Executive Order 12898 – Environmental Justice

Executive Order 12898 directs each Federal agency to make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations. Where Forest Service proposals have the potential to disproportionately adversely affect minority or low-income populations, these effects must be considered and disclosed (and mitigated to the degree possible) through NEPA analysis and documentation.

The actions under the proposed action would not adversely affect any disadvantaged or minority groups because of the project area’s distance from large population centers and the diffuse level of adverse impacts on any social group. A project such as this would not produce hazardous waste or conditions that might affect human populations.

Federal Noxious Weed Act of 1974

This act provides for the control and management of non-indigenous weeds that injure or have the potential to injure the interests of agriculture and commerce, wildlife resources, or the public health. Implementation of Alternative 2 (proposed action) would actually likely improve the status of invasive species within the allotment over time through the use of adaptive management and intensive monitoring procedures. See Chapter 3 Effects Analysis (3. Increased weed occurrence). Alternative 1 (no action) would also likely reduce the rate of spread of invasive species over time. Removal of livestock from the allotment would likely result in an increase of native

vegetation and other herbaceous species, which provide competition for invasive species. However, with Alternative 1 (no grazing), the Forest Service would lose administrative authority over the private portions of the allotment, which could still be in use.

Migratory Bird Treaty Act of 1918

The purpose of this act is to establish an international framework for the protection and conservation of migratory birds. Neither Alternative 1 (no action) nor implementation of Alternative 2 (proposed action) would negatively affect migratory bird populations. See Appendix A (Wildlife).

National Historic Preservation Act of 1966 (NHPA)

NHPA requires federal agencies to consult with the State Historical Preservation Office and American Indian Tribes before cultural resources, such as archaeological sites and historic structures are damaged or destroyed. Section 106 of this act requires federal agencies to review the effects project proposals may have on cultural resources in the project area. The Montana State Historic Preservation Officer (SHPO) has been consulted concerning proposed activities in the project area. The Forest Service has reached concurrence with SHPO, indicating a no-effect determination for cultural resources on this project. Scoping letters asking for comments about the project were sent to George Reed, representing the Crow Tribe. No concerns were voiced regarding this project. Grazing has been ongoing in the Crazy Allotment for over 100 years with no apparent conflicts.

American Indian Religious Freedom Act of 1994 (AIRFA), Native American Graves Protection Act of 1990 (NAGPRA)

AIRFA prohibits federal actions that interfere with American Indians' "rights of freedom to believe, express, and exercise the traditional religions of the American Indian ... including, but not limited to access to sites, use and possession of sacred objects, and the freedom to worship through ceremonies and rites."

NAGPRA specifies that a Federal Agency must take reasonable steps to determine whether a planned activity may result in disturbance of American Indian human remains, funerary objects, and items of cultural patrimony from Federal lands. NAGPRA has specific requirements for notification and consultation with tribes.

Scoping letters asking for comments about the project were sent to George Reed, representing the Crow Tribe. No concerns were voiced regarding this project. Grazing has been ongoing in the Crazy Allotment for over 100 years with no apparent conflicts. Neither Alternative 1 nor 2 are likely to have negative effects in regard to either act..

VII. Other Disclosures

Effects on Threatened and Endangered Species

Grizzly Bear: Grizzly Bears are not known to inhabit the Crazy Mountains. The Fish and Wildlife Service (FWS) does not require the Forest Service to analyze the effects of livestock grazing on grizzly bears north of Interstate 90. The proposed action “may affect but is not likely to adversely affect” the threatened grizzly bear. *See the Biological Assessment located in the Project File (Chapter 10-C-1).*

Gray Wolf: Although reports of wolves have been verified in the Crazy Mountains, there is no known evidence of occurrence on the allotment or recent occurrence on the east side of the Crazy Mountains. As stated in 50 CFR Part 17 (November 22, 1994) "there are no conflicts envisioned with any current or anticipated management actions of the Forest Service....". The CFR also states: "nonessential experimental animals located outside National Wildlife Refuges or National Park lands are treated for purposes of Section 7 of the Act, as if they were only proposed for listing." Therefore, implementing the Proposed Action Alternative would be “not likely to jeopardize” the continued existence of the nonessential/experimental gray wolf. *See the Biological Assessment located in the Project File (Chapter 10-C-1).*

Bald Eagle: There may be some fall and winter usage of the Crazy Allotment area by bald eagles; however, the eagles are primarily found along the Yellowstone River during the summer months when the allotment would be active. There is no evidence that individual eagles or known or potential bald eagle habitat would be impacted by implementing this project. Implementation of the proposed action would have "No Effect" on the threatened bald eagle. *See the Biological Assessment located in the (Chapter 10-C-1).*

Lynx: Suitable lynx foraging and denning habitat can be found in the project area, but confirmed sightings of Canada lynx have not been reported on the east side of the Crazy Mountains. Implementation of the proposed action would not add to current levels of human activity. No timber harvest is associated with this project.

The proposed livestock grazing would possibly have minor beneficial effects on suitable lynx habitat. Upon implementation of the Proposed Action Alternative, grazing levels would be less than what has been occurring historically for several decades. After implementation of the proposed action, there should be a continuing upward trend in increasing vegetative cover and species composition, which would likely improve lynx habitat. Implementing the proposed action “may affect but is not likely to adversely affect” the threatened Canada lynx.

Unique Characteristics of the Geographic Area

The Crazy Allotment does not contain any ecologically unique or critical areas. However, the geology and spectacular beauty of the area is thought by many people to be very special. The allotment is located on the south east side of the Crazy Mountains approximately 15 miles northwest of Big Timber. To a traveler on Highway 191, the allotment is visible as the eastern outslope of the Crazy Mountains. The western edge of the allotment contains long open ridges coming off Crazy Peak and Big Timber Peak and, at the eastern edge a huge, gray scarp face above the South Fork of Big Timber Creek.

The Crazy Allotment, with the exception of private lands and all or portions of National Forest Sections 2, 12, 14 & 24, was inventoried as part of *Roadless Area #1-541 (Forest Plan FEIS, C-7)*. Nothing within the Proposed Action Alternative or the No Action Alternative has the potential of changing and/or modifying this inventory.

The allotment contains the South Fork Big Timber Creek, the Middle Fork Big Timber Creek, Devil Creek, and several ephemeral tributaries. There are no lakes or ponds. There are no major or large wetland areas. Due to steep topography and vegetation, which limits access, the South Fork of Big Timber Creek and the upper reaches of the Middle Fork and Devil Creek are not accessible to cattle and are in good condition. Private timber harvest, road building, and grazing activities have impacted stream reaches on the lower portion of the allotment. The proposal contains standards for grazing utilization levels for riparian and upland areas.

There are no Wild & Scenic Rivers or ecologically critical areas known to occur within the allotment boundaries.

Effects of the Alternatives on Prime Farmland, Rangeland, and Forest Land

There is no prime farmland, rangeland, or forestland located within the project area. There are 8,430 acres within the allotment boundary with 1,680 acres that are considered to be suitable rangeland. Grazing has been active on this allotment for many decades. The proposed action would improve the suitable range conditions over time by adjusting the number of grazing livestock to fit the carrying capacity of the land. Implementation of the proposal would help to better distribute the livestock in order to increase the native vegetative composition, lessen the occurrence of invasive weeds, aid in stabilizing stream banks, and help to return disturbed stream reaches to their proper functioning condition. The No Action Alternative may also somewhat improve suitable rangeland conditions over time by eliminating grazing, however, the Forest Service would lose administrative authority over the private portions of the allotment.

Effects of Alternatives on Floodplains and Wetlands

Floodplains and wetland areas would be improved over current conditions by implementing the proposed action. Numbers of grazing livestock would decrease from historic usage levels. Streams and wetland areas would be monitored on a regular basis. The opportunity to develop alternative watering sources would be assessed, as would the need for internal fencing to better distribute livestock. Protective measures to be taken would be dependent on the results of monitoring, regarding whether an upward trend is occurring in restoring native vegetative composition, proper functioning condition of streams, stream bank stability, etc. The No Action Alternative would also likely improve floodplain and wetland conditions by removing cattle from the National Forest portions of the allotment, however, the Forest Service would lose administrative authority over the private portions of the allotment.

Effects of Alternatives on Social Groups

The Proposed Action Alternative would have no discernible effects on minorities, American Indians, or women, or the civil rights of any United States citizen. It would not have a disproportionate adverse impact on minorities or low-income individuals.

The proposed action is intended to promote efficient use of intermingled ownership lands. The Crazy Allotment is an integral part of the current permittee's livestock operation and discontinuing the grazing permit (the No Action Alternative) would have an economic effect to the permittee and possibly the local community.

Effects on Public Health and Safety

There would be no significant effects on public health and safety. The allotment consists of checkerboard ownership consisting of 49% National Forest and 51% private lands. There is no public access to roads on the allotment. The only public usage of the area is by permitted access granted by the private landowner, who is the current permittee of the allotment.

Effects to Scientific, Cultural, or Historic Resources

Heritage resource sites have been found in the project area. During recording and survey of these sites, no mention was made that grazing has adversely affected the integrity of any of these sites, and no negative effects to known sites would be expected from the proposal. If there were a need for any type of excavation within the National Forest portion of the allotment, such as constructing an alternative watering site, a heritage survey would be conducted prior to any ground disturbing activity.

Short-term Use versus Maintenance and Enhancement of Long-term Productivity

Short-term uses are those uses that generally occur annually. Long-term productivity refers to the ability of the land to produce a continuous supply of a resource. Implementation of the proposed action would improve both short-term and long-term productivity by adjusting the number and providing for better distribution of permitted livestock to better fit the carrying capacity of the land. The project area has a history of extensive grazing for many decades. There are mitigation and monitoring requirements associated with the proposed action (adaptive management) with a stepped approach to corrective actions that would be taken depending on the results of the required monitoring. Important features associated with the proposal include improvement of the proper functioning condition of streams, ensure of streambank stability, reduce invasive weed species, enhance native vegetative composition, and enhance aspen regeneration within the allotment boundaries. . The purpose of adaptive management is to allow management the flexibility to be responsive to necessary adjustments in permitted actions.

Irreversible and Irretrievable Commitment of Resources

An *irreversible* commitment of resources refers to the use or commitment of a resource that is incapable of being reversed or changed. For example, nonrenewable resources, such as minerals in the ore, would be removed forever during the milling of the ore and would be irreversibly lost or committed. Irretrievable commitment of resources refers to actions that result in changes to resources that cannot be recovered or regained. The proposed action (Adaptive Management Plan) would cause no additional irreversible or irretrievable commitment of resources. The allotment has a grazing history that has occurred for many decades, sometimes very extensively.

Currently areas within the allotment have infestations of invasive weeds and other non-native vegetative species outcompeting the native vegetation. Some stream reaches are not operating within their proper functioning condition. Objectives of the proposed action, to be met through monitoring and corrective action, are:

- Continue to promote the efficient use of intermingled lands.
- Utilize management techniques that will improve or help to reverse negative trends occurring to both the vegetative and riparian related resources.

Possible Conflicts with Other Land Use Plans, Policies, and Controls

The purpose of the proposed action (Adaptive Management Plan) is to revise and update the grazing permit and allotment management plan (AMP) to comply with the Gallatin Forest Land and Resource Management. The proposal is consistent with the Public Law 104-19, Section 504(a), which requires land management agencies to schedule and complete NEPA analyses on all allotments where necessary to support grazing activities, the Multiple-Use Sustained Yield Act of 1960 that states that National Forests are established for outdoor

recreation, range, timber, watershed and wildlife purposes, and the Federal Land Policy and Management Act of 1976, which authorized the Secretary of Agriculture to issue permits for various uses on National Forest Lands. The proposed action also adheres to the legal requirements of numerous other laws, regulations and guidelines that are cited beginning on p. 3-24 of the EA. The proposal has no known conflicts with any Land Use Plans, Policies or Controls.

Energy Requirements and Conservation Potential of Alternatives

The energy required to implement the proposed action in terms of use of petroleum or energy consuming products is insignificant. Livestock grazing on National Forest Land is an activity that has been ongoing for several decades and does not consume measurable amounts of any type of energy resource.

Probable Adverse Environmental Effects That Cannot Be Avoided

Implementation of the proposed action, which would continue grazing opportunities on intermingled National Forest and private land, would not result in adverse environmental effects that cannot be avoided. The proposal incorporates adaptive management direction to address changing livestock management concerns. Alternative 2 has been designed to be responsive to the effects of grazing on the various resources present within the allotment boundaries. Provisions are included to adjust management requirements/strategies to those that are the most responsive to the needs of the resources affected.