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# **West Bridger and Carey Gulch Allotment Management Plan Update**

## **Environmental Assessment**

*Yellowstone Ranger District  
Gallatin National Forest  
Sweet Grass County  
Big Timber, Montana*



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Allotment Management Plan Update**

**Environmental Assessment**

**Yellowstone Ranger District  
Sweet Grass County, Big Timber, Montana**

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## **Chapter 1 - Proposed Action & Purpose and Need**

### ***Introduction***

This environmental assessment (EA) is being prepared to address the direct, indirect, and cumulative effects of re-authorizing livestock grazing permits on the West Bridger & Carey Gulch Allotments, which are located approximately 20 miles southeast of Big Timber, Montana on the Yellowstone Ranger District of the Gallatin National Forest (See Vicinity Map 1). Two action alternatives and a no action alternative are being considered in detail. Both action alternatives would continue grazing on the West Bridger & Carey Gulch Allotments. The No Action Alternative (Alternative 1) would not re-authorize grazing permits for either of the allotments and would incorporate a two year phase out period for livestock grazing on National Forest lands within these allotments. Alternative 2 would continue with current management of the allotments. The proposed action (Alternative 3) would incorporate Adaptive Management Strategies, which would allow flexibility for modifications in livestock grazing in the future as long as desired future conditions are met and maintained, or improvements to the forage and stream resources continue to be made.

This analysis is being prepared in compliance with the National Environmental Policy Act (NEPA), Council of Environmental Quality (CEQ) regulations, and the Gallatin National Forest Land and Resource Management Plan (1987). Gallatin Forest Plan standards would be followed. The information and analysis in this document will be used to determine whether to prepare an environmental impact statement (EIS) or a finding of no significant impact (FONSI) (40 CFR 1508.9). The purpose of the NEPA process is to help public officials make decisions that are based on the understanding of environmental consequences, and to take actions that protect, restore, and enhance the environment (40 CFR 1500.1 (c)). This process also ensures that the public has opportunities to become informed and involved throughout all aspects of the process.

The Gallatin Forest Plan set goals for management of rangeland habitats and livestock grazing. Overall goals are to maintain or improve the forage resource and provide for a small increase in livestock grazing (Forest Plan, p. II-1). Management applications in the West Bridger and Carey Gulch Allotments associated with the various alternatives described in this Environmental Assessment are designed be consistent with these goals.

The Rescission Act of 1995 gave the Forest Service (FS) the ability to re-issue grazing permits pursuant to NEPA analysis. Streams, associated wetlands, and riparian vegetation are the key to maintaining fisheries, wildlife habitat, and wildlife corridors, as well as esthetic environments for forest users. Therefore the framework for these analyses is focused on the management of livestock grazing on National Forest allotments in an effort to characterize existing stream and vegetative conditions and to assign management sideboards for which to hold livestock permit holders accountable, and to assess the long-term effectiveness of these sideboards in achieving desired future conditions for the allotments.

Effects of livestock grazing on vegetation composition, and soil and vegetation productivity are dictated by the timing, intensity, duration of grazing, and length of rest and recovery periods from grazing. Livestock grazing effects can be managed or mitigated by altering and/or manipulating any of these factors through planned grazing systems and/or minimizing overgrazing of forage plants, and by balancing stocking levels with available forage. Allowable use guidelines for desirable key species and utilization monitoring are tools available for mitigating grazing effects,

achieving management objectives, and managing for desired vegetation composition and production. Allowable use is defined as the degree of utilization that is considered desirable when considering present resource conditions, management objectives, and level of management (USDA-NRCS 1997, Glossary pp. 2). Allowable use can vary depending on the desired utilization needed to achieve management objectives for a pasture.

Authorized use may vary annually as available forage fluctuates with precipitation and available soil moisture for plant growth. Planned grazing systems (e.g. deferred rotation, time controlled grazing) is another management tool used to mitigate effects of livestock grazing, achieve management objectives, achieve desired vegetation composition and species diversity, and maintain long term vegetation and soil productivity. Planned grazing systems provide periodic rest and allow grazed plants to recover from grazing during critical phenological stages of plant growth.

The critical phenological growth stage occurs when plants are rapidly growing to produce green leaf material and drawing down carbohydrate root reserves to support plant growth and physiological processes. The critical period continues until there is sufficient green leaf material to support the level of photosynthesis needed to meet a plant's physiological needs and replenish lost root reserves. For mountain grassland species, the critical phenological stage occurs from initiation of green growth through seed ripening. Detrimental effects occur with repeated grazing of forage plants without providing adequate recovery/rest periods for plants to recover. Mitigating the effect of heavy continuous grazing is accomplished either through establishing allowable use guidelines, or implementing planned grazing systems, which provide periods of rest or defer grazing until after critical phenological stages of desirable/key species are completed.

### ***Project Area Description***

The project area consists of the West Bridger and Carey Gulch Allotments, which are administered by the Yellowstone Ranger District, Gallatin National Forest. The project area is located in the West Bridger Creek, Deer Creek, and Derby Gulch drainages on the eastern edge of the district, and is located approximately 20 miles southeast of Big Timber, Montana (See Vicinity Map 1). Elevations vary from 7950' at Sugarloaf Mountain to about 5000' at the mouth of Lower Deer Creek. Average annual precipitation in the allotment areas varies from about 17 to 39 inches a year with about 40% occurring as snow in lower elevations and 60% at higher elevations. Average snowfall varies from about 70 inches at the Forest Boundary to about 200 inches in the highest parts of the West Bridger Allotment. Winters are long and cold and snow usually remains at the higher elevations for about 7-8 months. Summertime high temperatures range from 60- 80 degrees with occasional 90 degree highs.

Average annual runoff in the West Bridger and Carey Gulch Allotments (on a per acre basis) is about 0.7 acre-feet/acre. Parent soil material consists primarily of weathered Tertiary volcanic rocks on moderate to steep slopes. These soils are low to moderately productive on grasslands and transitional grassland/Douglas fir forest. The allotments are mostly well drained with few wet areas.

Following is a description of each allotment:

#### **West Bridger Allotment**

The West Bridger Allotment consists of approximately 20,746 acres (all National Forest System lands) and may be accessed from the Iron Mountain Road or the West Bridger Road. The West Bridger Allotment is located approximately 20 miles southeast of Big Timber, Montana in the

area of Lower Deer Creek, West Bridger Creek and Derby Gulch (See Map 1). The allotment includes all or portions of the following sections: T2S, R14E, Sections 25, and 36, T3S, R14E, Sections 1, 12, 13, 14, 23, 24, 25, and 36, T2S, R15E, Sections 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, and 36, T3S, R15E, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 15, 16, 17, 18, 19, 20, 29, 30 and 31.

The allotment topography consists of long, deeply incised drainages flowing in a northerly direction. Nearly all of the suitable range occurs in the northern portion of the allotment where there are grassy high ridges, plateaus, and benches between the drainages. This area has likely been grazed by livestock since the time of Eurasian settlement, before the Forest Service was created. Prior to 1946, the area was part of the Custer National Forest. Big Timber District records began in 1941, at which time 320 cow/calf pairs were permitted for a four month grazing season. The same numbers of cow/calf pairs have been permitted from 1941 to the present, however, the season of use has been reduced twice, and currently the grazing season is from July 16–October 15 annually. A three pasture deferred rotation grazing system was implemented in the 1970s (Map 2). This system has been refined over the years to improve cattle distribution.

There are currently three livestock permits for this allotment. There are seven stock water developments and four miles of fence on the West Bridger Allotment (Map 3). Most of the water developments and fences were damaged or destroyed in the Derby Fire. Some have been repaired or rebuilt. In the fall of 2006, the Derby Fire burned through the majority of the allotment with the exception of several of the riparian areas. Nearly all the forested areas within the allotment were burned.

Elevations range from 4678 to 8600 feet. Streams within the allotment boundary include portions of Lower Deer Creek, West Fork Lower Deer Creek, Bear Gulch, Fire Gulch, Placer Gulch, Tie Cutter Gulch, Jims Gulch, West Bridger Creek, Derby Gulch, North Derby Creek and unnamed tributaries. Not all of these streams are in areas that are accessible to livestock.

### **Carey Gulch Allotment**

The Carey Gulch Allotment lies immediately east and adjacent to the West Bridger Allotment, and consists of approximately 2,870 acres (Map 2). There are 1632 acres of National Forest System (NFS) lands, 1,093 of private land, and 145 acres of Bureau of Land Management (BLM) land, which are currently managed together as one grazing area. Access is by permission through private land up Carey Gulch, or through National Forest land in Derby Gulch.

The Carey Gulch Allotment is located in T2S, R15E, Section 36 and T3S, R15E, Sections 1, 12 and 13 (1632 acres). The allotment also includes private land in T2S, R16E, Section 31 and 32, and T3S, R16E, Sections 5, 6, 7, 18, (1093 acres) and BLM land in T2S, R16E, Section 31 and T3S, R16E, Sections 6 and 7 (145 acres).

There is a 1992 Memorandum of Understanding (MOU) between the Forest Service and the BLM, which states that the FS is the administering agency for the Carey Gulch Allotment. The BLM reviewed and concurred with information contained in this EA regarding potential future management of this allotment. The topography and ownership of the area are such that the stream channel and riparian bottoms of Carey Gulch and most of the live water occurs on private land. The NFS and BLM uplands are well vegetated with grasses and shrubs but contain very little water.

The allotment likely has been grazed by livestock since the time of Eurasian settlement. The primary livestock were sheep until 1947 when the area began to be grazed by cattle. Big Timber District records began in 1943 when 500 sheep were grazed for a total of 250 sheep months on the allotment between 6/16 and 9/15. The permit was converted to cattle in 1947 when 150 head (10% on NFS) were permitted for the season of 6/16–10/15. The allotment has been grazed by various numbers of permitted cattle and for somewhat different seasons of use since 1947. The most current permit is for 47 cow/calf pairs attributed to NFS, 3 cow/calf pairs attributed to BLM, and 85 cow/calf pairs attributed to private land for a grazing season of one month annually, to occur either in July or August.

There is one grazing permit administered by the FS. There is one livestock water tank on NFS land, which was destroyed in the Derby Fire (Map 4). The Derby Fire burned in the fall of 2006 and most of the allotment was burned with the exception of some the riparian areas. Nearly all the upland forest burned.

Elevation on the Carey Gulch Allotment ranges from approximately 4641 to 5904 feet. The allotment contains portions of Carey Gulch and Blind Bridger Creeks.

## ***Background***

The climate in the allotment areas is normally characterized by warm summers and cold winters with the most precipitation occurring late spring and early summer. Precipitation increases with elevation, ranging from 18 inches at the lower end of the project area to 30 inches at the higher elevations (Montana Natural Resource Information System Digital Atlas of Montana). Early growing season precipitation, which varies annually, greatly affects grass and forb production, and to some extent the composition of plant communities. April, May and June precipitation highly influences the coming season's forage production. The 60 year April through June precipitation average for the Big Timber weather station is 2.44 inches and 2.28 inches for the Livingston weather station.

The winter of 2004/2005 had above average snowfall, combined with above average spring precipitation causing riparian areas throughout both of the allotments to have well above average runoff in the spring of 2005, which created significant damage to roads, culverts, and channel erosion on various streambanks. Road restoration and culvert replacement was completed during the summers of 2006 and 2007.

Following an abnormally dry spring and summer in 2006, both the West Bridger and Carey Gulch Allotments burned extensively in the Derby Fire (August 2006). The two allotments were estimated to be approximately 90 percent burned with the exception of riparian areas and north slopes. Most of the fences and livestock water developments were damaged or destroyed by the fire. The allotments were rested from grazing following the fire to protect soils, allow vegetation recovery, and allow for the rebuilding of the range infrastructure. On the West Bridger Allotment, no grazing occurred in 2007, approximately 30 percent of the range was grazed in 2008, and approximately 60 percent grazing levels were resumed from 2009 through 2011. Carey Gulch Allotment has not been grazed since the Derby Fire.

Upon field review of the allotments in the fall of 2010 by various Forest Service specialists that comprise the interdisciplinary team for the project, it was determined that the majority of the streams within both allotments had recovered and were considered to be in proper functioning condition. Upland and riparian vegetation was in the process of recovery from the 2005 flooding and the 2006 Derby Fire, but still lacked species and age class diversity.

Major flooding occurred again in the spring of 2011, due to substantially above average winter snowpack and a spring rain on snow event. Forest Service specialists reviewed stream effects and infrastructure damage from these rain/runoff events in the summer of 2011 and determined that culverts within these areas, many of which had recently been replaced and upgraded after the 2005 flood event, remain intact and functioning properly, however, several stream reaches that were previously considered to be in proper functioning condition (PFC) in the fall of 2010, are currently functioning at risk (FAR) due to the spring 2011 flood event. See Chapter 3, stream form and function, for more complete descriptions of the various stream reach conditions. Upland areas within the allotments were not affected by the flood event.

### ***Existing Condition***

The following existing condition summaries provide brief descriptions of upland and riparian vegetation, and stream conditions that currently occur within the West Bridger and Carey Gulch Allotment boundaries. Detailed descriptions of existing conditions for individual streams and riparian vegetative conditions can be found in the Affected Environment portions of Chapter 3 for each of these relevant resources. Descriptions of existing conditions for other resources are also found in Chapter 3.

Although these two allotments have been deemed suitable for use by livestock in the Forest Plan<sup>1</sup>, this project level analysis evaluates site specific impacts of grazing, in conformance with the National Environmental Policy Act (NEPA) and is required in order to continue to authorize livestock grazing (FSH 2209.13 – 91). For this analysis, project-level capability and suitability of the West Bridger and Carey Gulch grazing allotments were reviewed in the context of the planning direction found in the Gallatin Forest Plan. Permitting livestock use within these two allotments is consistent with the capability and suitability determinations found in the Forest Plan. The resulting allotment-specific rangeland capability and suitability analysis was used to help determine the appropriate level of livestock grazing and management. Key management factors including timing, intensity, duration, frequency, opportunity for recovery, and management effectiveness were also used to determine the appropriate livestock grazing levels.

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<sup>1</sup> Requirements to perform analysis of rangeland suitability for livestock grazing are found in the National Forest Management Act (NFMA) at 16 U.S.C 1604(g)(2)(A) and are found at 36 CFR 219.20. Determining capability is the initial step in the determination of suitability. It is portrayed as a separate step both for reasons of clarity and because the actual product of “capability” often has utility in planning beyond its role in the determination of suitability. Capable rangeland is determined by resource and site conditions such as forage productivity, and slopes and landforms that can physically be grazed. At the Forest Plan level, the capability determination does not vary by alternative. Determination that certain areas are suitable for grazing is a finding that the land is capable of sustaining grazing over time and that there are no current or planned activities for that parcel of land that would render livestock grazing incompatible. At the Forest Plan level, rangeland suitability varies by alternative based on the application of certain resource management practices. A decision was made in the 1986 Gallatin Forest Plan that certain management areas are suitable given that specific management area standards and guidelines are followed. The specifics associated with those decisions are disclosed in pages II-1, II-4, II-13, II-20, chapter III, and F-10 of the Gallatin Forest Plan and the analysis documented in pages IV-29-34, A-13, B-19-21, and B-28 of the Forest Plan FEIS.

At the Forest Plan level the Suitability determination provides basic information regarding the potential of the land to produce resources and supply goods and services in a sustainable manner, as well as the appropriateness of using that land in a given manner. This information assisted the Forest Service in evaluating alternatives and arriving at Forest Plan level decisions. It also helped in an analysis of alternative uses foregone during Forest Planning. Changes to Forest Plan Suitability determinations would involve making changes at the Forest Plan level, as suitability is a Forest Planning level determination.

Suitability can also have value when applied at the site specific level. At this level, both capability and suitability analyses may be reviewed or made more site specific, if doing so will provide information useful to the decisions being made. However, this use of the analyses is outside the scope of Forest Planning regulations and purposes, and is strictly an application of a useful tool as an aid in management decision making.

For this analysis, capable lands are classified as suitable range 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 are capable of being grazed without damage
- Located within one-half mile of a water source
- Slopes are generally less than 30%
- Consist of mapping units larger than 5 acres each

The West Bridger Allotment consists of approximately 20,746 acres (all NFS land) located on the eastern edge of the area known as the “Deer Creeks”, which include the three main tributaries of the Deer Creeks and the two main tributaries of the Bridger Creeks. The allotment is located southeast of Big Timber, Montana, parts of which can be seen from the town. Of these total acres, approximately 1521 acres are considered suitable for livestock grazing and 19,225 acres are too steep, rocky, forested or otherwise unsuitable for livestock. Suitable range by vegetative type on the West Bridger Allotment is displayed in Table 1 and on Map 5.

The Carey Gulch Allotment consists of approximately 2870 total acres located east and immediately adjacent to the West Bridger Allotment. Carey Gulch is mainly a ridge and upper slope consisting of 1632 acres of NFS land and 145 acres of BLM land that slopes down onto approximately 1093 acres of private land and Carey Gulch Creek bottom. Carey Gulch Allotment has 149 acres of suitable range on National Forest land, 19 acres of suitable range on BLM, and 215 acres of suitable range on private land. Suitable range by vegetative type on the Carey Gulch Allotment is displayed in Table 2 and Map 5.

**Table 1-Suitable Range by Vegetative Type on the West Bridger Allotment**

Type	Acres NFS	% of suitable	Habitat Type
<b>Grassland</b>	381	25%	Timothy-Idaho fescue, timothy-Kentucky bluegrass, Idaho fescue-bluegrass, timothy-green needlegrass, bluebunch wheatgrass-green needlegrass
<b>Shrub/Grass</b>	715	47%	Sagebrush/Idaho fescue, Sagebrush/timothy-Idaho fescue, Sagebrush/Idaho fescue-bluebunch wheatgrass, ninebark/timothy, ninebark/timothy-Kentucky bluegrass
<b>Forest/Grass</b>	425	28%	Douglas fir/timothy-pinegrass, lodgepole pine/timothy-pinegrass, lodgepole pine-Douglas fir/timothy-pinegrass, aspen/timothy, Douglas fir/Idaho fescue-bluegrass, Lodgepole pine/Idaho fescue-green needlegrass, Douglas fir/Kentucky bluegrass-timothy

**Table 2-Suitable Range by Vegetative Type on the Carey Gulch Allotment**

Type	Acres Private	Acres NFS	Acres BLM	% of suitable	Habitat Type
Grassland	10	0	0	3%	Bluebunch wheatgrass-Idaho fescue
Shrub/Grass	99	135	19	66%	Sagebrush/Idaho fescue, sagebrush/timothy-needlegrass, sagebrush/bluebunch wheatgrass-Idaho fescue
Forest/Grass	106	14	0	31%	Ponderosa pine/sagebrush/timothy, Douglas fir/timothy, Ponderosa pine/timothy

The majority of suitable range in the West Bridger Allotment consists of open grassland and the shrub/grass type is dominant on the Carey Gulch Allotment. Timothy (*Phleum pretense*), 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 eco-system. Timothy is highly successful and able to out-compete native grasses, given favorable habitat conditions and is widespread throughout primary ranges on both the West Bridger and Carey Gulch Allotments. This grass species is palatable to cattle early in the grazing season, but loses palatability as the season progresses. Other dominant vegetation species include Idaho fescue, Kentucky bluegrass, green needlegrass, bluebunch wheatgrass, pine grass, sagebrush species, ninebark, Douglas-fir and lodgepole pine.

Shrub lands were also burned and sagebrush cover has been greatly reduced from pre-2006 levels (ocular estimates). Research indicates that sagebrush recovery may take between 12–27 years depending on burn conditions, seed source, annual rainfall, and other factors, (Sankey:2008, Winward:1991). Since these areas have the potential to recover and support sagebrush in the future and are already beginning to recover, these areas remain classified as shrub lands, despite the current absence or reduction in sagebrush cover. Ninebark (*Physocarpus malvaceus*) typically sprouts vigorously following fire and therefore was not reduced in cover.

Forested habitat types also burned in the Derby Fire and approximately 90 percent of all forested areas consist of standing dead trees. Riparian habitats with higher humidity and areas that burned at night stand as islands of unburned forest surrounded by blackened trees. Forest understory vegetation recovery following the burn has generally been excellent. This was documented during post-fire vegetation monitoring in 2007 & 2008. Broadleaved colonizers and grasses are now dominating understory areas and soil stability has improved as herbaceous vegetation colonized the burned forest areas. In addition burned trees are now falling over, increasing soil cover and creating micro-sites for further plant colonization.

Forested range areas suitable for grazing were those that had low slope, low canopy cover and supported considerable grass understory before the Derby Fire. The Derby fire of 2006 burned through the allotments extensively. Prior to this fire, conifers were encroaching onto grassland and meadow areas. The “tree wall” or edge of the forest was moving into meadows as seedling conifers became established, grew and reproduced on what was once grassland habitat. Now meadow areas

are once again open and free from encroaching trees. These areas now support increased herbaceous vegetation. Field observations by Orr, Senger and others (Project File) are that tree regeneration has been amazingly swift in many burned forest areas with “doghair” stands of tiny Lodgepole seedlings, and extensive areas of Douglas-fir and ponderosa pine seedlings.

In addition, many areas that once were inaccessible to livestock due to dense forest or blow-down trees now are open and accessible. There is, in fact, increased forage for both livestock and wildlife throughout the West Bridger and Carey Gulch Allotments. Since the fire, there are numerous unmapped range areas (often consisting of five acres or less) that are now accessible. Although there is only two years of post-fire grazing data, results of 2009-2010 range utilization analysis indicate that cattle distribution has improved and that cattle are using areas that have not been accessible due to pre-fire forest canopy closure and blow-down trees, resulting in reduced use on primary range areas.

The 2006 Derby Fire and numerous droughts (1980’s, 1990’s and from 2000-2006) are thought to have contributed to the current amount of cheatgrass and other non-native annuals such as pepperweed (*Alyssum alyssoides*). The recent fires have decreased the amount of canopy and vegetative cover allowing for weeds to take hold in some areas of the Carey Gulch and West Bridger Allotments. Over a period of 10-20 years, some of the canopy will come back, shading out some of the weeds.

The greatest displacement of native vegetation within the allotments has been from the introduction of non-native timothy and Kentucky bluegrass through various ground disturbing activities related with past timber harvest. Road building and road maintenance introduced and spread weeds into areas that were once weed-free. Weed infestations within the analysis area are mainly associated with road systems. Activities on private lands bordering the Forest Service also introduce weeds that can spread to adjacent lands, and are then spread further by cattle grazing, wind, recreationalists and wildlife. Private landowners are required to control weeds on their lands, but this is rarely enforced. There are currently approximately 109 acres infested with invasive weeds within the allotment boundaries (See Table 3 & Map 7). Nearly all these infestations are adjacent to, or near roadways and are treated annually with herbicide. There is an active weed control program on the allotments, which primarily targets roadside applications. All treatments are in accordance with the June 2005 Gallatin National Forest Noxious Weed Treatment Project EIS.

**Table 3– Acres of Noxious Weed Infestation by Allotment**

Allotment	Acres	Noxious Weed Species
Carey Gulch*	0	
West Bridger	109	Canada thistle, musk thistle, spotted knapweed, hounds tongue, yellow toadflax and sulphur cinquefoil.

**\*This data only reflects the Forest Service portion of this allotment**

Riparian areas within the allotments were impacted by severe flooding in the spring of 2011, when a major rain on snow event occurred. Prior to the flood, all streams within the allotments were considered to be in proper functioning condition (PFC). Triggered by the flood event, a rapid assessment of post-flood stream conditions was conducted in the summer of 2011 by various resource specialists. This assessment indicated that stretches of some streams were no longer meeting PFC. West Bridger Creek, Tie Cutter Gulch, and Derby Gulch (Upper above Carey Gulch spur road) are functioning at PFC. Derby Gulch (Lower), North Derby Gulch (Upper and Lower), Jim's Gulch and Lower Deer Creek (upstream from Placer Gulch) are Functioning-at-Risk (FAR) due to the instability of the channels, and North Derby Gulch (Middle) is not functioning properly due to the large active head cut caused by the spring 2011 flooding. This area has been fenced off from livestock grazing to protect the integrity of the springs and to help promote the healing process of the active head cut.

Stretches of Derby Gulch (Lower), North Derby Gulch (Upper and Lower), Jim's Gulch and Lower Deer Creek (upstream from Placer Gulch) have riparian vegetation along the banks that have remained intact, but are lacking age class diversity. A stretch of Derby Gulch Lower (near the Forest Boundary) has excessive deposition from the flood that has either covered the existing grass and forb vegetation or removed it completely, although most of the existing cottonwoods, Douglas-fir, and alder remain intact. Various grasses and forbs are becoming re-established, but this stretch is still lacking diversity in riparian grass, forb, and shrub components. See Chapter 3 for detailed descriptions of these stream reaches and riparian vegetative conditions.

The following discussion outlines the concepts of proper functioning condition (PFC) and desired future condition (DFC), which are referred to in describing changes and/or departures in stream and vegetative conditions throughout this EA.

### *Desired Future Condition*

#### **Determining Desired Future Condition**

The Gallatin Forest Plan includes a programmatic Desired Future Condition (DFC) statement related to Forest-wide grazing. The DFC is "Improved range management practices will be initiated to improve wildlife habitat in livestock grazing allotments on wildlife winter ranges and riparian areas (Forest Plan page II-12)." DFC's reflect the capability of the landscape, the various laws and regulations that apply to an area, and the values, or "products" that are desired. In other words, DFC's are portrayed through descriptions of how an area should look and function.

The concept of proper functioning condition (PFC) has recently surfaced as guidance for the management of streams on public lands and is useful in helping to describe the overall DFC of a riparian area. The PFC of a stream entails maintaining the physical components in a fashion that dissipates stream energy, filters sediment, retains floodwaters, and develops root masses to stabilize stream banks (BLM, 1993).

DFCs for the West Bridger and Carey Gulch Allotments were derived from utilizing a combination of Forest Plan standards, goals, and objectives. Generalized DFCs for riparian vegetation and streams, as well as upland vegetation are described below:

- **Riparian Vegetation:** Desired conditions for riparian vegetation are for plant communities associated with springs and riparian areas to exhibit dominance of desired native sedges, grasses and forbs. Desired woody species are vigorous and reproducing successfully as demonstrated by an unaltered growth form and representation of all age classes. Introduced

and native species usually associated with long term, intense grazing may be present but at relatively low levels. Riparian vegetation expands to the fullest extent possible.

- **Streams:** The DFC for a stream or stream reach will fall somewhere between a minimum of Functional at Risk (FAR) with an upward trend)) and a maximum of Potential Natural Condition (PNC). Potential Natural Condition would reflect that the stream is functioning at full habitat potential. DFC for streams also incorporates Forest Plan standards and guidelines relative to streambank stability (i.e., meet all standards and guidelines), and fish habitat management guidelines found in Table 14 (p. 67). DFC's have been established for each stream within the allotment
- **Upland Vegetation:** Maintain good to excellent upland vegetation condition through improved livestock distribution, proper utilization levels, and management of grass and forbs to decrease noxious weed species including spotted knapweed, bull thistle, musk thistle, Canada thistle, houndstongue, etc.

A more detailed description of determining desired future conditions and developing use levels can be found in Chapter 3 of the EA. A detailed discussion of individual stream conditions and riparian DFC determinations for all streams located within the allotments can also be found in Chapter 3. In addition, a rapid assessment for each stream within the allotments was conducted in the field by the Interdisciplinary Team (IDT) and can be found in the Project File. A further riparian and upland vegetation discussion can be found on pp 44-60. Achieving DFC for riparian and upland areas would see the following goals achieved on public and private lands within the allotments:

- Permitted use levels are commensurate with estimated carrying capacity
- Cattle distribution and forage use levels are appropriate to maintain or improve sustainable conditions consistent with Forest Plan riparian utilization standards (FP p. III-20) and upland utilization guidelines. These use levels are described in Chapter 3.
- Native and desirable non-native forage species are generally on a stable or upward trend and are able to compete effectively against weedy invaders.
- Stream banks, wetlands, springs, and tributaries are maintained within their properly functioning condition (PFC) in accordance with the Forest Plan (p. III-21).

A comparison between the existing conditions and the desired future conditions for the West Bridger and Carey Gulch Allotments can be found in Table 4 on the following page:

**Table 4-Comparison of Existing to Desirable Conditions by Allotment**

<b>Allotment</b>	<b>Existing Condition</b>	<b>Desired Future Condition</b>
<b>West Bridger Allotment</b>	<p>Upland areas are meeting DFC.</p> <p>*West Bridger Creek, Tie Cutter Gulch, and Derby Gulch Upper (above Carey Gulch spur road) are meeting PFC, North Derby Gulch Middle is Nonfunctional, and the remaining stream segments are FAR.</p> <p>Riparian vegetation is in recovery, but is still lacking age class and desirable species diversity to meet DFC.</p>	<p>Meet and/or maintain FP standards and LRMP goals and objectives for all upland areas that are currently meeting DFC. Riparian areas that are not currently meeting DFC, promote better grazing management strategies (i.e. develop additional water sources, fencing, riding, etc.).</p>
<b>Carey Gulch Allotment</b>	<p>Upland areas, riparian vegetation, and streams are meeting DFC and LRMP goals and objectives.</p>	<p>Continue to meet DFC and LRMP goals and objectives for all upland and riparian areas.</p>

\* Streams not currently meeting PFC were directly related to flood effects and not grazing impacts as these streams were meeting PFC prior to the 2011 spring flood event.

### ***Purpose and Need for Action***

The purpose and need of this proposed action is to adhere to Public Law 104-19, implement the direction in the Gallatin Forest Plan, and comply with applicable laws, regulations, and policies for grazing permits that authorize livestock use on West Bridger and Carey Gulch Allotments. This may require adjusting livestock management practices, stocking rates, and maintaining, constructing, or reconstructing range developments.

The purpose of doing NEPA is to comply with the Multiple-Use Sustained Yield Act (16 USC 528) and the Rescission Act (PL 104-19, Sec 504a). An adaptive management strategy as described in 36 Code of Federal Regulations (CFR) 220.3 and associated Forest Service Handbooks 1909.15, 14.1 and 2209.13, Chapter 90 is being considered with the proposed action (Alternative 3) as a means to continue meeting Forest Plan Standards for maintenance of vegetation, wildlife, riparian, and other resource values, while also maintaining or improving rangeland conditions within the allotments. Adaptive Management would be incorporated into the allotment management plans if the proposed action (Alternative 3) is selected.

## ***Proposed Action***

The proposed action (Alternative 3) would continue permitted livestock grazing under management designed to meet DFCs, as described on the following pages, that are consistent with Forest Plan standards. This alternative focuses on DFCs rather than specific seasons of use, permitted livestock numbers, or grazing rotations. This alternative is based on the principle of applying Adaptive Management Strategies.

Adaptive management is defined as, “A system of management practices based on clearly identified intended outcomes and monitoring to determine if management actions are meeting those outcomes; and, if not, to facilitate management changes that will best ensure that those outcomes are met or re-evaluated. Adaptive management stems from the recognition that knowledge about natural resource systems is sometimes uncertain” (36 CFR 220.3). It is a process that allows the responsible official to deal with uncertainty and changing conditions over time and it provides for constrained flexibility to adapt to changing conditions or unanticipated resource response. Adaptive management is based on the assumption that current resources and scientific knowledge are limited and a certain level of uncertainty exists. To a degree it also acknowledges the “art” of natural resource management. Nevertheless, an adaptive management approach attempts to apply available resources and knowledge and adjusts management techniques as new information is revealed.

The adaptive management approach can respond to unanticipated changes in environmental conditions, inaccurate predictions, or subsequent information that might affect the original decision. Under adaptive management an initial set of proposed actions is put forth to address a resource concern. However, if initial actions are shown through monitoring not to be meeting or moving toward the desired condition, under adaptive management other management tools can be selected. Adaptive management establishes what livestock grazing practices are allowed including timing, intensity, frequency, and duration. These practices are monitored to ensure that prescribed actions are followed. Monitoring also determines if management changes are needed. Building adaptive management flexibility into allotment management allows for decisions that are responsive to needed adjustments in permitted actions. Future administrative actions that adhere to the decision notice can then be implemented without additional analysis. Examples of administrative decisions include:

- Determination of dates for grazing
- Livestock numbers
- Class of animal
- Grazing systems
- Range readiness

Under Adaptive Management, a course of action is chosen as a starting point that is believed to best meet or move toward desired resource objectives. The starting points of the proposed action for the grazing on the West Bridger and Carey Gulch Allotments would be as follows:

**West Bridger Allotment** would be grazed under Term Permits administered by the FS for a total of 320 cow/calf pairs on NFS land for a variable season of use that is between July 16-October 15<sup>th</sup>, not to exceed 981 cow/calf months or 1295 Animal Unit Months (AUMs).

**Carey Gulch Allotment** would be grazed under one Term Permit (“on” portion) administered by the FS for 47 cow/calf pairs attributable to NFS land (49 cow/calf months or 65 AUMs) and 85 cow/calf pairs attributable to private land (“off portion”) (88 cow/calf months or 116 AUMs), and 3 cow/calf pairs attributable for BLM land (3 cow/calf months or 4 AUMs), on the allotment not to exceed 140 cow/calf months or 185 AUMs for a variable season of use for

one month annually, to occur between July 1 and the end of September with alternating the month being used every other year. Typically, this will be alternating between July and August, due to water limitations later in the season.

Grazing would be permitted at these levels provided that implementation of the additional points of the proposal (more fully described in Chapter 2, Alternative 3 (pp. 25-28) either maintain or are moving the allotments toward meeting Forest Plan Standards for riparian and upland areas.

Implementation of the proposed action (Alternative 3) is presented in phases for the West Bridger Allotment. The Carey Gulch Allotment is considered to be meeting riparian and upland FP standards and Adaptive Management will be used to adjust grazing practices if monitoring indicates a deviation from standards. On the West Bridger Allotment, the phases correspond to increasing levels of complexity and financial investment allowing for a progression of management intensity. The need for implementation of these phases would be determined by monitoring results. Monitoring is a critical element required for each of the allotments (and is described in Chapter 2). Monitoring would occur over time, with the evaluation of the results used by the interdisciplinary team and District Ranger to make adjustments to management as needed.

Monitoring and management adjustments would help to ensure adequate progress toward defined resource objectives and would be within the scope of effects documented in this Environmental Assessment. Table 4 provides a comparison between the existing condition and the desired future condition for each allotment. The differences between these conditions drive the purpose and need for the proposed action (Alternative 3).

### ***Gallatin Forest Plan Direction and Other Applicable Laws***

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). Adaptive Management (FSH 2209.13) guidelines are also being utilized in association with development of the proposed action (Alternative 3). Compliance with several other laws, regulations, and guidelines that are also applicable to this project are addressed in Chapter 3 for each resource.

#### **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."

**The National Environmental Policy Act of 1969 (NEPA)** NEPA establishes the format and content requirements of environmental analysis and documentation.

**The Federal Land Policy and Management Act of 1976 (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.

**Adaptive Management (FSH 1909.15 and 2209.13)** Adaptive management prescribes allowable limits for the timing, intensity, frequency, and duration of livestock grazing practices. These limits are monitored to ensure that prescribed actions are being followed. Monitoring also determines if management changes are needed. Future administrative actions that are within the scope of the decision can be implemented without additional analysis.

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.

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

Direction is 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 Gallatin Forest Plan provides overall management direction in the form of objectives, guidelines and standards. The objectives for range resources include: Improved forage management will be used to maintain or enhance the range environment and to provide for increased animal unit months (AUMs); Development and use of available forage will depend upon the livestock industry's ability and desire to make the necessary investments and the Plan calls for continuing to administer grazing use on private lands that are intermingled with National Forest lands within grazing allotments. Guidelines and standards from the Forest Plan (FP, p. II-20) include:

- Allotment management plans will be completed on a scheduled priority basis.
- Some allotments will be closed.
- Vacant livestock allotments will be evaluated and allotment plans prepared prior to livestock use.
- Domestic sheep will not be reintroduced to vacant allotments in grizzly bear MS-1 areas.
- Structural and nonstructural improvements to increase forage production will be planned and scheduled through the allotment management process.
- Livestock grazing in riparian areas will be controlled at levels of utilization listed in Management Area 7.
- Allotments with continuous grazing during the growing period will be evaluated and alternative-grazing systems will be applied.

The Gallatin Forest Plan subdivided the forest into 26 management areas (MA's). These areas are described in detail in Chapter III, Forest Plan (FP, pp. III-2 through III-73). West Bridger and Carey Gulch Allotments are within Forest management areas MA6 (dispersed recreation), MA7 (riparian), MA8 (timber management), MA10 (range/timber), MA11 (timber/livestock), MA12 (wildlife/dispersed recreation), MA16 (livestock), and MA17 (livestock/wildlife) as displayed on Map 6.

The Forest Plan uses management areas to guide management of specific National Forest lands within the Gallatin National Forest with each MA providing for a unique combination of activities, practices, and uses. The Forest Plan (Chapter III) contains a detailed description of each MA as it relates to significant issues. Following is a brief description of the applicable management area direction for each of the MAs that could be affected by the project.

**Management Area 6 (MA6)-Dispersed Recreation:** These areas are generally large blocks of undeveloped land with a trail system or roads passing through (FP. p. III-17). They provide a wide variety of opportunity for dispersed recreation in a variety of terrain and vegetative types. Management goals for MA6 are:

- Provide for a wide variety of dispersed recreational activities.
- Provide additional public access to these areas.
- In MA 6 the standards for range include:
- Range management systems, such as deferred rotation, may be implemented to develop the range resource and distribute use.
- Schedule new range improvements through the allotment management plan.
- Forage improvement projects may be initiated.

**Management Area 7 (MA7)-Riparian:** These are riparian management areas (FP, p. III-19). Riparian pertains to the banks and other adjacent terrestrial environs of freshwater bodies, water courses, and surface emergent aquifers. Riparian areas can be identified by the presence of mesic/hydric vegetation. Much of this area is not mapped because it is often a narrow zone that is not practical to map or estimate the number of acres within MA7. The management goal for MA7 is to:

- Manage the riparian resource to protect the soil, water, vegetation, fish, and wildlife dependent on it.

The Forest Plan (MA7) requires the GNF to "manage riparian vegetation, including overstory tree cover, to maintain streambank stability and promote filtering of overland flows". The Forest Plan monitoring requirements listed in Table IV-1, item 5, lists two guidelines and standards which relate to limits of cumulative allowable management caused change to sediment filtration i.e. "more than a 25% loss in effective streambank cover" and stream channel stability i.e."20 point increase in stream channel score within 5 years due to management practices".

The MA7 standards for range include provisions to maintain or improve riparian conditions:

- Range improvements such as fences and water structures may be constructed to help meet the forage utilization standards.
- Salting for livestock distribution will be outside of riparian areas.

- Concentration of livestock will be kept at a level compatible with riparian zone-dependent resource needs through development of pasture systems and associated improvements.

**Management Area 8 (MA8)-Timber Management:** These areas consist of lands, which are suitable for timber management. Although this area consists primarily of capable forestland, there are inclusions of non-forest and nonproductive forestlands (FP, pp. III-24 through III-26). Management goals for MA 8 include:

- Provide for productive timber stands and optimized timber growing potential.
- Develop equal distribution of age classes to optimize sustained timber production and improve vegetative diversity.
- Allow for other resource uses if compatible with the first two goals.
- Meet Montana water quality standards and maintain channel stability.

In MA 8 the standards for range include:

- Use the Northern Region and Gallatin National Forest "Guidelines for the Protection of Regeneration from Livestock Grazing" to ensure protection of conifer regeneration.

**Management Area 10 (MA10)-Range/Timber:-** These areas contain open grasslands, which provide forage for livestock interspersed with suitable timberlands (FP, pp. III-30 through III-32). Management goals for MA 10 include:

- Maintain healthy stands of timber and promote a level of timber growth consistent with the other goals.
- Improve range management to optimize livestock grazing.
- Use timber harvest to create transitory livestock range.

In MA 10 the standards for range include:

- Coordinate grazing and timber management to ensure tree regeneration after harvest.
- Structural improvements may be used to distribute grazing.

**Management Area 11 (MA11)-Forested Big Game Habitat:** - These areas consist of forested big game habitat. They include productive forest lands that are available for timber harvest, provided that big game habitat objectives are met (FP, pp. III-33 through III-36). Management goals for MA 11 include:

- Maintain elk habitat effectiveness following timber harvest.
- Base vegetative management on vegetative characteristics needed for featured wildlife species.
- Allow a level of timber harvest consistent with goals 1 and 2.
- Meet Montana water quality standards and maintain stream stability.

In MA 11 the standards for range include:

- On big game winter range, meet big game forage needs before making forage allocations to livestock.
- Base allocation of big game summer range forage on range allotment analysis.

**Management Area 12 (MA12)-Wildlife/Dispersed Recreation** - These areas provide important habitat for summer or winter wildlife use in a variety of terrain and vegetative types and also offer dispersed recreational opportunities. (FP, pp. III-37 through III-39). Management goals for MA 12 include:

- Maintain and improve the vegetative condition to provide habitat for a diversity of wildlife species.
- Provide for a variety of dispersed recreational opportunities.
- Provide forage for livestock consistent with goal 1.

In MA 12 the standards for range include:

- On big game winter range, meet big game forage need before making forage allocations for livestock.
- Base allocation of big game summer range forage on the range allotment analysis.
- Range improvements may be scheduled when identified in the allotment management plan.

**Management Area 16 (MA16-Range/Open Grasslands:-** These areas have open grasslands interspersed with nonproductive timber lands on slopes generally less than 40 percent. They contain the most productive and heavily used portions of range allotments (FP, pp. III-50 through III-51). The goal of MA 16 is:

- Maintain or improve vegetative conditions and forage production for livestock use.

In MA 16 the standards for range include:

- Implement intensive management systems to utilize the range resource.
- Schedule forage improvement projects, such as sagebrush burning and poisonous plant control.
- Schedule structural improvements when identified in approved allotment management plan.

**Management Area 17 (MA17)-Range/Big Game:-** These areas consist of grasslands or nonproductive forestlands on slopes less than 40 percent that are suitable for livestock grazing and contain important big game habitat. They contain some of the most productive and heavily used portions of range allotments (FP, pp. III-52 through III-53). The goal of MA 17 is:

- Maintain or improve vegetative conditions and forage production for livestock and wildlife usage.

In MA 17 the standards for range include:

- On big game winter range, big game forage needs are to be met before making forage allocations to livestock.
- Base allocation of big game summer range forage on range allotment analysis.
- Schedule structural improvement when identified in an approved allotment management plan.
- Schedule forage improvement projects, such as sagebrush burning and poisonous plant control.

### ***Scope of the Proposed Action and Decision to be Made***

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.

The scope of actions to be addressed in this analysis is limited to management of cattle grazing within the project area. Portions of the project area consist of intermixed National Forest and private lands that would be managed by the Forest Service. Private lands managed separately from National Forest System lands, not included within the allotments, are not being analyzed.

Range and vegetation management practices are addressed together because the timing and geographic location represent a similar action under 40 CFR 1508.25(a)(3). Range improvement construction, reconstruction, vegetation treatment, and protecting or improving upland and riparian habitats represent connected actions under 1508.25(a)(1)(iii). The scope of the proposed action is site-specific to range and vegetative management practices.

The decision to be made with this Environmental Assessment is whether or not to re-issue permits for grazing on the West Bridger and Carey Gulch Allotments and if so under what conditions. If the decision is to re-issue permits, the proposal must be adequate to keep or bring the allotments into compliance with Forest Plan utilization and stream bank /riparian standards. The main issues that need to be addressed if grazing is to continue are riparian and upland vegetation grazing levels, including long-term maintenance or improvement of desirable forage, native plant species, and stream bank integrity and stability, and preventing noxious weed invasion.

The Responsible Official for this proposal is the District Ranger of the Yellowstone Ranger District. Based on the analysis in this document, the District Ranger will make the following decisions and document them in a Decision Notice (DN) if a Finding of No Significant Impact (FONSI) can be made:

- Should the Forest Service continue to allow livestock grazing on any or all of the range allotments within the project area?

If so:

- What management and mitigation requirements are needed to maintain or improve resource conditions towards meeting desired future conditions in an acceptable timeframe?
- What monitoring requirements are appropriate to evaluate the success of project implementation?



## Chapter 2 - Issues and Alternatives

### *Introduction*

Chapter 2 describes and compares the alternatives that wholly or partially meet the purpose and need of this project as identified on p. 11. The no action (no grazing), current management, and (proposed action) adaptive management alternatives are described and considered in detail on pp. 23-28. Two other action alternatives were considered but were not brought forward for detailed analysis. These are described on pp. 34-35. The purpose and need for action and the comparison between the existing condition and the desired future condition (DFC) for the allotment areas provided the framework for alternative development along with the significant issues identified internally and during scoping. These alternatives reflect different responses to the issues identified through both the scoping and analysis processes, producing different environmental effects. Chapter 2 also discusses the scoping and public involvement process, other issues, alternative development, monitoring requirements, and alternatives considered, but not studied in detail.

### *Public Involvement*

The first step in environmental analysis is to determine what needs to be analyzed. To do this, the National Environmental Policy Act (NEPA) outlines a process termed "scoping" (refer to 40 CFR 1501.7). The Council on Environmental Quality (CEQ) defines scoping as "an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a Proposed Action" (40 CFR 1501.7).

First, comments are obtained from interested and affected parties, both within and outside the agency, to develop potential issues that must be considered. Second, these "potential issues" are reviewed by the interdisciplinary team to determine: (a) the relevant issues to be analyzed in depth and (b) issues that are not significant or that have been covered by prior environmental review and, therefore, should be briefly discussed and eliminated from detailed study. Documentation of the review of comments and potential issues can be found in the project file.

Before a decision can be made, the 36 CFR 215 appeal regulations require a 30-day notice and comment period for Environmental Assessments

### *Scoping Process*

The scoping process is used to invite public participation, to help identify issues that are specific to the decision to be made, and to obtain public comment at various stages of the environmental analysis process. Although scoping is to begin early, it actually serves as an iterative process that continues until the responsible official makes a final decision.

On December 10, 2009 the Big Timber Ranger District (which has recently been combined with the Livingston Ranger District to form the Yellowstone Ranger District) sent a scoping letter regarding the proposals to permittees, local residents, and other potentially interested and/or affected members of the public. It was sent to approximately 60 interested and/or affected organizations and individuals. Six comment letters were received. The six letters contained comments concerning the effects of the 2006 Derby Fire coupled with livestock grazing regarding noxious weeds, riparian areas, upland vegetation, soil concerns, wildlife, private property/public safety, recreation conflicts, sagebrush, bison, range improvements, and economics, as well as other more general comments. The Project File contains the actual

comment letters and a comment summary matrix, as well as additional information on the scoping and issue development process.

### ***Identification of Issues***

In order to determine issues related to the proposed project, the Interdisciplinary (ID) Team analyzed comments from both the public and Forest Service resource specialists (Project File). Following is a list of the relevant resource issues that were reviewed by the interdisciplinary team and could be factors in the decision whether to permit livestock grazing on the allotments and under what management conditions. Other resource issues were also analyzed to display effects from the various alternatives. A discussion regarding each of these issues is provided in Chapter 3 of this document.

#### **Relevant Resource Issues**

1. Upland/Riparian Vegetation/Noxious Weeds/Non-native Species
2. Stream Form & Function/Water Quality/Yellowstone Cutthroat Trout/Sensitive Aquatic Species
3. Wildlife Species & Habitat (Threatened and Endangered, Sensitive, Management Indicator Species/Migratory Birds ) & Sensitive Plant Species
4. Soils

#### **Other Issues Analyzed**

- a) Recreation/Public Safety
- b) Inventoried Roadless Areas
- c) Socio-Economics
- d) Heritage Resources

### ***Range of Alternatives***

Once the scoping process was complete, the interdisciplinary team (ID team) developed alternatives. Forest Service NEPA regulations state, “When there are no unresolved conflicts concerning alternative uses of available resources (NEPA, section 102(2)(E), the EA need only analyze the proposed action and proceed without consideration of additional alternatives” (36 CFR 220.7(b)(2)(i). For the West Bridger and Carey Gulch Allotments, the No Action-No Grazing Alternative (Alternative 1), the Current Management Alternative (Alternative 2) and the proposed action, Adaptive Management Alternative (Alternative 3) have been determined to be the only alternatives warranting detailed consideration. Alternatives 1 and 2 reflect different interpretations of no action (Alternative 1 No Grazing; Alternative 2 No Change to Grazing) as suggested in the Forest Service NEPA handbook (FSH 1909.15, 14.2). Tables 9-11 provide a comparison of the alternatives by National Forest administered grazing permitted livestock numbers.

## *Alternatives Considered in Detail*

### **Alternative 1 - No Action-No Grazing**

The National Environmental Policy Act (NEPA) requires consideration of a No Action Alternative in any NEPA environmental document. Alternative 1 is the "No Action" Alternative, in which the grazing of domestic livestock on West Bridger and Carey Gulch Allotments would be discontinued. This is also the No Grazing Alternative as grazing permits for these allotments would not be re-issued after a two-year phase out period. Under Alternative 1, no permitted livestock grazing would occur on either allotment within the analysis area. Current permittees would be given two years written advanced notice of the cancellation of their permits as provided under 36 CFR 222.4(a)(1). Existing fences, not including private boundary fences, would be removed by the Forest Service. If the permit was cancelled on the Carey Gulch Allotment, the private landowner would be required to prevent cattle on the private land portion from using the National Forest either by fencing or some other control.

### **Alternative 2 - Current Management**

With Alternative 2, livestock grazing would continue to be permitted under current management, which includes all applicable standards and guidelines from the current Gallatin Forest Plan. This alternative focuses on timing and duration of use to maintain the current conditions. Under this alternative, permits for livestock grazing on the West Bridger and Carey Gulch Allotments would be re-issued and there would be no changes to current seasons of use, grazing rotation systems, livestock numbers, kind or class. Allowable utilization levels for upland and riparian vegetation are displayed in Table 5 below. Permits would adhere to the same terms and conditions as apply to the existing permits. Any changes to grazing management would be administrative only. Proactive management of the range resources, to adapt to changing resource or environmental conditions would not occur.

Range allotment compliance monitoring would occur annually to assess compliance with annual operating instructions. Other monitoring would also occur over time for both allotments within the analysis area. Results from the monitoring would be used by the ID Team and District Ranger to determine the effectiveness of the allotment management plan (AMP) objectives. Failure to meet or exceed management objectives could result in an amendment or revision of the AMP.

**Table 5-Alternative 2-Percent Allowable Utilization for Upland and Riparian Vegetation**

Pasture Type	Allowable Utilization Levels
Upland	55%
Riparian	50%

The actions that would occur under Alternative 2 for each of the allotments are detailed below:

### ***West Bridger Allotment***

The West Bridger Allotment consists of approximately 20,746 acres (all NFS lands). The allotment may be accessed from the Iron Mountain Road or the West Bridger Road.

Three livestock grazing permits would be issued on this allotment for the grazing of 320 cow/calf pairs on National Forest System lands. Grazing would be allowed between the dates of July 16th to October 15th annually with a three pasture deferred rotation grazing system. This system and season of use has been refined over the years to improve conditions and cattle distribution.

There are seven stock water developments and four miles of fence on the West Bridger Allotment (Map 3). Most of the water developments and fences were damaged or destroyed in the 2006 Derby Fire. Some have been repaired or rebuilt. The remainder would continue to be repaired or replaced. A riparian exclosure on North Derby Creek in North Derby Gulch, an area where the livestock congregate and heavily use, was constructed in the summer of 2011 after the spring flood event. The exclosure consists of barbed wire and steel posts with cross-bracing at the corners and across the creek. No other new developments are proposed under this alternative.

### ***Carey Gulch Allotment***

The Carey Gulch Allotment consists of approximately 2,870 total acres, with 1632 acres of NFS land, 1,093 acres of private land, and 145 acres of BLM land, which are currently managed together as one grazing area, which is administered by the FS. Access is by permission through private land up Carey Gulch, or through Forest Service land in Derby Gulch.

There is one grazing permit for the allotment. The current permit for 47 cow/calf pairs attributable to NFS land, 3 cow/calf pairs attributable to BLM land, and 85 cow/calf pairs attributed to private land for a grazing season of one month annually, to occur either in July or August and alternating every other year would be continued.

There is one livestock water tank on NFS land, which was destroyed in the 2006 Derby Fire (Map 4). This water tank will be replaced. No new developments are proposed under this alternative.

## **Actions Common to Alternatives 2 & 3**

### ***West Bridger and Carey Gulch Allotments***

- Utilization within each active pasture would be monitored to ensure that utilization standards are not exceeded.
- Upland utilization would not exceed 55% in both allotments.
- Once utilization standards are met, then livestock would be moved to another pasture, another area of the pasture, or off the allotment for the grazing season.
- Rangeland management practices would be consistent with weed management decisions made in the 2005 Final Noxious and Invasive Weed Treatment Project,

Environmental Impact Statement (EIS) and Record of Decision (ROD) and preventative measures outlined in FSM 2080.

- A four-wheeler trail system in the Deer Creek area within the West Bridger Allotment will be implemented as part of the Gallatin NF Travel Plan Decision (2006). Improvement and development of trails for four-wheeler use would likely affect cattle movement. Motorized trail implementation will require evaluation of the existing fences for livestock and may necessitate additional fences and/or trail cattle-guards to insure that cattle stay in their assigned pasture.

### **Alternative 3: Adaptive Management Alternative**

In addition to the actions outlined under the section titled, “Actions Common to Alternatives 2 and 3”, Alternative 3 would continue permitted livestock grazing and would utilize management techniques designed to meet desired future conditions (DFCs). To address identified riparian resource concerns, Alternative 3 reduces the allowable riparian use levels from the current management of 50% (Alternative 2) to 35% use along functioning streams during late season grazing, and to 30% late use along streams that are functioning at risk or non-functioning. This alternative focuses on DFC rather than specific seasons of use, permitted livestock numbers, or grazing rotations. Alternative 3 is based on the principle of applying Adaptive Management Strategies, which includes the process of utilizing monitoring data to determine if management changes are needed to improve resource conditions within allotments, and if so, what changes and to what degree.

Alternative 3, the Adaptive Management Alternative, would authorize ten year term grazing permits on West Bridger and Carey Gulch Allotments. Under Adaptive Management, a course of action would be chosen as a starting point that is believed to best meet or move toward desired management objectives. Implementation of the Adaptive Management Alternative is presented in various phases that correspond to increasing levels of complexity and financial investment, allowing for a progression of management intensity. The need for implementation of further phases would be determined by evaluation of monitoring results, thus making monitoring a critical component.

Various types of monitoring, as described on pp. 29-33, would occur over time, with the results being used by the range manager and line officer to identify if there is a need to adjust management. Monitoring and management adjustments would help insure that adequate progress is made toward obtaining the desired resource conditions. Management adjustments in response to monitoring may occur the following grazing season or additional monitoring data may be collected for up to three years if needed, depending on the location, extent, or type of problem.

- Riparian vegetative utilization for the allotment varies by stream and is discussed in detail in Chapter 3. Allowable utilization by pasture type for upland and riparian vegetation is displayed in Table 6 on the following page. Critical parameters to be monitored are included by specific allotment and affected stream reach (See Tables 7 & 8).
- Monitoring of riparian conditions by stream segment and permitted use (Table 8).

**Table 6- Alternative 3- Percent Allowable Utilization for Upland and Riparian Vegetation**

Pasture Type	Allowable Utilization Levels
Upland	55%
Riparian – Early Pasture	50%
Riparian – Late Pasture	35% (30% for streams not meeting PFC)

**Actions Unique to Alternative 3**

***West Bridger and Carey Gulch Allotments***

- Under a deferred rotation grazing system, consistent with Forest Plan Standards (Page III-20) riparian areas are allowed to be grazed at 50% utilization standards in the early pastures and 35% in the late pastures with 30% late use on streams not meeting PFC (Table 6). Encourage better distribution of cattle away from concentrated use areas (i.e. streambanks and riparian) through increased riding and use of mineral supplements.
- Encourage training of permittees on how to monitor grazing utilization of key riparian areas.
- All adaptive management actions would be within the scope of effects documented in this environmental assessment.

***West Bridger Allotment***

**Phase 1 (Starting Point)**

With Alternative 3, grazing levels would be authorized for variable numbers and a variable season of use between the dates of July 16th - October 15, equivalent to a total of 320 cow/calf pairs for a three month period, not to exceed 981 cow/calf months or 1295 Animal Unit Months (AUMs).

A three-pasture rotation grazing system would be used within Tomato Can, West Bridger and Derby pastures. Grazing would be balanced, based on pasture capacity, between the pastures to achieve better overall distribution on the allotment.

Allowable use would be set at 55% in uplands, 50% in early use riparian areas, and 35% in late use riparian areas (Table 6). As outlined in the Gallatin National Forest Riparian Framework, riparian utilization of 30% would not be exceeded for streams not currently meeting PFC. Streams not currently meeting PFC are displayed in Table 8. Through this monitoring period, permit holders may be asked to move livestock earlier in order to not exceed allowable use standards.

A permanent riparian livestock enclosure in the impacted portion of North Derby Gulch located in the Derby Pasture has been designed and implemented and would be closely monitored for effectiveness.

An alternative water source would be developed in the North Derby Gulch portion of the Derby Pasture if further monitoring indicates a need to distribute the livestock away from the stream. This could occur prior to implementation of Phase 2.

If monitoring indicates that the riparian areas are not progressing toward DFC, then Phase 2 actions would be implemented as described below.

### **Phase 2**

Upon three years of utilization monitoring, there may be a need to reduce authorized AUMs in numbers and/or season on the allotment to be in alignment with the changes in riparian use standards.

If goals and objectives are not adequately met or are not showing a steady trend toward improvement after monitoring, additional practices such as (but not limited to) increased riding, salting, or moving livestock to the next pasture would be implemented.

Additional water developments may be installed or off-site water developments created to improve livestock distribution.

Monitoring would be conducted throughout both phases to determine if grazing management of upland and riparian vegetation meet land and resource management protection (LRMP) goals and objectives and DFC's. No other phases would be established, unless monitoring results define the need for additional actions.

Through monitoring, if Phase 2 proves unsuccessful in meeting Gallatin Forest Plan standards and long-term resource goals in five years, then the allotment would be re-evaluated with the permittee to consider further actions necessary to achieve DFC.

### ***Carey Gulch Allotment***

#### **Phase 1 (Starting Point)**

Authorize the existing Term Permit administered by the FS with on/off provisions for variable numbers and dates equivalent to one month for 47 cow/calf pair attributed to NFS land, 85 cow/calf pair attributed to private land and 3 cow/calf pair attributed to BLM land within the allotment, not to exceed 140 cow/calf months or 185 AUMs for the entire allotment. Typically the season of use has been alternated between June and July every other year. Depending on water availability, Alternative 3 would allow for the extension of the season of use to September without increasing authorized AUMs.

The allotment "boundaries" would be reviewed and monitored to assure that cattle remain in this allotment. Prior to the Derby Fire, cattle were confined to the allotment by stands of forest and natural cliffs and ridges. Most forested areas are now entirely burned and it is not known if the boundaries to cattle movement will still be effective in keeping cattle on the allotment.

Monitor National Forest System lands to be sure grazing use is within the allowable use guidelines (See monitoring Tables 7- 8).

Through monitoring, if Phase 1 proves unsuccessful in maintaining Gallatin Forest Plan standards and long-term resource goals after five years, then the allotment would be re-evaluated with the permittee to consider further actions necessary to maintain DFC, and Phase 2 would be implemented.

## **Phase 2**

Phase 2 actions have not been specifically identified because the allotment is currently meeting LRMP goals/objectives and Forest Plan standards, however if further monitoring indicates the need, future actions could include construction of additional fences and/or water developments to either keep cattle on the allotment or to improve cattle grazing distribution in order to maintain DFC.

## ***Mitigation and Monitoring***

The mitigation/monitoring detailed below would apply to the two action alternatives, Alternative 2 (current management) and Alternative 3 (adaptive management). Mitigation is a means to alleviate effects to the various resources. Monitoring is a critical component to insure progress toward meeting the desired future conditions (DFCs).

### **Mitigation**

#### ***General Upland and Riparian Vegetation Mitigation***

Mitigation measures beyond adjusting the timing, duration and intensity of livestock grazing through implementation of planned grazing systems include a variety of tools that will improve livestock distribution and discourage livestock from concentrating in areas. These include riding/herding, placement of supplements (salt, protein, mineral blocks etc.), riparian pastures or exclosures, off-site water developments and drift fences.

#### ***Water Quality and Stream Form and Function***

1. Keep salt supplements out of the watershed influence zone, if feasible, and always out of riparian areas and wetlands.
2. Avoid season-long grazing in riparian areas and wetlands. Strive for short-duration grazing in these areas to provide greater opportunity for regrowth and to avoid over-utilization of woody species. Avoid livestock grazing, as feasible, during the hot season (mid-to-late summer) when livestock are more likely to concentrate in the riparian areas and wetlands and to utilize woody species. Follow the forage utilization standards prescribed for each stream.
3. Design grazing systems to limit utilization of woody species. Move livestock from riparian areas and wetlands when they begin to have a preference for woody species, especially plants in the young maturity classes. Follow woody utilization prescriptions for each stream as outlined in the Forest Plan.
4. Maintain the extent of stable banks in each stream. If bank alteration is occurring, develop and implement allowable streambank alteration prescriptions for applicable streams and move livestock from riparian areas when allowable levels of streambank alteration are reached.

#### ***General Wildlife***

5. Fences to be constructed will incorporate wide gates at appropriate locations to allow wildlife passage when livestock are not present, and will use construction techniques that are wildlife friendly (wood vs. wire and/or adjusting wire spacing).
6. Any fence that is no longer needed for allotment management will be removed.
7. Spring developments for livestock watering sites would include an overflow system which returns the unused water to the natural drainage, and a shut-off valve for increased management flexibility, allowing the spring to continue to exhibit its full extent. The

development would also include the construction of an enclosure to protect the spring site and large enough to facilitate the full extent of recovery.

8. Livestock losses, regardless of cause, are to be reported to the Yellowstone Ranger District within 24 hours of discovery. Once reported, the permittee and Forest Service representative will jointly determine whether and how to treat the carcass to eliminate the attractant and avoid potential conflicts with bears.

### ***Recreation/Wilderness/Roadless***

9. Coordinate necessary access with road and trail manager to ensure damage does not occur to soft, wet road and trail surfaces. Ensure access is obtained consistent with current Forest Travel Plan restrictions.
10. Placement of mineral supplements should be at least 300 feet from roads and trails and ¼ mile from rental cabins or campgrounds.
11. Water developments should be located away from roads, trails, rental cabins and/or campgrounds as coordinated with the recreation staff.
12. New trails crossing pasture boundaries should include drift fences and gates for foot and horse users and ATV cattle guards for motorized users if the trail is a motorized trail.
13. An enclosure will be constructed around Lower Deer Creek Cabin to exclude cattle grazing.

### ***Heritage & Sensitive Plants***

14. If there is a need for any type of excavation within the National Forest portion of the allotments, such as constructing an alternative watering site, a heritage and a sensitive plant survey will be conducted by qualified Forest Service personnel prior to any ground disturbing activity. Any sites found would be protected.

### ***Soils***

15. Restrict access to livestock grazing on all allotments when soils are wet. Most years the permitted entry dates are adequate, but there may be years when authorized livestock entry would be delayed due to wet conditions.

### **Monitoring**

Monitoring would be used to insure compliance with annual operating instructions and Forest Plan Standards. Monitoring procedures would be conducted and documented by the FS range manager, fisheries biologist, wildlife biologist and/or their staff, and would be used to determine whether riparian and upland utilization, and streambank stability objectives are being met. Sampling frequency of proposed monitoring could vary, however, monitoring Tables 7 & 8 detail the projected monitoring schedule for both riparian and upland areas within the allotments.

If Alternative 2 is selected, monitoring would ensure compliance with Annual Operating Instructions and Forest Plan Standards at current utilization levels (Table 5).

If Alternative 3 is selected, monitoring would be key to the success of adaptive management and places priority on areas of resource concern (See Table 8). An additional focus would be placed on a three year utilization study to determine new livestock distribution patterns (due to post-fire and flood effects) and proper use capacity (Table 6). Monitoring results would be used to determine whether the prescribed adaptive management strategy is working, or if adjustments would need to be implemented. Evaluation of monitoring data is

an important means to determine if there is adequate short-term improvement towards long-term recovery.

**Monitoring Common to Alternatives 2 & 3**

***Forest Service Grazing Permit Compliance Monitoring***

To ensure compliance with term grazing permits, the East Zone Range Management Specialist or their staff would:

- Verify proper permittee maintenance of all range improvements listed on permit.
- Check authorized livestock use (numbers, brands, types of livestock) and conduct spot checks to see that livestock are moved from one pasture to the next as dictated by utilization levels.
- Check allotment conditions for range readiness (plant development and soil conditions) before livestock are allowed on the allotments as necessary. Drought conditions might necessitate grazing adjustments on an annual basis or as warranted by weather conditions.
- Check salt locations periodically to be sure they are a proper distance from water or other sensitive areas including aspen stands.
- Identify new infestations of noxious weeds during allotment inspections (or at other times) and treat in an appropriate manner as time and money allows.
- Conduct random compliance checks to see that prescribed upland and riparian utilization levels are not being exceeded.
- When the allotments are not in full use status, uplands and riparian will be monitored annually for 3 years to firm up stocking levels

The range management specialist would coordinate with permittees to ensure that prescribed forage utilization levels are followed. This should be done at the mid-point of the prescribed use period, and again as utilization approaches the allowable use or the exit date for the pasture to assure that these guidelines are not being exceeded. These are considered the minimum for permit compliance monitoring. Permittees would be encouraged to check conditions on a more regular basis and coordinate with the Forest Service Range Specialist. The upland monitoring schedule would be similar for Alternatives 2 & 3, as displayed in Table 7.

**Table 7-Upland Utilization Monitoring Schedule by Allotment (Alts 2 &3)**

<b>Allotment</b>	<b>Range Utilization</b>
<b>Carey Gulch</b>	5-10 years
<b>West Bridger</b>	As needed

## **Monitoring Unique to Alternative 2**

### ***Monitoring of Riparian Utilization***

Prescribed utilization levels for upland suitable range are a maximum of 55% use. Because riparian utilization standards are typically reached first, 50% use monitoring would focus primarily on riparian utilization and would be the responsibility of both the Forest Service and the permittee (Table 5). Compliance with these Forest Plan Standards would be the maximum allowable use.

Monitoring and utilization levels for these parameters are defined in Table 5. Utilization monitoring would be documented for each pasture on key use areas in each of the allotments for both riparian and upland utilization. Table 7 displays the proposed monitoring schedule for Alternative 2.

## **Monitoring Unique to Alternative 3**

### ***Monitoring of Riparian Utilization***

Prescribed utilization levels for upland suitable range are a maximum of 55% use. Because riparian utilization standards are typically reached first (50% for early use pastures, 35% for late use pastures, and 30% for riparian areas not meeting PFC ), monitoring would focus primarily on riparian utilization and would be the responsibility of both the Forest Service and the permittee.

Monitoring and utilization levels for these parameters are dependent on existing and desired conditions and are defined in Table 6. Utilization monitoring would be documented for each pasture on key use areas in each of the allotments for both riparian and upland. Table 7 describes the proposed upland utilization monitoring schedule by allotment for Alternative 3. Monitoring of affected stream reaches for streambank stability and trends towards meeting Forest Plan standards will be performed. Table 8 describes the proposed monitoring schedule for various streams throughout the allotments. Agency approved monitoring methodologies would be utilized and could include a combination of the methods described below:

- ***Streambank Alteration:*** Forest Service Northern Region proposed standardized protocol for measuring bank alteration on grazing allotments can be used to monitor bank stability and allowable bank alteration (Final report, April 2005, see project file). If this protocol is utilized, focus would be on streams that are not meeting desired conditions.
- ***Channel Morphology:*** Long-term channel stability trends are best determined by monitoring appropriate geomorphic parameters (e.g., width/depth ratio) to determine channel morphology changes through time. To accomplish this, the Gallatin National Forest Channel Morphology monitoring protocol will be implemented in stream segments that are both sensitive to grazing disturbance and not at PFC. Morphology monitoring will occur at a frequency of every five years to determine whether affected channels are trending toward PFC or site potential. Per the GNF morphology protocol, specific measurements include fifty bankfull widths, residual pool depths, and pebble counts. In addition a Rosgen Level II survey will also be completed to delineate stream type and quantify those parameters which define it. Currently long-term channel morphology monitoring sites have been established on North Derby Gulch and Lower Deer Creek.

- **Proper Functioning Condition (PFC) assessments:** PFC assessments will be performed to monitor recovery trends and DFC attainment for all streams. PFC monitoring frequency will coincide with other monitoring schedules (Table 8).
- **Photo Points:** Photo points would be established streamside at year one and re-taken every 5 years for high priority reaches and every 5-10 years for medium to low priority reaches to document obvious visual long-term trends.

Any or all of the following standard protocol as outlined in the Gallatin National Forest Riparian Framework (2009) may also be used to determine long-term trends if future monitoring shows a need. These protocol include:

- Bankfull widths
- Substrate composition
- Stream temperature
- Macroinvertebrates
- Fish species presence/age classes/biomass
- Streambank stability
- Large woody debris
- Greenline and cross section vegetation composition (species >5%) in all structural layers
- Greenline woody cover

**Table 8-Riparian Monitoring Schedule by Stream for Alternative 3**

<b>Stream Reach</b>	<b>Riparian Utilization *</b>	<b>Photo Points</b>	<b>PFC and/or Long Term Stream Monitoring***</b>	<b>Priority/Rational**</b>
<b>Carey Gulch/Blind Bridger</b>	If needed	Year 1 10 year intervals	If needed	L - No Existing Problems (perennial stream is all on private land)
<b>West Bridger Creek above Jim's Gulch</b>	****Annually Years 1-3	Year 1 5 year intervals	5 years	H- woody vegetation diversity,
<b>Jim's Gulch</b>	****Annually Years 1-3	Year 1 5 year intervals	5 years	H – channel instability and re-establishment of vegetation
<b>Derby Gulch (Upper)</b>	Every 5-10 years	Year 1 5-10 year intervals	5-10 years, if needed	L-Cobble banks due to flooding, long term vegetation re-establishment
<b>Derby Gulch (Lower)</b>	Every 3-5 years	Year 1 5-10 year intervals	5 years	M-deposition from flood

<b>Stream Reach</b>	<b>Riparian Utilization *</b>	<b>Photo Points</b>	<b>PFC and/or Long Term Stream Monitoring***</b>	<b>Priority/Rational**</b>
<b>North Derby Gulch (Upper)</b>	Every 3-5 years	Year 1 5-10 year intervals	5 years	M-Erosion and deposition present from 2011 flood event
<b>North Derby Gulch (Middle)</b>	If needed	Year 1 10 year intervals	If needed	L – dewatering; not related to grazing or flooding
<b>North Derby Gulch (Lower)</b>	Every 3-5 years	Year 1 5-10 year intervals	5 years	H-Head cut-Riparian livestock enclosure installed****; low vegetative issues
<b>Deer Creek at Placer Gulch</b>	If needed	Year 1 10 year intervals	If needed	L-No existing Problems
<b>Lower Deer Creek (Upstream from Placer Gulch)</b>	If needed	Year 1 10 year intervals	If needed	L-No existing Problems
<b>Tie Cutter Gulch</b>	If needed	Year 1 10 year intervals	If needed	L-No existing Problems

\*Riparian Utilization includes: Forage utilization and/or stubble height. If utilization monitoring or PFC indicates a problem, then more intensive monitoring will be initiated.

\*\*Priorities are classified as: Low, Medium and High.

\*\*\*Long Term Monitoring includes permanent, replicable plots and /or stream channel morphology, etc. (See list on pp.27-28)

\*\*\*\*Riparian Utilization will be monitored annually for the first 3 years when allotments are stocked and depending on the trend toward PFC intervals could be modified thereafter.

\*\*\*\*\*Riparian enclosure will be monitored for effectiveness.

## **Monitoring Results**

Under Alternative 2, monitoring results would be used to ensure compliance with Annual Operating Instructions and Forest Plan Standards. Under this alternative, monitoring would ensure that the current conditions do not deteriorate. If monitoring indicates non-compliance, then administrative actions would be invoked as outlined in FS Handbook 2209.13 (Chapter 10).

Under Alternative 3, monitoring results would be used to determine the need for implementation of phases as outlined on pages 25-28. If both short-term management prescriptions and long-term goals are not being met because of non-compliance, then administrative actions would be invoked as outlined in FS Handbook 2209.13 (Chapter 10). Adaptive management actions could include redistribution of livestock throughout the pasture and/or allotment, more riding, shorter duration, different salting practices, and/or early removal of the cattle for the season once prescribed upland and riparian utilization levels have been reached. Redistribution and/or other management practices would be implemented for permitted livestock numbers and/or season of use, and would continue until demonstrated progress towards the desired future condition is made, as evidenced by monitoring and inventory data collected. Changes would be reflected in the annual operating instructions (AOI) and in the term grazing permits. If three years of monitoring indicates that permitted use exceeds proper use, then a reduction in numbers and/or season of use would be implemented to help achieve the DFC. The three key areas of concern in achieving desired future conditions for the allotments are defined as:

- Maintaining or improving upland conditions while managing noxious weed species.
- Maintaining or improving riparian vegetation diversity and extent.
- Achieving PFC in area streams and maintaining them in properly functioning condition.

## ***Alternatives Considered But Eliminated From Detailed Study***

During the analysis process, two alternatives were suggested. These alternatives were considered but were not carried forward for specific reasons as described below:

### **Alternative 4- Close the Allotments and Allow Wild Bison Grazing**

An alternative that was asked to be considered was to eliminate cattle grazing and allow wild bison on the allotment. The West Bridger and Carey Gulch Allotments are several miles from and are not connected in any way to Yellowstone National Park (YNP). Wild bison leaving YNP are not in close proximity to, nor are they able to access the allotments. The State of Montana Department of Fish, Wildlife, and Parks (FWP) has jurisdiction over the management of wild bison outside of Yellowstone Park, and has an agreement with the Montana Department of Livestock (DOL) to implement the Interagency Bison Management Plan for the State of Montana and Yellowstone Park as outlined in the December 20, 2000 Record of Decision (ROD).

The Interagency Bison Management Plan was approved by the Governor of the State of Montana as the appropriate strategy for the management of wild bison that move from Yellowstone National Park onto Montana lands, and emphasizes measures to maintain temporal and spatial separation between bison and cattle. This plan also establishes population targets for the wild bison herd and identifies management actions if and when

bison move beyond the YNP boundary. Transmission of brucellosis from Yellowstone bison to cattle in Montana could have not only direct effects on local livestock operators, but also on the cattle industry statewide. Because bison that leave YNP are under the management jurisdiction of the State of Montana, the cooperation of several agencies is required to fully manage the herd and the risk of transmission of brucellosis from bison to Montana domestic cattle. The plan limits bison distribution to Yellowstone National Park (Zone 1) and, during limited periods of the year, to certain areas of the Gallatin National Forest (GNF) that are immediately adjacent to the park (Zone 2). Areas of the GNF that are not immediately adjacent to YNP are considered to be Zone 3, where wild bison are not tolerated. Both allotments are located in Zone 3. In addition, the allotments do not contain sufficient winter range to provide adequate feed for bison during the winter months, increasing the likelihood that they would wander out onto adjacent private land where cattle ranching is prevalent.

A scenario for permitting a private domestic bison herd was requested by a potential permit holder on the West Bridger Allotment in the mid-1990s. At that time the Forest Service asked the bison owner if he would be able to control the animals and keep them within the allotment boundaries. The owner assessed the proposal and came to the conclusion that he could not afford adequate fencing to be able control and contain bison over such a large, rugged landscape and withdrew his request. Also, under this scenario, there would be human safety considerations from recreating publics, especially in a confined fenced setting.

### **Alternative 5-Riparian Fencing throughout the Allotments**

The suggestion has been made to fence Lower Deer Creek, West Bridger Creek and/or Derby Gulch to keep cattle entirely off the riparian area. There are a few areas where it might be possible to entirely fence the riparian area (a riparian enclosure has been constructed on an impacted stretch of North Derby Creek); however, terrain on both these allotments is extremely rugged with coulees, breaks, cliffs, incised stream courses and other rough topographic features. Fencing is both difficult and expensive in terrain like this. Many miles of fence would be necessary as these allotment areas are large. In addition, the area is home to mule deer, elk and many other species of wildlife. Fencing of riparian areas for livestock also has impacts on wildlife, especially on young animals that may become separated from their mothers. Elk are particularly hard on fences and can tear out large segments of fence every year thus increasing maintenance costs. Probably the most important fact is the data indicating that all streams on the West Bridger and Carey Gulch Allotments were in PFC (Proper Functioning Condition) prior to the 2011 spring flood event and are currently in recovery. Some short stream segments have since been identified as below Forest Plan Standards and are the focus of more intensive management described in Alternative 3. It is not considered necessary to fence entire stream lengths to improve conditions on these isolated segments.

### ***Comparison of Alternatives***

Tables 9 through 11 below provide a comparison of Alternative 1 (no action), Alternative 2 (current management), and Alternative 3 (adaptive management) by National Forest administered grazing permit livestock numbers, seasons of use, and head months. Table 12 provides a comparison of how the relevant resource issues are affected by each of the alternatives.

**Table 9-Permitted Livestock Numbers-Alternative 1-No Grazing**

Allotment	Cow/Calf Pair	Season of Use	Head Months	Allotment Size (Ac)
West Bridger	0	0	0	20,589 FS
Carey Gulch	85 PVT (Need to Fence PVT Boundary)	0	0	2,870 FS 1,093 PVT 145 BLM

**Table 10-Permitted Livestock Numbers- Alternative 2-Current Management \***

Allotment	Cow/Calf Pair	Season of Use	Head Months	AUMs	Allotment Size (Ac)
West Bridger	320 NFS	7/16-10/15	981	1295	20,589 NFS
Carey Gulch	47 NFS 85 PVT 3 BLM	One Month (Alternate July and August every other year)	49 NFS 88 PVT 3 BLM  Total 140	65 NFS 116 PVT 4 BLM  Total 185	2,870 NFS 1,093 PVT 145 BLM

\* Numbers and season of use are variable on an annual basis not to exceed the applicable AUMs or seasons that are listed above.

**Table 11-Permitted Livestock Numbers-Alternative 3-Adaptive Management (Phase 1\*\*)**

Allotment	Cow/Calf Pair	Season of Use	Head Months	AUMs	Allotment Size (Ac)
West Bridger	320 NFS	7/16-10/15	981	1295	20,589 NFS
Carey Gulch	47 NFS 85 PVT 3 BLM	One Month between 7/1 and 9/30 (Typically alternating July and August every other year, but could authorize use in September if water sources are available.)	49 FS 88 PVT 3 BLM  Total 140	65 FS 116 PVT 4 BLM  Total 185	2,870 NFS 1,093 PVT 145 BLM

\*\* This is only considered to be a starting point for permitted livestock numbers. Information in this table is subject to change dependent on achievement of desired resource conditions. Monitoring results would be used to determine necessary changes utilizing Adaptive Management strategies.

**Table 12-Summary of Effects to Relevant Resource Issues by Alternative**

<b>Resource Issue</b>	<b>Alternative 1- No Grazing</b>	<b>Alternative 2- Current Management</b>	<b>Alternative 3- Adaptive Management</b>
<b>Riparian Vegetation</b>	No grazing would be beneficial for the reaches of riparian vegetation affected from cattle grazing. This would allow for plant communities to fully develop structural layers. Recovery from recent flooding would continue.	Stream reaches that are currently at proper functioning condition (PFC) would be maintained, however the affected reaches from cattle grazing would likely continue to decline. Recovery from recent flooding would continue but at a slower timeframe than with Alts. 1 or 3.	Meeting the desired future conditions for riparian vegetation with any or all of the adaptive management practices would improve the structural layers within the plant communities and a larger number of desired plant species would be present. Recovery from recent flooding would continue.
<b>Upland Vegetation</b>	Overall increase in vegetative biomass and plant density in the short run, however permittees would likely fence the National Forest boundary and continue grazing. This could result in additional impacts to private land streams and riparian areas	Would provide for minor improvement in vegetative biomass overtime. Impacts to vegetation from cattle would remain within Forest Plan Standards and guidelines.	Would provide for an overall increase in vegetative biomass and plant density Adaptive management allows for the flexibility to install range improvements as monitoring shows appropriate
<b>Noxious Weeds</b>	Noxious weeds would continue to be present in various areas. Soil disturbance from cattle grazing would not be present; susceptibility to invasion by certain weed species may be less.	Noxious weeds would continue to be present in various areas and could increase in areas of disturbance, such as along trails and salting areas	Noxious weeds would continue to be present in various areas. Native vegetative conditions improve through livestock distribution, proper utilization levels, and management of grass and forbs to decrease invasive weed species
<b>Stream Form and Function/ Aquatic Species</b>	No effect to water quality or stream channel stability. Natural recovery from recent flood events will occur overtime to result in PFC for all streams No impact to YCT , wild trout, or other sensitive aquatic species	Minor localized impacts on streambank stability Natural recovery from recent flood events will occur overtime at a slower timeframe than with Alts 1 & 3 No impact to YCT, wild trout, or other sensitive aquatic species	Would prevent/reduce any grazing related impacts through adaptive management. No effect to water quality or stream channel stability. No impact to YCT, wild trout, or other sensitive aquatic species

<b>Resource Issue</b>	<b>Alternative 1- No Grazing</b>	<b>Alternative 2- Current Management</b>	<b>Alternative 3- Adaptive Management</b>
<b>Wildlife, Migratory Bird Species and Habitat</b>	No effect to most wildlife species and habitat. No grazing would be beneficial for those migratory bird species dependent on complex riparian vegetation or aspen stands through increase niche space for nesting and cover. The risk of cowbird parasitism would decrease or be eliminated.	No effect to most wildlife species and habitat. Migratory bird species dependent upon riparian areas or aspen would have slightly less quality habitat available than the Alt 3. Other species would respond favorably to continued livestock grazing. The risk of cowbird parasitism would persist at current low levels due to July 1 or later turn on dates.	No effect to most wildlife species and habitat. By improving administrative controls to respond to monitoring with a myriad of management options, yet still allowing some level of grazing, the Adaptive Management Alternative may be beneficial to a larger array of bird species. The risk of cowbird parasitism would be higher only if livestock were to be turned on to the allotments prior to July 1, otherwise would be the same as Alt 2.
<b>Soils</b>	Limited positive effects because most soils in areas utilized by grazing cattle are quite resistant to detrimental soil disturbance. Low levels of activity related Detrimental Soil Disturbance (DSD) currently exist on National Forest lands within the allotments, with estimates of total DSD below 2% for all pastures. If livestock grazing were eliminated, this figure would not change dramatically. Impacts to soil resources from recent flooding would recover sooner in floodplain areas without grazing.	No change from current due to relatively coarse soil rocky soils with few poorly drained areas; most sensitive areas are largely not used by cattle. No significant changes from pre-Derby Fire levels of detrimental disturbance would be expected. Some continued degradation would occur in concentrated use areas, such as watering sites, salt licks, or bedding areas.	Provides the most flexibility to adjust land management actions in response to changing conditions on the ground. Alternative 3 would initially have few differences to Alt 2 because Phase 1 maintains similar range management and stocking levels. The FS is committed to conducting additional monitoring before making substantive changes in management. Provides a mechanism to implement new management ideas where warranted.

## **Chapter 3. Affected Environment and Environmental Consequences**

### ***Introduction***

Chapter 3 discusses the environmental effects that would occur with implementation of the alternatives described in Chapter 2 and forms the scientific and analytical basis for comparing the environmental effects of each alternative. Affected environment and environmental effects have been combined into one chapter to give the reader and the decision-maker (responsible official) a more concise and connected depiction regarding the effects that the various alternatives would have on the three “relevant” and various other resource issues identified in Chapter 2. The direct, indirect, and cumulative effects of each alternative are presented by issue. Also included are discussions of past, present, and reasonably foreseeable activities that were considered in the cumulative effects analysis for the various issues. Chapter 3 discusses the environmental effects that would occur with implementation of the alternatives described in Chapter 2 and forms the scientific and analytical basis for comparing the environmental effects of each alternative. The direct, indirect, and cumulative effects of each alternative are presented by issue. Also included are discussions of past, present, and reasonably foreseeable future activities that were considered in the cumulative effects analysis for the various issues.

The impacts discussed in this chapter are for those issues considered to be factors in formulating the decision. For each "relevant" issue, this chapter addresses: a) the affected environment, b) direct and indirect effects, and c) cumulative effects are described in full. Chapter 3 also includes a summarized version of effects for those issues that were not considered to be "relevant" factors in making a decision or did not drive an alternative or could be effectively mitigated and dismissed. The specialist reports (Project File) contain the complete discussion/analysis regarding these issues and can be obtained upon request. Additional information regarding resource issues can also be found in the Project File. A discussion of the various alternatives; compliance with the Gallatin Forest Plan and applicable laws, regulations, policies, and other direction is provided for all issues and alternatives in Chapter 3.

Some of the effects discussed in this chapter are complex and not easily quantified. In regard to this, it should be kept in mind that many of the values presented are based on professional analysis or are modeled predictions of the effects. The actual effects may not occur exactly to the degree presented. More important than the exact effects, is the comparison of effects between the various alternatives Alternative 1 (No Grazing), Alternative 2 (Current Permitted Grazing), and Alternative 3 (Adaptive Management).

### ***Past, Present, And Reasonably Foreseeable 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))."

The environmental analysis required under NEPA is forward-looking in that it focuses on the potential effects of the proposed action that the agency is considering. Thus, the review of past

actions is required to the extent that this review informs agency decision-making regarding the proposed action (36 CFR 220.4(f)). The past and present actions and natural events that have contributed in creating the existing condition are described in the Existing Condition sections in Chapter 3.

Both natural events and human activities have the potential to impact rangeland and forestland ecosystems (e.g. forest, riparian, grassland, and shrubland vegetation and soils). Natural events include wildfire, insect and disease, and flooding, while human activities include livestock grazing, roads, timber harvest, and recreation. The degree of impact depends upon the vegetation, soil, and hydrologic characteristics of the watershed and how sensitive and resilient they are to these disturbances, as well as the overlap in time and space with the proposed grazing activities.

### **Historical Activity and Uses**

Past activities within the analysis area include wildfire, flooding, timber harvest and associated road building, wildlife management by permit, and livestock grazing that has been ongoing for the last 100 years. Recent wildfire activities associated with the large Derby Fire (2006) have altered plant communities' biomass production, species composition, and diversity. Noxious weeds were introduced and infestation levels have increased in some areas. Past logging and road building have also contributed to altered habitats in some areas of the allotments. Wildlife management of big game populations by permit has evolved to present day permits, seasons, and protections. All of these activities may disturb vegetation locally. These disturbances are small in scale and not usually long-term in duration.

#### ***2006 Derby Fire and Rehabilitation Activities***

There was a large wildfire in the project analysis area in 2006. The Derby Fire burned 200,000 acres including approximately 90% of the lands within the West Bridger and Carey Gulch Allotments. Many of the fences and range improvements were destroyed in this fire, most of which have been replaced or are in the process of being replaced.

After the Derby Fire, a burned area emergency report (BAER) was completed. The recommendations in this report regarding the road stabilization and restoration involved installation and improvement of most of the culverts for the entire road system within the burned area and construction of rolling dip and in-road diversions to control potential erosion from future precipitation events before vegetation could recover and stabilize soils. All of the post-fire improvements within the project area were completed in 2007 and vegetation has recovered and stabilized.

#### ***2005 Flood Event***

In the spring of 2005, a rain on snow event occurred in the eastern portion of the Deer Creek range. This resulted in a catastrophic flood event that washed out sections of the Main Bridger, West Bridger and Derby gulch road system and caused significant channel erosion in Bridger Creek and West Bridger Creek. A project was initiated by the County and the Forest Service and all culvert bridges and damaged roads have been restored. Any residual damages that may have occurred from the flood event are difficult to discern from the effects of the Derby fire and post-fire erosion and recovery.

***Lodestar Mine Closure***

In 2000, the Lodestar mine was approved and initiated operations. An access road was constructed, along with an ore dump facility and a single shaft adit on Forest Service Lands east of Gold Hill adjacent to FS Road 482. In 2005, operations were suspended and the bond reclamation process began. During the 2006 Derby fire the timbers supporting the adit were burned and the adit collapsed. In 2007, the adit was backfilled and all surface disturbance was reclaimed and seeded. The reclaimed mine area represented a very small (less than an acre) area of disturbance and has been fully reclaimed to a forest grass composition. The area is located within a steep (30-40% slope) drainage and is not regularly grazed by livestock within the allotment.

***Past Timber Harvesting on National Forest Lands***

Timber harvesting has occurred in the project area in timber compartments 107 & 108. Most harvesting took place from the 1960s through the 1990s. Recent harvest in 2007 consisted of harvesting burnt hazard trees immediately adjacent to roads in areas burnt by the Derby Fire in 2006. Table 13 below, displays the past harvest areas within the allotments by sale name, date harvested, type of harvest and year accomplished.

**Table 13- Past Harvest Activity within the Allotment Areas**

<b>Name</b>	<b>Dates Harvested</b>	<b>Acres</b>	<b>Type of Harvest</b>
<b>Iron Mtn Hazard Tree</b>	2007	24	Salvage Intermediate Cut
<b>Derby Hazard Tree</b>	2007	262	Salvage Intermediate Cut
<b>Packsaddle Butte</b>	1999	70	Partial Cut
<b>Iron Mtn. Fire Salvage</b>	1993	70	Patch Clearcut
<b>Iron Mtn. Post &amp; Pole</b>	1994	12	Sanitation Salvage
<b>Iron Mountain Sale</b>	1989	115	Regeneration Harvest
<b>Bridger Salvage</b>	1989	56	Patch Clearcut
<b>Bridger-Derby Sale</b>	1987-91	431	Regeneration Harvest
<b>Upper Derby Cleanup</b>	1983	64	Seed tree cut
<b>Misc Small Sales</b>	1966-94	688	Salvage, Seedtree, Regeneration Harvest
<b>Totals</b>		<b>1792</b>	

### ***Plantations (Harvested Areas Recently Planted by the FS)***

There are 889 acres of previously harvested areas on National Forest lands within the allotment areas where the regeneration burned in the Derby Fire 2006 that were replanted by the Forest Service in 2007-2010. Most of these plantations are located in areas that aren't considered to be suitable range and are not heavily used by livestock. Reforestation surveys in 2009 and 2010 did not show any significant livestock related damages to planted trees.

### ***Timber Cutting /Development on Private Land***

Post-fire salvage harvest occurred on adjacent private lands (approx. 3,000 acres) in 2006 and 2007 after the Derby Fire. This harvest was conducted during all seasons throughout the year when conditions enabled access. As a result, there were significant increases in non-native grasses, forbs, and noxious weeds on these lands after harvest activities were completed.

## **Current Activity and Uses**

### ***2011 Flood Event***

The Gallatin National Forest, and much of southwest and south central Montana, had well above average runoff events in May and June of 2011 due to substantially above average snowpacks and spring rain events. The Forest hydrologist and east zone fisheries biologist reviewed stream effects and infrastructure damage from the rain/runoff events in the Main Bridger, West Bridger, Derby Gulch, Placer Gulch, and Lower Deer Creek areas. Considerable flooding and damage to road and trail infrastructure occurred. Culverts that were replaced and upgraded following the 2005 flood event and 2006 Derby Fire did not show signs of significant failure, but were not able to accommodate the extraordinary volumes of water. Channel erosion, sediment deposits, and undercutting of stream banks occurred on several stream segments within the allotments.

### ***Livestock Grazing***

The West Bridger Allotment consists of approximately 20,589 acres (all National Forest system lands). There are currently three ten-year term livestock grazing permits issued on this allotment for the grazing of up to 320 cow/calf pairs. Grazing is allowed between the dates of July 16st to October 15st annually with a three pasture deferred rotation grazing system. There are seven stock water developments and four miles of fence on the West Bridger Allotment. Most of the water developments and fences were damaged or destroyed in the 2006 Derby Fire. Many have been repaired or rebuilt. The remainder will continue to be repaired or replaced.

The Carey Gulch Allotment consists of approximately 2,870 acres of National Forest lands, 1,093 acres of private lands, and 145 acres of Bureau of Land Management (BLM) lands, which are currently managed together as one grazing area. There is one term grazing permit with on/off provisions for the grazing of 47 cow/calf pairs on Forest Service lands, 3 cow/calf pairs on BLM lands, and 85 cow/calf pairs attributed to private lands for a grazing season of one month annually, to occur either in July or August. There is one livestock water tank on National Forest land, which was destroyed in the 2006 Derby Fire. This water tank will be replaced. Livestock has not grazed on the National Forest or BLM portions of this allotment since the Derby Fire in 2006.

### ***Gallatin National Forest Travel Plan (2006) Implementation***

Implementation of the recent Gallatin National Forest Travel Management Plan FEIS (10/2006) within the project area is outlined in the Detailed Description of Decision for the Deer Creeks Travel Planning Area, pp. II-52 - II-58 and includes:

- A new motorized trail system is proposed to be completed in 2011/2012 in the project area. New or rebuilt trails will include the existing Derby Ridge Trail #126, Jim's Gulch Trail # 129 and trails connecting Lower Deer Creek Trail #5 to Tie Cutter Gulch, W. Bridger Creek and Derby Gulch. A new trailhead is proposed to be built in 2012 in Derby Gulch near North Derby Gulch.
- The Deer Creeks Fishery Project includes the West Fork Lower Deer and Lower Deer Proper from the falls approximately 1 mile upstream from the FS cabin downstream to the state section 16 and all smaller tributaries between. The State of Montana's EA was completed and a copy was forwarded to USFS. Initial work was completed in August 2011 with two consecutive treatments planned.
- A former drift fence near the Deer Creek Cabin which burnt in the 2006 Derby Fire is being replaced with an enclosure fence around the perimeter of the cabin. The fence would provide a buffer between cabin renters and cattle. The former drift fence is scheduled to be rebuilt as part of a fencing contract, but will be replaced with the cabin enclosure fence.

### ***Recreational Activities***

The West Bridger/Carey Gulch areas are not heavily used for recreation. Uses include ATV/Motorcycle use on the Placer Gulch Trail #256 and Lower Deer Creek Trail #5 north of Deer Creek Cabin; Motorcycle use on Tomato Can Trail #156; and horseback and hiking use on Jim's Gulch Trail #129, Lower Deer Creek Trail #5 and Derby Ridge Trail #126. Multiple sections of the Placer Gulch ATV trail # 266 were washed out in the spring 2011 flood event and will need to be re-routed and/or repaired. Use is heaviest during fall hunting season. There are also two forest service rental cabins in the project area: W. Bridger Cabin and Deer Creek Cabin. W. Bridger Cabin is rented daily during summer months and is less frequently used the remainder of the year. Deer Creek Cabin has much lower use and is chiefly rented during the summer months.

### ***Special Use Permits***

The West Bridger Allotment has two day use hunting outfitters whose hunting areas overlaps with National Forest System (NFS) lands in the allotment. The operating period is during fall archery season (September 4-October 17) and general hunting season (October 23-Nov 28). The West Bridger Allotment also has one overnight hunting outfitter whose hunting area overlaps with NFS lands in the allotment. His camp is located outside of the allotment in Dry Creek. The operating period is the same as day use.

The Cary Gulch Allotment has no outfitters operating in this area.

### ***Noxious Weed Control***

Trailheads, roadsides, and other known noxious weed infestations in the project area are currently being chemically treated as a part of the regular district noxious weed program and pre-project trail construction.

## **Potential Future Activity and Uses**

Livestock grazing is proposed to continue under the conditions described in the action alternatives. Weed treatments will continue as a part of the regular district weed management program. Recreation in the form of camping, hiking, fall hunting, trail riding, and backcountry driving will likely continue.

Grazing by wild ungulates will continue, as will the hunting seasons managed by the State of Montana Department of Fish, Wildlife, and Parks.

Other reasonably foreseeable actions that may occur in the project area on private lands include increased private land development. Private landowners will likely continue to conduct agricultural activities such as farming and ranching. No specific areas have been identified for any changes from current activities. The Forest Service has no control over these types of activities occurring on private land.

## ***Affected Environment and Effects Analysis***

This section describes the environment for each relevant resource issue that may be affected by the proposed action or its alternatives. It includes a discussion of natural resources, Forest Plan goals and objectives, effects of management activities and compliance with applicable laws, regulations and guidelines.

### **Issue 1–Upland/Riparian Vegetation/Noxious Weeds/Non-native Species**

Issue 1 provides a comparison of the effects that the various alternatives associated with this proposal would have on upland and riparian vegetation, as well as noxious weeds, within the West Bridger and Carey Gulch Allotments. The effects are weighed against the desired future condition (DFC) for the allotments, which describe the conditions that management is intended to produce. DFCs for the West Bridger and Carey Gulch Allotments were derived from utilizing a combination of Forest Plan goals and objectives, and standards.

#### ***Affected Environment***

The two allotment areas contain approximately 23,616 acres with a wide variety of vegetative communities. Of these acres, approximately 1,904 acres are considered suitable for grazing. The allotments range from approximately 7% (West Bridger) to 13% (Carey Gulch) suitable primary grazing range with the remaining 87-93% of the acreage being non-range, not used, or not suitable for livestock. The suitable livestock grazing areas are primarily located in open meadows and under coniferous forest in fairly scattered locations across the allotments, along roadways, and in openings created by timber harvest. Suitable vegetation types within the allotments include open grasslands, sagebrush/grasslands, and timbered grasslands (see Map 3, Suitable Range).

#### **West Bridger Allotment**

##### ***Upland Vegetation***

The West Bridger Allotment consists of approximately 20,746 acres (all National Forest system land) located on the eastern edge of the area known as the “Deer Creeks” which include the three main tributaries of the Deer Creeks and the two main tributaries of the Bridger Creeks. Of these total acres, approximately 1,521 acres are considered suitable for

livestock grazing (approximately 7% of the allotment) and 19,225 acres are too steep, rocky, forested or otherwise unsuitable for livestock. Dominant vegetation species include timothy, Idaho fescue, Kentucky bluegrass, green needlegrass, bluebunch wheatgrass, pine grass, sagebrush species, ninebark, Douglas-fir and lodgepole pine. Suitable Vegetation on the West Bridger Allotment is displayed in Table 1 on p. 6 of this EA.

In 2005, an extensive field review of suitable habitat types was conducted on the West Bridger Allotment. The current trend summaries are listed below:

- 957 acres in good condition with upward trend
- 245 acres in good condition with static trend
- 319 acres are in good condition with downward trend.

There were no areas in excellent condition, primarily due to the large amount of non-native timothy throughout the area, and no areas in fair or poor condition. Acres classified to be in a downward trend were primarily based on increasing noxious or non-native vegetation, and the proliferation of cheatgrass due to factors other than cattle. The field review noted increased areas of weedy species, especially houndstongue and musk thistle up Derby Gulch, as a result of road building and timber harvest conducted in the early to mid 1980s and again in the mid-1990s. Also, cheatgrass was noted on the thinner, less resilient, soil types of the Packsaddle area. Cheatgrass (*Bromus tectorum*) has increased in nearly all rangeland areas of south central Montana. This increase is thought to be the result of the 6 year drought from approximately 2000–2005 (NOAA, 2010 report) and climate variability related to global warming, (Ziska, 2008).

Monitoring of upland utilization indicates that forage use is fairly consistent on the allotment. Utilization data shows that most suitable upland range areas receive 20–50% grazing use annually with an average actual use of 1,044 AUMs per year (data was averaged from 1985 – 2010). Utilization data from 2009 and 2010 indicated that the Derby Fire of 2006 contributed to more widely distributed cattle use and reduced use on primary upland and riparian range areas. However, the allotment was not fully stocked for either of these grazing seasons (2009-2010). Additional years of utilization data at full numbers will be needed to accurately assess post-fire vegetation use and distribution. The Derby Fire helped set back vegetative succession and greatly increased herbaceous vegetation across the entire area, also improving cattle distribution by consuming dead and downed timber.

The allowable use level on upland areas is 55%. This level is based on information gained through range analysis coupled with field observations and research findings for mountain and foothill cool season settings (Valentine, 2001 p. 390). Allowable use is the amount of current forage production that could be removed in order to maintain or improve rangeland conditions. In general, upland areas within the West Bridger allotment are grazed within allowable use guidelines and are maintaining good conditions. However, distribution could be improved in the Derby Gulch pasture above the West Bridger Cabin, in the West Bridger Pasture above the last private cabin, and in the Tomato Can pasture above the Tomato Can tank. As stated above, post-fire conditions may be assisting with beneficial re-distribution of livestock in these areas.

The West Bridger Allotment is currently grazed as a three-pasture deferred rotation grazing system. Cattle are brought onto the allotment on or after July 16<sup>th</sup> and placed in one of the

pastures. After a prescribed amount of time they are moved to the second and then the third and final pasture. They are removed from the allotment on or near October 15<sup>th</sup>. Five short segments of fence on National Forest system land and five developed water sources help control cattle, keep them in the correct pasture, and encourage use of upland areas. Salting is also used to encourage cattle to graze away from streams and springs.

### ***Riparian Vegetation***

The West Bridger Allotment includes portions of Lower Deer Creek, West Fork Lower Deer Creek, Bear Gulch, Fire Gulch, Placer Gulch, Tie Cutter Gulch, Jims Gulch, West Bridger Creek, Derby Gulch, North Derby Creek, and unnamed tributaries. Dominant riparian species include Douglas-fir, Engelmann spruce, ponderosa pine, rocky mountain maple, red osier dogwood, chokecherry, snowberry, gooseberry, western meadow rue, sweet-scented bedstraw, field horsetail, water birch, bluebell species, bluejoint reedgrass, timothy, and Kentucky bluegrass.

In order to determine if the riparian areas within the West Bridger Allotments were meeting DFC, the interdisciplinary team (IDT) conducted a Rapid Assessment for each stream (See Project File) in both 2010 and 2011. The 2010 rapid assessment was revisited in 2011 to determine the effects of the spring 2011 flood event. Following are the findings from both years:

**2010:** This rapid assessment indicated that the majority of the streams were meeting DFC. There were two isolated areas (North Derby and West Bridger above Jim's Gulch) that were at proper functioning condition (PFC), but not meeting DFC for vegetative vigor or age class diversity in the shrub community due to livestock grazing. The remaining riparian areas were inaccessible to livestock and were either meeting the DFC or were not at DFC for reasons other than livestock use. Some areas exhibited high similarity to the potential natural community; they were either inaccessible to livestock, produce forage that is not suitable for livestock, receive adequate grazing recovery periods, or were grazed only in passing and not used for extensive periods for loafing and shade.

There was a small reach of the North Derby Creek that was not meeting PFC. This was a very small area (less than 200 yards) where the water came back up to the surface and was accessible to livestock. The main Derby Creek and Lower Deer Creek were lacking age class diversity due to the 2005 flood event and 2006 Derby fire. These areas were considered to be in an early seral stage with heavy cottonwood and aspen regeneration. The density of the regeneration restricts livestock access into the riparian areas. Parts of West Bridger Creek were lacking plant vigor and age class diversity, also due to the 2005 flood event. Riparian shrubs were well represented, but were lacking in age class diversity. There were isolated patches where the point bars were trying to recover, but were lacking plant vigor. These areas were easily accessible and may be susceptible to trampling by livestock (both cattle and recreational horses). All other riparian areas within the analysis area were meeting DFC.

**2011:** The rapid assessment in 2011 indicated very different results from the 2010 readings. Several stream reaches are no longer meeting PFC due to effects of the spring 2011 flood, which was considered to be a 500 year flood event. West Bridger Creek and Tie Cutter Gulch are at PFC, but they are not meeting DFC due to the lack of age class diversity of riparian vegetation. Derby Gulch, upper North Derby Gulch, Jim's Gulch,

and Lower Deer Creek are Functioning-at-Risk (FAR) due to channel erosion, and the under-cutting of some stretches of streambank. The lower portion of North Derby Gulch is not functioning properly due to the large active head cut caused by the spring 2011 flooding.

The lower part of North Derby Gulch that is nonfunctional has been temporarily fenced out from grazing to protect the integrity of the springs and to help promote the healing process of the active head cut. Upper Derby Gulch, upper North Derby Gulch, Jim's Gulch and Lower Deer Creek are considered to be FAR due to the instability of the channels; however, vegetation along the banks has remained intact but is still lacking some of the age class diversity. The Lower Derby Gulch (near the Forest Boundary) has excessive deposition from the flood that has either covered the existing grass and forb vegetation or removed it completely. Some of the existing cottonwoods, Douglas-fir, and alder remained intact after the flood. There are various grasses and forbs starting to become re-established, but the area is still lacking desirable grass, forb, and shrub components.

### ***Noxious Weeds***

Within the West Bridger Allotment, Canada thistle, spotted knapweed, musk thistle, and sulphur cinquefoil are the dominant noxious weed species; although a variety of other species are present. Nearly all of these infestations are adjacent to or near roadways, and are treated annually with herbicide by the district weed crew. There are currently approximately 109 acres within the allotment that are infested with noxious weed species.

### **Carey Gulch Allotment**

#### ***Upland Vegetation***

The Carey Gulch Allotment consists of approximately 2870 total acres located east and immediately adjacent to the West Bridger Allotment. Carey Gulch consists of a ridge and upper slope with 1632 acres of NFS land and 145 acres of BLM that slopes down onto 1093 acres of private land and Carey Gulch Creek bottom. Carey Gulch Allotment contains 149 acres of suitable range on NFS lands, 19 acres of suitable range on BLM, and 215 acres of suitable range on private land, consisting of approximately 13% of the total allotment. Suitable Vegetation on the Carey Gulch Allotment is displayed in Table 2 on 6 of this EA.

Field vegetation mapping was originally conducted in 1979. Additional range monitoring exams were carried out in 2008 following the Derby Fire, which burned extensively on NFS, BLM, and private lands. In 2008, plots were taken in burned sagebrush habitat. The reviewers noted that they saw some sagebrush regeneration. This was two years after the fire. Much of the rangeland is classified as "fair" is due to shallow soils and the limited presence of sagebrush prior to the 2006 Derby Fire. The soils are inherently thin, a state not related to cattle.

This allotment has not been fully stocked since 2005. There has been no grazing since the Derby Fire in the fall of 2006, due to a combination of personal convenience, non-use, and resource protection non-use. Because of this, there is no current utilization data for this allotment.

The Carey Gulch Allotment has been grazed as a one pasture deferred rotation grazing system. Public (NFS and BLM) and private land are grazed together as one unit that is

administered by the FS. Permitted grazing use is for 135 cow/calf pairs annually for one month, between July and October. Thus, cattle normally would enter the allotment either in July or August and stay for one month. This bi-annual change provides a small variation in grazing dates and allows some later flowering herbaceous species to fully mature and set seed at least every other year with no grazing disturbance.

There is one water development in the allotment on NFS land, which was destroyed in the Derby Fire and has not been reconstructed. Cabins, outbuildings, and other structures on private land were also burned in the Derby Fire. There are no range fences or water developments on private land with the exception of the private allotment boundary fence, which has not been reconstructed following the fire. The Forest Service fence known as the Derby/Carey Ridge Fence, which is located on the West Bridger Allotment, keeps cattle from crossing the ridge east or west. This was reconstructed in 2008.

### ***Riparian Vegetation***

In order to determine if the riparian areas within the Carey Gulch Allotment were meeting DFC, the Forest Service conducted a Rapid Assessment for each stream (See Project File). The streams within this allotment are at proper functioning condition (PFC) even after the 2011 flood event, but are not meeting DFC for vigor or age class diversity for the shrub community due to reasons other than livestock use. Most of these areas are not meeting DFC due to the 2006 Derby Fire; the vegetation is still recovering. Some areas exhibit high similarity to the potential natural community; they are either inaccessible to livestock, produce forage that is not suitable for livestock, receive adequate grazing recovery periods or are grazed only in passing and not used for extensive periods for loafing and shade.

### ***Noxious Weeds.***

No noxious weed infestations are known to exist on the NFS portion of the Carey Gulch Allotment. Areas containing non-native weedy species were, however, noted in the 2008 vegetation review including pepperweed (*Alyssum alyssoides*), and cheatgrass.

## ***Scale of Analysis***

### **Spatial Bounds**

The spatial bounds considered for the effects analysis for vegetation includes the West Bridger and Carey Gulch Allotment boundaries. The rationale for setting these boundaries is that the distribution of cattle in and between allotments will not be affected outside of this area.

### **Temporal Bounds**

The temporal bounds for past, present and future actions to be considered in evaluating effects to upland vegetation reflect the life of the livestock permits and are approximately 50-60 years into the past and 10-20 years into the future. The rationale for this time frame is that significant rangeland improvements were made in the mid-1950 and 60's with cross-fencing and rotation systems. The future effects of most actions would likely occur over the next 10-20 years.

## *Methodology of Analysis*

### **Upland Vegetation**

Although these two allotments have been deemed suitable for use by livestock in the Forest Plan<sup>2</sup>, this project level analysis evaluates site specific impacts of grazing, in conformance with the National Environmental Policy Act (NEPA) and is required in order to authorize livestock grazing (FSH 2209.13 – 91). For this analysis, project-level capability and suitability of the West Bridger and Carey Gulch grazing allotments were reviewed in the context of the planning direction found in the Gallatin Forest Plan. Permitting livestock use within these two allotments is consistent with the capability and suitability determinations found in the Forest Plan. The resulting allotment-specific rangeland capability and suitability analysis was used to help determine the appropriate level of livestock grazing and management. Key management factors including timing, intensity, duration, frequency, opportunity for recovery, and management effectiveness were also used to determine the appropriate livestock grazing levels.

The majority of the upland vegetation information in this report is derived from past field records for the West Bridger and Carey Gulch Allotments. To help assess capacity, many years of utilization data was summarized and is included in the analysis. Utilization data was interpreted with consideration to effects of weather and actual stocking. Utilization data was field collected after grazing using mainly the Grazed Plant Method as outlined in R1 Range Analysis Handbook (R1 FSH 2209.21). Some data consists of overall allotment utilization mapping, using both transect data and estimated ocular data. Vegetation was field mapped as outlined in R1 FSH 2209.21. Lands were classified as suitable rangeland for livestock grazing if they satisfied 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 are capable of being grazed in a suitable fashion.
- Located within one-half mile of a water source.
- Slopes are generally less than 30%.
- Consists of mapping units larger than 5 acres each.

<sup>2</sup> Requirements to perform analysis of rangeland suitability for livestock grazing are found in the National Forest Management Act (NFMA) at 16 U.S.C 1604(g)(2)(A) and are found at 36 CFR 219.20. Determining capability is the initial step in the determination of suitability. It is portrayed as a separate step both for reasons of clarity and because the actual product of “capability” often has utility in planning beyond its role in the determination of suitability. Capable rangeland is determined by resource and site conditions such as forage productivity, and slopes and landforms that can physically be grazed. At the Forest Plan level, the capability determination does not vary by alternative. Determination that certain areas are suitable for grazing is a finding that the land is capable of sustaining grazing over time and that there are no current or planned activities for that parcel of land that would render livestock grazing incompatible. At the Forest Plan level, rangeland suitability varies by alternative based on the application of certain resource management practices. A decision was made in the 1986 Gallatin Forest Plan that certain management areas are suitable given that specific management area standards and guidelines are followed. The specifics associated with those decisions are disclosed in pages II-1, II-4, II-13, II-20, chapter III, and F-10 of the Gallatin Forest Plan and the analysis documented in pages IV-29-34, A-13, B-19-21, and B-28 of the Forest Plan FEIS.

At the Forest Plan level the Suitability determination provides basic information regarding the potential of the land to produce resources and supply goods and services in a sustainable manner, as well as the appropriateness of using that land in a given manner. This information assisted the Forest Service in evaluating alternatives and arriving at Forest Plan level decisions. It also helped in an analysis of alternative uses foregone during Forest Planning. Changes to Forest Plan Suitability determinations would involve making changes at the Forest Plan level, as suitability is a Forest Planning level determination. Suitability can also have value when applied at the site specific level. At this level, both capability and suitability analyses may be reviewed or made more site specific, if doing so will provide information useful to the decisions being made. However, this use of the analyses is outside the scope of Forest Planning regulations and purposes, and is strictly an application of a useful tool as an aid in management decision making.

Vegetation production (carrying capacity) is based on clipped plots, USDA-FS General Technical Report-66 (standard production ranges for grassland and shrubland habitat types) and many years of field observations combined with actual grazing use information under varying influences of rainfall and temperature. Vegetation monitoring in 2007 and 2008 was conducted using an Eco-Data Ocular Macroplot protocol as outlined in the R1 Ecological Classification and Inventory Guide (R1 FSH 2090.11) including site and setting information, ocular macroplot data, narrative, and photographs of each site monitored.

Vegetation condition and trend is measured to determine the health of the range based on what the range is naturally capable of producing and how it is changing over time. Condition and trend for this analysis was derived from an extensive field review. This review studied several components as outlined in the R1 Range Analysis Handbook (R1 FSH 2209.21).

### **Riparian Vegetation**

The riparian information in this report is derived from the Rapid Assessments that were conducted by the interdisciplinary team (IDT) in the summers of 2010 and 2011 (Project File). Additional detailed vegetative and stream data was collected during the summer of 2011 by the Forest Riparian crew as well as the Forest hydrologist and the East Zone fisheries biologist.

### **Noxious Weeds**

Information on noxious weed populations was derived from the FACTS database. This information has been collected, compiled, and entered into FACTS by Forest Service range and weed specialists, and consists of several years of field inspections and active weed treatments.

## ***Direct/Indirect Effects***

### **Effects Common to All Alternatives**

#### ***West Bridger and Carey Gulch Allotments***

Most upland suitable range on the West Bridger Allotment is currently in good condition but contains 319 acres in good condition with downward trend. These acres are in downward trend due to infestation of non-native or noxious plants. These plants exist due to factors other than livestock grazing, as described in the affected environment section and removal of cattle would not change this situation. On the Carey Gulch Allotment, much of the range classified as “fair” is due to shallow soils and the presence of sagebrush prior to the 2006 Derby Fire. These soils are inherently thin, a state not related to cattle. All the sagebrush areas were burned in the Derby Fire, a situation that changes the status of the sagebrush habitats to a higher range condition class for cattle in terms of herbaceous vegetation production. Again, these events and the effects on upland vegetation are not related to cattle grazing and will not be affected by the presence or absence of cattle on the Carey Gulch Allotment.

## **Alternative 1 – No Grazing**

### ***West Bridger and Carey Gulch Allotments***

Under Alternative 1, no permitted livestock grazing would occur on either allotment within the analysis area. Current permittees would be given two years written advanced notice of the cancellation of their permits as provided under 36 CFR 222.4(a)(1).

**Upland Vegetation:** Existing fences, not including private boundary fences, would be removed by the Forest Service. The removal of fences may impact soil and vegetation from vehicles and equipment used to remove the fences, but the impacts would be localized and temporary. The sites should recover rapidly. If the permit was cancelled on the Carey Gulch Allotment, the private landowner would be required to prevent the cattle on the private land portion of the allotment from using the National Forest, either by fencing or some other means of control.

Direct effects of the no grazing alternative include an increase in standing herbaceous biomass. These effects would occur primarily on suitable range, which constitutes about 7% of the West Bridger Allotment and 13% of the Carey Gulch Allotment. Ungrazed and non-range areas, which constitute by far the majority of acres on both allotments, would not be affected by any of the alternatives.

Suitable range within both allotments contains a large component of non-native forage species. Timothy and Kentucky bluegrass became established on these allotments either during or even before early Eurasian settlement. These plants are so supremely adapted and competitive that no amount of release from grazing will allow native plants to once again dominate their former ranges. Both timothy and Kentucky bluegrass are adapted to grazing. In the absence of grazing, timothy in particular can produce so much biomass that it can self-shade and in some cases create extensive tiller mats which prevents native grass colonization (Esser, 1993).

On ranges consisting of mostly native herbaceous species, elimination of grazing would allow for an increase in native plant vigor and increase litter accumulation on suitable range areas more rapidly than implementation of either Alternative 2 or 3. However, the presence of timothy and Kentucky bluegrass mixed with native grass species, would limit most benefits of removal of livestock to native vegetation.

**Riparian Vegetation:** Alternative 1 would provide the most opportunity for riparian vegetation re-development within the West Bridger Allotment and Carey Gulch Allotments. It would likely result in maintenance of those riparian reaches that are currently at their DFC and/or improvement of those isolated reaches that show a departure from DFC. The elimination of livestock grazing would allow for the natural rate of recovery that is occurring from past flood impacts. Other potential effects related to natural events, such as flooding and fire, could impact these riparian systems in the future and reduce this anticipated rate of recovery.

**Noxious Weeds:** With Alternative 1, the allotments as a whole and over a long period of time may contain a more favorable composition of native plant species; however, noxious weeds would continue to be present in various areas. Soil disturbance from cattle grazing would not be present; therefore susceptibility to invasion by certain weed species may be

less. Reduction of noxious weeds through treatment, on National Forest lands, would continue as sites are identified and as funding allows.

## **Alternative 2 – Current Management**

### ***West Bridger and Carey Gulch Allotments***

With Alternative 2, livestock grazing would continue to be permitted under current management with the FS administering the permits, which include all applicable standards and guidelines from the 1987 Gallatin Forest Plan. Upland utilization is not to exceed 55%. Riparian utilization is not to exceed 50%. Salt is not to be placed within a ¼ mile of riparian areas or other water sources. There would be no changes to current seasons of use, grazing rotation systems, and livestock numbers or kind. No new range improvements would be constructed to implement better management. Changes to authorized grazing would be administrative only in response to drought or other conditions. Proactive management of the range resources, to adapt to changing resource or environmental conditions would not occur.

**Upland Vegetation:** Alternative 2 would maintain the current vegetative condition in regard to grazing impacts through the use of deferment and authorized use within prescribed utilization levels. Post-fire effects from Derby Fire may also provide for improved distribution. As stated above, livestock grazing would likely continue under current management without additional help from new improvements such as water tanks or fences.

**Riparian Vegetation:** The current grazing practices on the West Bridger Allotment has shown minor adverse impacts to riparian areas except in isolated reaches that were apparent prior to the 2011 spring flood event. Conditions and trends with respect to grazing would be expected to continue for those reaches that were not meeting DFC prior to the flooding. Reaches that are not currently meeting DFC, due to recent activities unrelated to livestock grazing such as the 2011 flooding, and/or Derby Fire would be expected to continue post-flood recovery.

**Noxious Weeds:** Noxious weeds would continue to be present in various areas throughout the analysis area and would increase in areas of disturbance, such as along trails and salting areas. Noxious weeds could be spread by wind, recreationists, and wildlife. They may even increase in areas where plants are repeatedly grazed during the growing season. Eventually many grazed plant species would die out, leaving bare soil or sparse vegetative conditions allowing for less desirable plants to become established. Reduction of noxious weeds through treatment, on National Forest lands, would continue as sites are identified and as funding allows.

## **Alternative 3 – Adaptive Management**

### ***West Bridger and Carey Gulch Allotments***

Alternative 3 would implement adaptive management, which is the process of utilizing monitoring data to determine if management changes are needed to improve resource conditions within allotments, and if so, what changes and to what degree. This alternative would focus on end results for the resource as opposed to specific seasons of use, permitted livestock numbers, and grazing rotations.

Monitoring results would be used to determine implementation of phases as outlined on pp. 24-26 and p.31. If both short-term management prescriptions and long-term goals are not being met because of non-compliance, then administrative actions would be invoked as outlined in FS Handbook 2209.13 (Chapter 10).

Monitoring would occur over time with evaluations of the results being used by the rangeland management specialist and the line officer to make adjustments as needed to ensure adequate progress toward the defined objectives. Adaptive management adjustments could include several tools including, but not limited to, the redistribution of cattle throughout the pasture and/or allotment, additional riding, shorter duration, different salting practices, and/or early removal of the cattle for the season once prescribed upland and riparian utilization levels have been reached. Redistribution and/or other management practices would be implemented in permitted livestock numbers and season of use would continue until demonstrated progress towards the desired future condition is made, as evidenced by monitoring and inventory data collected. Changes would be reflected in the annual operating instructions (AOI) and in the term grazing permits. If three years of monitoring indicates that permitted use exceeds proper use, then a reduction in numbers and/or season of use would be implemented to help achieve the DFC.

The two key areas of concern in achieving desired future conditions for the allotments are defined as:

- Maintaining or improving upland conditions while managing noxious weed species.
- Maintaining or improving riparian vegetation diversity and extent.

The desired future condition (DFC) of an area describes the conditions that management actions are intended to produce. The DFC reflects the capability of the landscape, the various laws and regulations that apply to an area, and the values or “products” that are desired. The DFC for the West Bridger and Carey Gulch Allotments were derived from utilizing a combination of Gallatin Forest Plan goals and objectives, and standards regarding upland vegetation utilization. Generalized DFCs for upland vegetation are to maintain good to excellent vegetation conditions through improved livestock distribution, proper utilization levels, and management of grass and forbs in order to provide maximum competition to slow down the advance of noxious weed species including spotted knapweed, musk thistle, Canada thistle, houndstongue, and others.

Alternative 3 sets upland and riparian allowable use levels for both allotments. Upland utilization is not to exceed 55%; riparian utilization on early pastures is not to exceed 50% and late pastures not to exceed 35%, and 30% late use on streams not meeting desired conditions (Table 6). This level of riparian use is at a reduced level in comparison to Alternative 2’s level of 50% use. Because of this change from current management, intensified monitoring will be done to identify new distribution patterns and firm up stocking rate capacity.

Salt is not to be placed within a ¼ mile of riparian areas or any other water sources. Duration, intensity of use, season of use, and/or class of livestock may also be adjusted in order to move toward DFC. Monitoring would be scheduled and implemented (Table 8) to determine management effectiveness.

The starting point for livestock numbers (AUMs) under this alternative for both allotments would be to continue with the existing permitted numbers since the allotments have not been fully stocked since 2005, and several areas that were previously encroached upon by conifers were burned in the 2006 Derby Fire, potentially providing additional grasslands. This alternative also allows for the flexibility to install range improvements as monitoring shows appropriate. Off-site water developments, riparian pastures or enclosures, and drift fences are some possibilities of different types of range improvements that could be installed.

### ***West Bridger Allotment***

**Upland Vegetation:** Under Alternative 3, the effects of grazing on upland vegetation would be very similar to Alternative 2. Areas with non-native grasslands, would be unaffected by this alternative because timothy and Kentucky bluegrass are too competitive to allow native plants to return.

Alternative 3 would improve livestock distribution by allowing for strategic salting and construction of new water developments and fences as deemed necessary from monitoring results. Post-fire effects from the 2006 Derby Fire may also provide for improved distribution.

**Riparian Vegetation:** Alternative 3 would be beneficial for riparian vegetation due to reduced allowable use levels on riparian areas in comparison to Alternative 2 allowable use levels. The riparian areas that have been identified as not meeting PFC would be monitored more closely using a combination of (but not limited to) riparian utilization, photo points, and PFC as outlined in Table 8. As outlined in Chapter 2, monitoring results may show a need to adjust the stocking rate.

Those riparian reaches with plant communities that receive light livestock use would maintain or improve their potential natural community, except where other activities have compromised riparian habitat (i.e. flooding and wildfire). The plant communities would have fully developed structural layers made up of desired plant species. Canopy cover of desired native sedges, grasses, and forbs would reflect potential. Introduced species may persist but at relatively low levels. As browsing and trampling is decreased, willows and other desired woody species would become vigorous, as demonstrated by their robust establishment and successful reproduction. A full complement of desired plant species adapted to some level of grazing would occur long-term. Long term, dense shrub communities in areas of wet soil would discourage livestock impact.

**Noxious Weeds:** Maintaining and/or improving vegetation conditions through improved livestock distribution, proper utilization levels, and management of grass and forbs may help to decrease invasive weed species such as spotted knapweed, bull thistle, musk thistle, Canada thistle, and houndstongue. However, noxious weeds would continue to be present in various areas and would spread by wind, recreationalists, and wildlife. Reduction of noxious weeds through treatment, on National Forest lands, would continue as sites are identified and as funding allows.

### ***Carey Gulch Allotment***

**Upland Vegetation:** Under this alternative, plant vigor, plant community compositions, mineral and nutrient cycling of native upland vegetation would be maintained or improved. Upland vegetation on National Forest System lands would continue to receive less grazing use than on the lower elevation private land areas of the allotment.

Areas of non-native forage species would still remain since timothy and Kentucky bluegrass are too competitive to allow a shift back to native plant communities.

**Riparian Vegetation:** Those riparian reaches with plant communities that receive light livestock use would maintain or improve their potential natural community, except where other activities have altered riparian habitat (i.e. flooding and wildfire). The plant communities would have fully developed structural layers made up of desired plant species. Canopy cover of desired native sedges, grasses and forbs would reflect potential. Introduced species may persist but at relatively low levels. As browsing and trampling is decreased, willows and other desired woody species would become vigorous, as demonstrated by their robust establishment and successful reproduction. A full complement of desired plant species adapted to some level of grazing would occur long-term. Long term, dense shrub communities where there are wet soils would discourage livestock impact.

**Noxious Weeds:** This alternative would maintain and/or improve vegetation conditions through improved livestock distribution, proper utilization levels, and flexible management of grass and forbs that may help decrease invasive weed species.

### ***Cumulative Effects***

Past, present, and reasonably foreseeable actions that could have cumulative effects with livestock grazing include a large wildfire in 2006, flooding in 2005 & 2011, smaller more localized wildfires during the 1990s, small prescribed burns, timber harvest and timber unit tree planting activities, road building and road maintenance, recreation activities including two rental cabins, recreation trails maintenance, re-routing and construction, dispersed camping, noxious weed treatments, many private land activities including large scale timber harvest, and a proliferation of noxious weeds on adjacent private lands. There has also been a large increase in the resident elk herd which uses some National Forest, but mainly private land, as well as an increase of wolves using the area. See pp. 39-44 for further descriptions of past, present and reasonably foreseeable activities and events that could contribute to cumulative effects.

### **Alternative 1 – No Grazing**

#### ***West Bridger and Carey Gulch Allotments***

The threat of a large wildfire has diminished because the Derby Fire of 2006 burned over 90% of both these allotments. If the area were not grazed at all, there may be a minor increase in the potential for wildfire to burn upland areas, but only 7% of the West Bridger Allotment and only 12% of the Carey Gulch Allotment are classified as suitable range. The remaining unsuitable and ungrazed areas represent by far the majority and these acres would not be affected by any alternative.

There would be no cumulative effects to riparian vegetation associated with implementation of any of the alternatives in combination with the above activities.

Weed infestations coming from adjacent private land are considered a threat and Alternative 1 would provide continuous rest for native forage species. However, most of the primary suitable range areas are not exclusively native and these non-native habitat areas would not provide a greater barrier to weed invasions regardless of whether the allotments are grazed or not.

## **Alternative 2 – Current Management**

### ***West Bridger and Carey Gulch Allotments***

Recent wildfires have changed some vegetative types and removed some natural barriers in portions of the West Bridger and Carey Gulch Allotments, which could result in altered grazing patterns for livestock. Adequate monitoring should identify problematic areas and help prevent over-utilization of these areas. The cumulative effects on upland vegetation under the current management are expected to be low. Upland areas grazed with Forest Plan standards have maintained good condition under the current grazing regime.

There would be no cumulative effects to riparian vegetation associated with implementation of any of the alternatives in combination with the above activities.

Ground disturbing activities, such as construction/reconstruction of ATV trails associated with implementation of the Gallatin National Forest Travel Plan (December 2006), may introduce additional noxious weeds. Portions of Placer Gulch trail that washed out in spring of 2011 will need to be re-routed. Roads and trails are the corridors where weeds are most common in this analysis area. Weeds may be established with any activity that is associated with a road or trail, and may be further spread by livestock grazing, wildlife, recreationists and/or weather. Mitigation is in place to reduce the possibilities of weed establishment through site specific documents (i.e. Travel Plan). Past harvest activity on National Forest lands in the analysis area includes a total of approximately 1792 acres in the late 1960s–2007. Most of these acres have either been planted or have naturally regenerated. Weed establishment is often associated with timber harvest, due to ground disturbing activities and harvest equipment that may not be weed free. Harvesting on National Forest lands requires equipment to be washed and disturbed areas to be re-seeded; however, harvest on private lands may or may not have similar requirements. If noxious weeds are established in harvest units within the allotment, they may be further spread by livestock grazing either because of continued disturbance (grazing) or by physical means (seeds that are carried by cattle). If noxious weeds are established in harvest units outside an allotment, they could spread into the allotment by wind, recreationists, and/or wildlife and establish on disturbed sites. Some activities on private land could have cumulative effects with livestock grazing, while others probably would not. Activities on private land that introduce noxious weeds could spread to the allotments and could displace native vegetation. Displacing native vegetation could result in different grazing patterns for livestock or could cause over-utilization of different areas.

## **Alternative 3 – Adaptive Management**

### ***West Bridger and Carey Gulch Allotments***

Alternative 3 provides for the best response to current and future cumulative impacts on upland vegetation due to the flexibility and addition of management tools under adaptive management. Cumulatively Alternative 3 would improve conditions except for where non-native plants have become established.

It is expected that the cumulative impacts of motorized vehicle use on the upland vegetation of remote areas will be the same under all grazing or non-grazing alternatives.

There would be no cumulative effects to riparian vegetation associated with implementation of any of the alternatives in combination with the above activities.

Under Alternative 3, any cumulative effects for West Bridger and Carey Gulch Allotments regarding noxious weeds would be similar to those associated with Alternative 2, although a greater range of responses would be available.

### ***Compliance with Applicable Laws, Regulations, and Guidance***

#### **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 (current management) and Alternative 3 (adaptive management) would provide for continued grazing opportunities and range improvement through various management practices.

#### **Federal Noxious Weed Act of 1974, as Amended**

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. Alternative 2 (current management) would not violate the Federal Noxious Weed Act, as populations of weeds are currently being treated as necessary as a part of the regular district noxious weed program. Implementation of Alternative 3 would likely reduce the rate of spread of invasive species within the allotments over time through the use of adaptive management and more intensive monitoring procedures. See the Upland/Riparian Vegetation discussion for Alternative 3. Alternative 1 (no action) would also likely reduce the rate of spread of invasive species over time. Removal of livestock from the allotments would likely result in an increase of native vegetation and other herbaceous species, which provide competition for invasive species.

#### **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 (current management) and Alternative 3 (adaptive management) were developed to comply with FLPMA. Alternative 1 (no action) would discontinue the grazing permit on National Forest Lands within the allotments.

#### **Adaptive Management (FSH 2209.13)**

Adaptive management prescribes allowable limits for the timing, intensity, frequency, and duration of livestock grazing practices. These limits 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. The key to development of adaptive management actions is to focus on factors that are essential to ensure management objectives are met.

Building adaptive management flexibility into allotment management allows for decisions that are responsive to necessary 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 for meeting desired conditions and project objectives. Alternative 2 would continue with the historic range permitting system. Alternative 3 was designed to incorporate adaptive management strategies and techniques into the management of the West Bridger and Carey Gulch Allotments. Alternative 1 would eliminate grazing in the National Forest portions of the allotments.

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

Direction is 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 Gallatin Forest Plan provides overall management direction in the form of objectives, guidelines and standards. The objectives for range resources include: Improved forage management will be used to maintain or enhance the range environment and to provide for increased animal unit months (AUMs); Development and use of available forage will depend upon the livestock industry's ability and desire to make the necessary investments and the Plan calls for continuing to administer permitted AUMs of grazing use on private lands that are intermingled with National Forest lands within grazing allotments. Guidelines and standards from the Forest Plan (FP, p. II-20) include:

- Allotment management plans will be completed on a scheduled priority basis.
- Some allotments will be closed.
- Vacant livestock allotments will be evaluated and allotment plans prepared prior to livestock use.
- Domestic sheep will not be reintroduced to vacant allotments in grizzly bear MS-1 areas.
- Structural and nonstructural improvements to increase forage production will be planned and scheduled through the allotment management process.
- Livestock grazing in riparian areas will be controlled at levels of utilization listed in Management Area 7.
- Allotments with continuous grazing during the growing period will be evaluated and alternative-grazing systems will be applied.

The Gallatin 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). Portions of the West Bridger and Carey Gulch Allotments lie within eight different Forest Plan Management areas MA6 (dispersed recreation), MA7 (riparian), MA8 (timber management), MA10 (range/timber), MA11 (timber/livestock), MA12 (wildlife/dispersed recreation), MA16 (livestock), and MA17 (livestock/wildlife).

There is nothing in the action alternatives (Alternatives 2 & 3) that is incompatible with management direction for any of the management areas. Standards for Management Area 7 are the most applicable to issues related with livestock grazing (Forest Plan page III-19,20,21). The Forest Plan (MA7) requires the GNF to comply with Riparian Area (Management Area 7) applicable goals and standards (Forest Plan page III-19, 20, 21). These goals and standards include:

- Manage the riparian resource to protect the soil, water, vegetation, fish, and wildlife dependent upon it.
- Maintain suitable habitats for those species of birds, mammals, and fish that totally or partially dependent upon riparian areas for their existence.
- Range improvements such as fences and water structures may be constructed to help meet the forage utilization standards listed below (see FP page III-20).
- Salting for livestock distribution will be outside of riparian areas.
- Concentration of livestock will be kept at a level compatible with riparian zone-dependent resource needs through development of pasture systems and associated improvements.
- Livestock utilization in riparian areas will follow these guidelines (see table in FP page III-20).
- Manage riparian vegetation, including overstory tree cover, to maintain streambank stability and promote filtering of overland flows.

For all of the management areas that are found within the allotments, no potential conflicts were identified with either of the action alternatives (Alternatives 2 & 3) that are incompatible with the MA direction; however, Alternative 3 provides the most flexibility in the management of the allotments. Management actions are dependent on monitoring results with this alternative. Alternative 1 would discontinue grazing in all MAs, which is not necessarily compatible with MA direction associated with MA 10 (Range/Timber), MA16 (Range/Open Grasslands), and MA17 (Range/Big Game). The direction in these MAs is to maintain or improve vegetative conditions and forage production for livestock and wildlife use.

Chapter 3 discusses the environmental effects that would occur with implementation of the alternatives described in Chapter 2 and forms the scientific and analytical basis for comparing the environmental effects of each alternative. Affected environment and environmental effects have been combined into one chapter to give the reader and the decision-maker (responsible official) a more concise and connected depiction regarding the effects that the various alternatives would have on the three “relevant” and various other resource issues identified in Chapter 2. The direct, indirect, and cumulative effects of each alternative are presented by issue. Also included are discussions of past, present, and reasonably foreseeable activities that were considered in the cumulative effects analysis for the various issues. Chapter 3 discusses the environmental effects that would occur with implementation of the alternatives described in Chapter 2 and forms the scientific and analytical basis for comparing the environmental effects of each alternative. The direct, indirect, and cumulative effects of each alternative are presented by issue. Also included are discussions of past, present, and reasonably foreseeable future activities that were considered in the cumulative effects analysis for the various issues.

The impacts discussed in this chapter are for those issues considered to be factors in formulating the decision. For each "relevant" issue, this chapter addresses: a) the affected environment, b) direct and indirect effects, and c) cumulative effects are described in full. Chapter 3 also includes a summarized version of effects for those issues that were not considered to be "relevant" factors in making a decision or did not drive an alternative or could be effectively mitigated and dismissed. The specialist reports (Project File) contain the complete discussion/analysis regarding these issues and can be obtained upon request. Additional information regarding resource issues can also be found in the Project File. A discussion of the various alternatives; compliance with the Gallatin Forest Plan and applicable laws, regulations, policies, and other direction is provided for all issues and alternatives in Chapter 3.

Some of the effects discussed in this chapter are complex and not easily quantified. In regard to this, it should be kept in mind that many of the values presented are based on professional analysis or are modeled predictions of the effects. The actual effects may not occur exactly to the degree presented. More important than the exact effects, is the comparison of effects between the various alternatives Alternative 1 (No Grazing), Alternative 2 (Current Permitted Grazing), and Alternative 3 (Adaptive Management).

## **Issue 2 - Stream Channel Form & Function/Water Quality/Aquatic & Amphibian Species**

Issue 2 discusses the relevant physical and biological components of the fisheries and aquatic resources for the West Bridger and Carey Gulch Allotments and analyzes the effects of selection and implementation of the various alternatives to stream channel form and function, watershed condition and water quality, and aquatic species. A discussion of the effects of climate change on project area fish habitat and populations is also included in the affected environment discussion.

### ***Stream Channel Form and Function***

Livestock grazing can have negative impacts on riparian areas and their associated stream characteristics. Poor grazing management practices may cause direct mechanical damage (i.e., trampling streambanks) that change the dimensions, pattern, and stability of alluvial channels. Depending on the type of channel and its sensitivity to disturbance, these adjustments can include: 1) accelerated bank erosion; 2) increased width/depth ratios; 3) altered channel patterns; 4) induced channel instability; 5) increased sediment supply; 6) decreased sediment transport capacity; and 7) damaged fisheries habitat.

### ***Watershed Condition and Water Quality***

Livestock grazing of the West Bridger and Carey Gulch Allotments could have cumulative detrimental sediment and channel stability effects due to existing conditions that were created from the 2006 Derby fire and 2011 flood event.

### ***Aquatic Species and Redd Trampling***

Livestock grazing could affect Yellowstone cutthroat and other wild trout populations by livestock trampling of spawning redds, causing direct mortality of incubating fish eggs and thus reducing recruitment success, fish numbers, or species viability.

## *Affected Environment*

### **Stream Channel Form and Function**

#### ***West Bridger Allotment***

The West Bridger Allotment includes its namesake West Bridger Creek, Derby Gulch, North Derby Gulch, Placer Gulch, Tomato Can Gulch, Lower Deer Creek, and numerous first order tributaries to Lower Deer Creek. It is currently managed under a three-pasture rotation schedule.

#### **West Bridger Creek**

West Bridger Creek is a 6.4 mile-long, third order tributary to Bridger Creek (Rosgen Streamtypes, 1996, Refer to methodology on pp. 76-77). It has a G4 channel with B4 and C4 inclusions. The G4 channel type is extremely sensitive to watershed disturbance, has very poor recovery potential, very high sediment supply, very high streambank erosion potential, and high vegetation controlling influence. The reach surveyed in 2008 had a C4b channel type which has very high sensitivity to watershed disturbance. The 2008 PFC rating showed the stream was in properly functioning condition with no evidence of riparian degradation or excessive erosion or deposition. The riparian area is comprised of diverse age classes of willow, cottonwood, and aspen as well as nettles, mint, riparian grasses, and hemlock. In 2008, riparian grasses were becoming established on point bars and were indicative of evolution toward a stable B channel. The 2011 flood event, which was in excess of the 500 year USGS recurrence interval, resulted in some localized channel erosion and downstream deposition. This contributed to an increase in dominant substrate size from gravel to cobble. West Bridger Creek was rated at PFC during the post-flood rapid assessment because all evaluation criteria, including floodplain access, vertical stability, and adequate riparian vegetation to dissipate flood flow energy were met. Fish species composition and distribution information are limited throughout the Bridger Creek drainage including West Bridger Creek (MFWP and others 2011). Yellowstone cutthroat trout, brook trout, and sculpin were captured during a 2002 electro-fishing survey by GNF personnel. Subsequent sampling during 2008 indicated that only brook trout were present.

#### **Derby Gulch**

Derby Gulch is a small first order tributary above the North Derby Gulch confluence, and a second order tributary to West Bridger Creek below. It has perennial streamflow through much of the allotment, but during drought years streamflow is intermittent along some reaches. The channel type is a G3c with predominately cobble and gravel substrates in upper reaches and G4 in reaches downstream of the North Derby Gulch confluence with predominately gravel substrates. Where valley gradient is less, the channel did not incise during the 2005 or 2011 floods and a B4 channel exists. The G channel type reflects significant channel scouring and incision that occurred during the flood events of 2005 and subsequently in 2011. G3 and G4 channel types are entrenched with a low width/depth ratio and no floodplain access. The channel has extreme sensitivity to disturbance, has a very poor recovery potential, very high sediment supply, very high streambank erosion potential and high vegetation controlling influence. The existing G4 channel is an altered state that reflects the detrimental effects of the floods. Prior to the 2005 flood, the channel was likely a B4 or B3 channel type with few G4 inclusions. Before the 2011 event, a more stable B channel was beginning

to develop within the confines of the G channel as evidenced by significant point bar development and increased sinuosity. This typically occurs when channels begin to adjust and stabilize following disturbance like the 2005 flood event. This stable channel evolution indicates a trend towards recovery that will occur over time following the 2011 flood. Primary grassland is limited to a ¼ mile reach of stream in the southwest quarter of section 36. The majority of suitable rangeland has been mapped as transitory because of the dominance of overstory coniferous forest. Much of the overstory conifers were burned during the Derby Fire, and the understory has been replaced by a dense understory of deciduous shrubs, forbs, and grass. Riparian vegetation along Derby Gulch consists of early successional cottonwood, aspen, alder, and dense deciduous shrubs and forbs. With the exception of upstream of the confluence with North Derby Gulch, topography along most reaches of the stream does not limit livestock access. However, the lack of suitable forage along much of the stream and the dense understory shrub community limits riparian use. The 2008 PFC ratings showed the stream was in properly functioning condition above and below the North Derby Gulch confluence, with positive trends towards post-fire recovery. The few PFC attributes that deviated from natural condition were related to previous flood and fire effects. There was little evidence of bank trampling or cattle related impacts. The stream was judged to be well within Gallatin NF channel stability and riparian filtration guidelines and was near its Desired Future Condition.

The 2011 flood event, which was in excess of the USGS 500 year recurrence interval, resulted in substantial channel erosion and deposition in Derby Gulch and an overall departure from desired condition that is expected to trend in the positive direction over time. Post-flood rapid assessment data were collected at two pre-existing monitoring sites to reevaluate the existing condition. The upper site was rated as non-functional by the Forest hydrologist and East Zone fisheries biologist and qualitatively rated as a Rosgen F3 due to the presence of an inset floodplain and recent erosion of the low terrace. This lateral erosion leads to conversion of the channel from a G4 stream type. Streambanks of F3 channels have a high content of cobble-sized rock, are moderately sensitive to disturbance, have moderate vegetation controlling influence, and have poor recovery potential. The cobble streambanks are resilient to physical disturbance from hoof shear but are not readily colonized by riparian vegetation. In addition, F3 channels have very high sediment supply and streambank erosion potential. Natural recovery from the 2011 flood event is expected to occur over time as the lower terrace continues to erode to the point that the inset floodplain is sufficiently widened to dissipate energy of flood flows and maintain a stable channel configuration. It is notable that the seasonal riparian crew qualitatively classified the channel as a Rosgen B3. Identification of bankfull is extremely difficult in recently disturbed channels and a misidentification of bankfull would explain inconsistency in channel type classification.

The 2011 lower Derby Gulch rapid assessment site is lower in gradient than the upper site and was the recipient of a massive amount of sediment derived from upstream flood-related erosion that converted the preexisting G3c stream type to a D4 stream type (Photo 8). These channels are inherently unstable with very high sensitivity to disturbance, poor recovery potential, very high sediment supply, very high streambank erosion potential, and moderate vegetation controlling influence. Aggradation related instability is likely to persist into the future until upstream reaches stabilize. The channel received a non-functioning rating due to the post-fire/flood watershed condition and lateral confinement from an adjacent road prism. It is noteworthy that the GNF

riparian crew classified the channel as a Rosgen B4C. This is because heavy equipment had been used to berm the channel to protect the adjacent roadway after the flood event thus changing the channel type. Long-term maintenance of the channel to protect the roadway is expected given the inherent instability of the site. Currently brook trout, which likely accessed the stream from adjacent ponds during the flood, are present in Derby Gulch. However, because of low and intermittent streamflow in dry years, Derby Gulch does not permanently support a fish population.

### **North Derby Gulch**

North Derby Gulch was surveyed in 2008. The channel type was primarily a B4, with gravel and cobble substrate. Like Derby Gulch, there were several G4 inclusions where channel incision occurred during the flood of 2005 and was exacerbated following the Derby Fire. B4 channel types have moderate sensitivity to changes in streamflow and sediment discharge, excellent recovery potential, moderate sediment supply, and low streambank erosion potential. Riparian vegetation exerts moderate-to-low controlling influence on streambank stability for B4 channels, but high controlling influence for G4 channels. The riparian corridor is densely vegetated with deciduous shrubs, forbs and grass. Riparian grazing occurs intermittently along the entire stream, with some trailing and crossings, but use is relatively low for most of the stream. Approximately 250 lineal feet of stream channel at the lower end of the first open meadow has historically received concentrated use. The 2008 PFC evaluation rated this high use reach as properly functioning but some bank trampling was noted. During early summer 2010, shortly after cattle began grazing the pasture, streambank trampling was measured at less than 10% for the 250' reach. In October 2010, at the end of the grazing season streambank alteration was measured at 56%. To prevent future bank alteration, an exclosure was constructed around the site in 2011.

Following the 2011 flood event, three sites (upper, middle, and lower) were surveyed to re-evaluate the existing condition. The stream channel at the upper site was classified as a Rosgen B3 with an increase in substrate size from gravel in the pre-flood B4 channel to cobble. B3 channels typically have low sensitivity to disturbance, excellent recovery potential, low sediment supply, low streambank erosion potential, and moderate vegetation controlling influence. Because the 2011 flood event resulted in excessive erosion and deposition, the channel received a functional at risk PFC rating. The middle reach also experienced substantial erosion and deposition during the flooding and was given a nonfunctional rating primarily because of insufficient surface flow to maintain a healthy riparian zone. This reach typically goes dry in summer months. The excessive bedload deposition from the 2011 flood event contributed to the dewatered condition. A Rosgen classification was not completed at the middle site because width/depth ratio could not be determined. The lower site was classified as a Rosgen B3c. Because there is a large active headcut in the reach, the site was deemed not vertically stable and was given a functional-at risk PFC rating. Over time channels are expected to stabilize and trend toward the desired condition. North Derby Gulch does not support a fish population.

### **Placer Gulch**

Placer gulch is a small tributary to lower Deer Creek. The 2011 flood event, which exceeded the 100-year USGS return interval, gutted the once stable B3 channel converting it to a G3 and F3 stream type. The G3 stream type has very high sensitivity

to watershed disturbance, poor recovery potential, very high sediment supply, very high streambank erosion potential, and high vegetation controlling influence. Placer Gulch has limited forage for grazing and vertical banks which limit livestock access. Natural recovery from the flood to a more stable channel type will occur gradually over time. Placer Gulch is an important spawning and rearing stream for Yellowstone Cutthroat trout in Lower Deer Creek.

### **Tomato Can Gulch**

Tomato Can Gulch is a small, first-order tributary to Lower Deer Creek. It is typically intermittent, does not have a well defined channel, and does not support fish. The channel is a B4 with moderate sensitivity to watershed disturbance, excellent recovery potential, low streambank erosion potential, and moderate vegetation controlling influence. The riparian corridor is dominated by upland vegetation species comprised of mostly grasses with some woody shrubs. Because the upland nature of the vegetative community adjacent to the channel is related to the lack of perennial flow rather than alteration from grazing, the 2008 PFC evaluation rated this reach as properly functioning. Tomato Can Gulch is not known to have been substantially altered by the 2011 flood event.

### **Lower Deer Creek and Un-named Tributaries**

Lower Deer Creek is a 25 mile-long third order stream tributary to the Yellowstone River. The primary channel type is a B3 with C4 inclusions upstream from the Placer Gulch confluence and F3 downstream from Placer Gulch. Inherent to the B3 channel type is a low sensitivity to disturbance, excellent recovery potential, low streambank erosion potential and moderate vegetation controlling influence. Segments of Lower Deer Creek with the C4 channel type have a very high sensitivity to disturbance, good recovery potential, very high bank erosion potential, and very high vegetative controlling influence. The 2008 PFC evaluation rated Lower Deer Creek as properly functioning with nearly all contributing attributes functioning properly. The riparian community is in the early to mid seral stage with a full spectrum of age classes present and resembles the Desired Future Condition. Alder, aspen, willow, spruce, cottonwood, mountain maple, grasses, horsetail, and mosses are all represented. Riparian grazing occurs intermittently along reaches where suitable forage exists but use is relatively low and overall, channels are resilient to grazing disturbance. Range utilization monitoring conducted during August 2010 identified some limited streambank trampling occurring along Lower Deer Creek near the Tomato Can Gulch Trail where topography concentrated use. Overall, the stream was judged to be well within Gallatin NF channel stability and riparian filtration guidelines and was near its Desired Future Condition.

Following the 2011, 500 year flood event, rapid assessment data were collected in Lower Deer Creek upstream from the Placer Gulch confluence to reevaluate the existing condition. The channel was classified as a Rosgen B3c and was given a functional-at risk PFC rating. PFC attributes contributing to the rating included vertical instability (downcutting in the upper portion of the reach) and aggradation (deposition) in the downstream portion of the reach), excess sediment supply, and insufficient vegetation to dissipate energy on the outside bend during flood flows. Despite flood effects, there was no conversion in channel type and rapid recovery is anticipated. This is likely the case throughout most of Lower Deer Creek on the allotment. Considering the magnitude of the flood, effects were relatively minor and were limited to point cobble bar formation

and pool scouring due to good floodplain connectivity and high streambed and bank rock content. In many locations bedrock limited the extent of vertical and lateral channel adjustment.

Lower Deer Creek in the Tomato Can Gulch area was relatively unaffected by the flood event. However, due to low bank rock content and banks with a high vegetative controlling influence, some locations are potentially susceptible to grazing-related degradation.

Lower Deer Creek has perennial streamflow on National Forest system lands and supports genetically pure Yellowstone cutthroat trout within the allotment boundary (MFWP and others 2011). Low levels of hybridization of Yellowstone cutthroat trout with non-native rainbow trout has been confirmed in Lower Deer Creek and some tributary streams. Moreover non-native brown trout have been increasing their distribution and relative abundance annually in Lower Deer Creek. To secure this population from further hybridization, and competition/predation, a concrete fish barrier was constructed in 2010 and brown trout removal efforts occurred in August 2011.

### ***Carey Gulch Allotment***

The Carey Gulch Allotment includes its namesake Carey Gulch Creek, and Blind Bridger Creek. This allotment contains one pasture that is a combination of private, FS and BLM lands.

#### **Carey Gulch Creek**

The Carey Gulch Allotment includes an approximate 1-mile reach of Carey Gulch Creek, which is an ephemeral 1st order tributary to Blind Bridger Creek, and approximately 2.5 miles of Blind Bridger Creek, the majority of which is on private land. For Carey Gulch, the stream on National Forest land has no fishery potential because of ephemeral streamflow. The riparian corridor and adjacent uplands were classified as transitory rangeland with primarily conifers and some suitable understory forage. Post Derby Fire, most conifers were burned, and understory is now comprised of primarily deciduous shrubs with some grass. Carey Gulch has a B3 channel type with some G3 inclusions that formed during a flood event in 2005 and may have been expanded during 2011 flooding. B3 channel types have a low sensitivity to changes in streamflow and sediment discharge, excellent recovery potential, low to moderate sediment supply, and low streambank erosion potential. Riparian vegetation exerts low to moderate controlling influence on streambank stability. The riparian corridor is densely vegetated with deciduous shrubs, grasses and forbs. Riparian grazing occurs intermittently along reaches where suitable forage exists but use is very low. The G3 inclusions are reaches with higher gradient that incised during the flood events. These short interspersed reaches have higher sensitivity to disturbance. The entire length of stream within the allotment on National Forest was surveyed in August 2009 and field notes indicate that cattle related impacts were not evident. PFC summary notes detail that all attributes contributing to the PFC rating were properly functioning and near pristine condition (PNC). Nearly 100% of the banks were densely vegetated with riparian species including aspen and mountain maple. Thistles were noted during a follow-up survey during summer 2010. The stream was judged to be well within Gallatin NF channel stability and riparian filtration guidelines and was at the Desired Future Condition prior to the 2011 flood event. The 2009 PFC rating showed the stream

recovering from the 2006 Derby Fire. There was no evidence of bank trampling or cattle related impacts or erosion, but the allotment had not been grazed since 2006. Although Carey Gulch has not been evaluated for impacts from the 2011 flood event, it is likely that some flood-related erosion and deposition occurred and as a result, some departure from the Desired Future Condition is probable.

### **Blind Bridger Creek**

Blind Bridger Creek is a second order tributary stream to Bridger Creek. Within the allotment, upstream reaches on National Forest land have a B3 channel type with a low sensitivity to changes in streamflow and sediment discharge, excellent recovery potential, low to moderate sediment supply, and low streambank erosion potential. Riparian vegetation exerts low to moderate controlling influence on streambank stability, depending on bank rock content. The riparian corridor is densely vegetated with deciduous shrubs, grasses and forbs. Riparian grazing occurs intermittently along reaches where suitable forage exists but use is very low. Near the Forest boundary, the channel has lower gradient and is considered a C3 channel type with a low to moderate sensitivity to disturbance, good recovery potential, moderate sediment supply, moderate streambank erosion potential, and a very high vegetation controlling influence. Rosgen (1994) noted that C3 channel types are sensitive to cattle grazing and that consequences of cattle related change can be high. Riparian vegetation at this site consists primarily of dense understory deciduous shrubs, recovering aspen, mountain maple and some sedge along the channel. During the 2010 survey, there was no evidence of recent cattle use or recent or historic impacts. There was little suitable forage and cattle access was limited by dense vegetation. The 2009 PFC rating showed the stream was in properly functioning condition. The stream was judged to be well within Gallatin NF channel stability and riparian filtration guidelines and was at the Desired Future Condition. PFC summary notes detailed that all attributes contributing to the PFC rating were properly functioning and near pristine condition (PNC). Nearly 100% of the banks were densely vegetated with riparian species including willows, forbs, grasses, shrubs, rushes, and horsetail in early to mid seral stage. There was no evidence of bank trampling, cattle related impacts or erosion. Currently, channel instability related to the spring 2011 flood event has resulted in a departure from the Desired Future Condition. Excessive sediment/bedload deposition is evident in Blind Bridger Creek immediately upstream from its confluence with Bridger Creek. This is indicative of substantial vertical streambed/lateral streambank erosion that occurred upstream during the flood. Over time, the channel will begin to naturally adjust, stabilize, and trend toward recovery and the Desired Future Condition. Fish species composition and distribution information are limited in Blind Bridger Creek. However, brook trout were abundant during an August 1989 electro-fishing survey and cutthroat trout were not present.

Desired future conditions (DFC's) were established for all streams throughout both of the allotments, which incorporate Forest Plan standards and guidelines relative to streambank stability (i.e., meet all standards and guidelines), and fish habitat management guidelines. For all streams that are not currently meeting Proper Functioning Condition (PFC), the functional at risk (FAR) and nonfunctional (NF) ratings were directly related to effects of the spring 2011 flooding. Tables 14 and 15 provide a summary of stream and riparian vegetation condition attributes for individual stream reaches located within the West Bridger and Carey Gulch Allotments both prior to (Table 14) and after (Table 15) the spring 2011 flood events. This information was gathered in the field in the fall of 2010 (Table 14) and

the summer of 2011 (Table 15) by the fisheries biologist, hydrologist, riparian crew, along with various other specialists comprising the interdisciplinary team for the project.

**Table 14- Stream and Riparian Vegetation Condition Attributes by Stream Reach (Pre- 2011 Flood Event)**

<b>Stream Reach</b>	<b>Desired Future Condition</b>	<b>Sensitivity</b>	<b>Resiliency</b>	<b>Similarity to DFC</b>	<b>Resource Value</b>	<b>Proper Function Condition</b>
<b>West Bridger above Jim's Gulch</b>	<p><b>Stream</b> G4 with B4 &amp; C4 Currently in recovery from floods</p> <p><b>Vegetation</b> on point bars Riparian shrubs &amp; graminoid species</p>	<p><b>Stream</b> Sensitive Channel Type</p> <p><b>Vegetation</b> Sensitive Not fully recovered from 2005 flood &amp; 2006 fire</p>	<p><b>Stream</b> Moderate</p> <p><b>Vegetation</b> Moderate</p>	<p><b>Stream</b> Moderate</p> <p><b>Vegetation</b> Moderate Recovering Does not have all age classes of desirable species</p>	<p><b>Other</b>  Shrubs have wildlife value not unique</p>	<b>At PFC</b>
<b>North Derby (End of Road to Perm Transect)</b>	<p><b>Stream at or Near DFC of G4</b> Small reaches of B4, C4 1% heavy use areas In recovery from floods</p> <p><b>Vegetation</b> Increase shrubs Continue recovery from fire &amp; flood</p>	<p><b>Stream</b> Sensitive</p> <p><b>Vegetation</b> Not Sensitive but in recovery</p>	<p><b>Stream</b> Moderate</p> <p><b>Vegetation</b> Moderate</p>	<p><b>Stream</b> High</p> <p><b>Vegetation</b> Low-Moderate</p>	<p><b>Other</b> Riparian no rec fishery or native trout intermittent stream</p> <p>Aspen has wildlife value</p>	<b>At PFC</b>
<b>Main Derby</b>	<p><b>Stream</b> Recovering to DFC of G4, G3, B4, G3-C Modified by fire &amp; floods, No livestock influence</p> <p><b>Vegetation</b> Early successional cottonwood, aspen, alder</p>	<p><b>Stream</b> Not sensitive</p> <p><b>Vegetation</b> Not sensitive shrubby &amp; difficult access by livestock</p>	<p><b>Stream</b> High</p> <p><b>Vegetation</b> Moderate-High</p>	<p><b>Stream</b> High</p> <p><b>Vegetation</b> Moderate but on the way to recovery</p>	<p><b>High</b> Aspen, cottonwood provide high wildlife value</p>	<b>At PFC</b>

<b>Stream Reach</b>	<b>Desired Future Condition</b>	<b>Sensitivity</b>	<b>Resiliency</b>	<b>Similarity to DFC</b>	<b>Resource Value</b>	<b>Proper Function Condition</b>
<b>Carey Gulch</b>	<b>Stream</b> G3 down-cut slightly from 2006 fire but close to DFC prior to 2011 flood. <b>Vegetation</b> Shrubs recovering aspen, mtn. maple	<b>Stream</b> Not sensitive Solid rock/cobble bottom  <b>Vegetation</b> Not sensitive Regenerate Shrubs	<b>Stream</b> High  <b>Vegetation</b> High Good response	<b>Stream</b> High  <b>Vegetation</b> Moderate Recovering but heavy thistle cover near streambank	<b>Other</b> Very limited accessibility for livestock Some elk, bear use, robust aspen regeneration	<b>At PFC</b>
<b>Lower Deer Creek at Placer Gulch</b>	<b>Stream</b> B3 Channel type in recovery from 2011 flood.  <b>Vegetation</b> at DFC due to lack of fire and accessibility. Maple, alder, cottonwood, red osier but not much of a grass component.	<b>Stream</b> not sensitive  <b>Vegetation</b> not sensitive	<b>Stream</b> High  <b>Vegetation</b> High	<b>Stream</b> High  <b>Vegetation</b> High	<b>High</b> Native trout, shrub component, recreational trail	<b>At PFC</b>
<b>Lower Deer Creek</b>	<b>Stream (above junction)</b> Channel in recovery from 2005 flood. <b>(below junction)</b> Mixture of channel types that are bedrock controlled. <b>Vegetation</b> recovering from fire. Willow, alder, maple and cottonwood	<b>Stream</b> sensitive in the meadow reach since it is a deposition reach, all other reaches are non-sensitive. <b>Vegetation</b> not sensitive.	<b>Stream</b> moderate for meadow reach, high for all others.  <b>Vegetation</b> high	<b>Stream</b> High  <b>Vegetation</b> Moderate due to fire recovery and rest years. On an upward trend.	<b>High</b> Native trout, shrub component, recreational trail	<b>At PFC</b>

**Table 15- Stream and Riparian Vegetation Condition Attributes by Stream Reach (Post-2011 Flood Event)**

<b>Stream Reach</b>	<b>Desired Future Condition</b>	<b>Sensitivity</b>	<b>Resiliency</b>	<b>Similarity to DFC</b>	<b>Resource Value</b>	<b>Proper Function Condition</b>
<b>West Bridger Creek</b>	<b>Stream</b> DFC Channel Type: Rosgen C3 In recovery from 2011 flood and 2006 fire.  <b>Vegetation</b> Late seral stage	<b>Stream</b> Rosgen C3: Moderate  <b>Vegetation</b> Sensitive	<b>Stream</b> Moderate  <b>Vegetation</b> Moderate	<b>Stream</b> Moderate  <b>Vegetation</b> Moderate, will need to re-establish some desirable species	<b>2)Other</b>  Shrubs have wildlife value not unique	PFC
<b>Jim's Gulch</b>	<b>Stream</b> DFC Channel Type: Rosgen B4  In recovery from 2011 flood and 2006 fire. <b>Vegetation</b> Early Seral	<b>Stream</b> Rosgen B4: Moderate  <b>Vegetation</b> Sensitive	<b>Stream</b> High  <b>Vegetation</b> Moderate	<b>Stream</b> Low <b>Vegetation</b> Moderate	<b>2)Other</b>  Shrubs have wildlife value not unique	FAR
<b>Derby Gulch (Upper)</b>	<b>Stream</b> DFC Channel Type: Rosgen B3, C3 In recovery from 2011 flood and 2006 fire.  <b>Vegetation</b> Late seral stage	<b>Stream</b> Rosgen F3: Moderate*  <b>Vegetation</b> Not Sensitive, shrubby and difficult to access by livestock	<b>Stream</b> Low  <b>Vegetation</b> Moderate - high	<b>Stream</b> Cobble deposits inhibiting establishment of streamside vegetation  <b>Vegetation</b> Moderate, Recovering	<b>1/High</b> Aspen, cottonwood provide high wildlife value	NF
<b>Derby Gulch (Lower)</b>	<b>Stream</b> DFC Channel Type: Rosgen B4, C4 In recovery from 2011 flood and 2006 fire.  <b>Vegetation</b> Early seral stage	<b>Stream</b> Rosgen B4c: Moderate-High  <b>Vegetation</b> Sensitive	<b>Stream</b> Moderate-High  <b>Vegetation</b> Moderate-High	<b>Stream</b> Proximity to road is limiting DFC  <b>Vegetation</b> Low, needs to re-establish desirable vegetation	<b>1/High</b> Aspen, cottonwood provide high wildlife value	FAR

<b>Stream Reach</b>	<b>Desired Future Condition</b>	<b>Sensitivity</b>	<b>Resiliency</b>	<b>Similarity to DFC</b>	<b>Resource Value</b>	<b>Proper Function Condition</b>
<b>North Derby Gulch (Upper)</b>	<b>Stream</b> DFC Channel Type: Rosgen B3 In recovery from 2011 flood and 2006 fire.  <b>Vegetation</b> Mid seral	<b>Stream</b> Rosgen B3: Low  <b>Vegetation</b> Not Sensitive	<b>Stream</b> High  <b>Vegetation</b> Moderate	<b>Stream</b> Moderate  <b>Vegetation</b> Moderate	<b>2)Other</b> Riparian no rec fishery or native trout intermittent stream  Aspen has wildlife value	FAR
<b>North Derby Gulch (Middle)</b>	<b>Stream</b> DFC Channel Type: Rosgen B3 In recovery from 2011 flood and 2006 fire.  <b>Vegetation</b> Mid-seral	<b>Stream</b> Unknown <b>Vegetation</b> Not Sensitive	<b>Stream</b> Unknown <b>Vegetation</b> Moderate	<b>Stream</b> Low  <b>Vegetation</b> Moderate	<b>2)Other</b> Riparian no rec fishery or native trout intermittent stream  Aspen has wildlife value	NF
<b>North Derby Gulch (Lower)</b>	<b>Stream</b> DFC Channel Type: Rosgen B3c In recovery from 2011 flood and 2006 fire.  <b>Vegetation</b> Late seral	<b>Stream</b> Rosgen B3c: Low-Moderate  <b>Vegetation</b> Moderate	<b>Stream</b> Moderate-High <b>Vegetation</b> Moderate-High	<b>Stream</b> Low  <b>Vegetation</b> Moderate	<b>2)Other</b> Riparian no rec fishery or native trout intermittent stream  Aspen has wildlife value	FAR
<b>Lower Deer Creek Upstream From Placer Gulch</b>	<b>Stream</b> DFC Channel Type: Rosgen B3C In recovery from 2011 flood and 2006 fire.  <b>Vegetation</b> Mid-Seral	<b>Stream</b> Rosgen B3c: Low-Moderate  <b>Vegetation</b>	<b>Stream</b> Moderate-High  <b>Vegetation</b>	<b>Stream</b> Moderate  <b>Vegetation</b>	<b>1/High</b> Native trout, shrub component, recreational trail	FAR
<b>Tie Cutter Gulch</b>	<b>Stream</b> DFC Channel Type: Rosgen A3 Rosgen A3  <b>Vegetation</b> Early-mid seral	<b>Stream</b> Rosgen A3: Very High  <b>Vegetation</b> Sensitive	<b>Stream</b> Low  <b>Vegetation</b> High	<b>Stream</b> High  <b>Vegetation</b> Moderate	<b>2)Other</b> Riparian no rec fishery or native trout; intermittent	PFC

### **Watershed Condition and Water Quality**

The Montana DEQ 303(d) list in the 2010 Montana Integrated Water Quality Report <http://cwaic.mt.gov/query.aspx> has one stream listed in the West Bridger Allotment. Lower Deer Creek (waterbody MT43B004-032) as assessed by the Montana DEQ with the conclusion that all beneficial uses are fully supported (agricultural, aquatic life, cold water fishery, drinking water, industrial, primary contact recreation). This stream segment runs from the headwaters through the allotment and 6 miles further downstream. The lower 4.4 miles of Lower Deer Creek (waterbody MT43B004-031) are listed as partially supporting aquatic life, cold water fishery, and primary contact recreation due to impacts from hydro-structure modification. A TMDL is not required as no pollutant related impairment was identified. All of the streams in the allotments are designated by the Montana DEQ as B1 water quality streams.

The HUC6 watersheds within the West Bridger and Carrey Gulch Allotments include Middle Bridger Creek 100700021405, Upper Lower Deer Creek 1007000214067, and Lower Lower Deer Creek 1007000214067.

In 2005 a flood event triggered channel instability in segments of Carey Gulch, Derby Gulch and North Derby Gulch. The following year, the Derby Fire resulted in increased sediment yields in Lower Deer Creek, East Fork Upper Deer Creek, West Fork Upper Deer Creek, West Derby Creek, and Derby Gulch. R1R4 sediment modeling for the 2006 Derby Fire BAER (Story and others, 2006) predicted increased sediment yields from the Derby Fire in Lower Deer Creek, East Fork Upper Deer Creek, West Fork Upper Deer Creek, West Derby Creek, and Derby Gulch. Sediment response to the Derby Fire was robust in 2007 and to a lesser degree in 2008, particularly in high intensity burn headwater areas. Vegetative and sediment recovery modeling in the BAER analysis was consistent with modeled post fire recovery. Field surveys of streams (as described in the following “Methodology” section) were conducted during summer 2008, 2009, and 2010. Data indicated that despite effects to channel stability and vegetation precipitated from the 2005 flooding and 2006 Derby Fire, project area streams were functioning properly and trending toward the desired condition under existing grazing management by fall of 2010.

In spring 2011, project area streams were again affected by a much above average flood event (Story 2011). Channel cross section data indicated that runoff in Derby Gulch, West Bridger Creek, Lower Deer Creek, and Placer Gulch exceeded the USGS 50 year recurrence interval. Channels in project area streams responded with varying degree and extent of vertical channel incision (streambed erosion), lateral migration (streambank erosion), and aggradation (deposition of eroded streambank and streambed material). In extreme cases, conversion of entire stream reaches from one channel type to another occurred. The Gallatin National Forest, and much of southwest and south central Montana had much above average runoff/flood events in May and June of 2011 due to substantially above average snowpacks in the Gallatin, Absaroka, Bearooth, Bridger, and Crazy Mountain ranges and well above average May and early June 2011 rain events (Story 2011).

Response of project area stream channels to flooding was highly variable ranging from minor to extreme, depending on discharge and resiliency of individual stream reaches. It is uncertain to what degree canopy removal from the 2006 Derby Fire has contributed to peak flow increases (PFIs), and the magnitude of flooding, in the project area. However, because vegetative ground cover had become reestablished over the five years following the 2006 Derby Fire, the influence of canopy removal on PFI is likely low to moderate (Story

Personal Communication). Table 16 below displays management interpretations of stream channel types both pre and post-2011 flood events.

**Table 16 Management interpretations of stream channel types pre (white) - and post (gray)-2011 flood (from Rosgen 1996).**

Stream	Channel types	Sensitivity to watershed disturbance <sup>a</sup>	Recovery potential <sup>b</sup>	Sediment supply <sup>c</sup>	Streambank erosion potential	Vegetation controlling influence <sup>d</sup>
Carey Gulch (Pre Flood)	B3 with G3 inclusions	low (B3) to very high (G3)	excellent (B3) to poor (G3)	low (B3) to very high (G3)	low (B3) to very high (G3)	moderate to high
Blind Bridger (Pre Flood)	B3upstream C3 near FS boundary	low (B3) to moderate (C3)	excellent (B3) to good (C3)	low (B3) to moderate (C3)	low (B3) to moderate (C3)	moderate (B3) to very high (C3)
West Bridger Cr (Pre Flood)	C4b	very high	good	high	very high	very high
West Bridger Cr (Post Flood)	C3*	very high	good	high	very high	very high
Derby Gulch upstream (Pre Flood)	G4	extreme	very poor	very high	very high	high
Derby Gulch upstream (Post Flood)	F3** Qualitative	moderate	Poor	very high	very high	moderate
Derby Gulch downstream (Pre Flood)	G3c	very high	poor	very high	very high	high
Derby Gulch downstream (Post Flood)	D4** Qualitative	Very high	Poor	Very high	Very high	moderate
North Derby Gulch upstream (Pre Flood)	B4	moderate	excellent	moderate	low	moderate
North Derby Gulch upstream (Post Flood)	B3*	low	excellent	low	low	moderate
North Derby Gulch downstream (Pre Flood)	B4	moderate	excellent	moderate	low	moderate
North Derby Gulch downstream (Post Flood)	B3c*	low	excellent	low	low	moderate

Stream	Channel types	Sensitivity to watershed disturbance <sup>a</sup>	Recovery potential <sup>b</sup>	Sediment supply <sup>c</sup>	Streambank erosion potential	Vegetation controlling influence <sup>d</sup>
<b>Lower Deer Cr above Placer Gulch (Pre Flood)</b>	B3 with C4 inclusions	Low (B3) to very high (C4)	Excellent (B3) to good (C4)	Low (B3) to high (C4)	Low (B3) to very high (C4)	Moderate (B3) to very high (C4)
<b>Lower Deer Cr above Placer Gulch (Post Flood)</b>	B3c	low	excellent	low	low	moderate
<b>Lower Deer Cr below Placer Gulch (Pre Flood)</b>	F3	moderate	poor	very high	very high	moderate
<b>Lower Deer Cr below Placer Gulch (Post Flood)</b>	Unknown, F3 probable	moderate	poor	very high	very high	moderate
<b>Tomato Can Gulch (Pre Flood)</b>	B4	moderate	excellent	moderate	low	moderate
<b>Tomato Can Gulch (Post Flood)</b>	Unknown, B4 probable	moderate	excellent	moderate	low	moderate
<b>Placer Gulch (Pre Flood)</b>	B3	low	excellent	low	low	moderate
<b>Placer Gulch (Post Flood)</b>	Qualitative G3**	very high	poor	very high	very high	high

<sup>a</sup> Includes increases in streamflow magnitude and timing and/or sediment increases

<sup>b</sup> Assumes natural recovery once cause of instability is corrected

<sup>c</sup> Includes suspended and bedload from channel derived sources and/or from stream adjacent slopes.

<sup>d</sup> Vegetation that influences width/depth ratio stability

\*Flood induced change in substrate size

\*\*Flood induced change in stream type.

### **Aquatic Species (Fish & Amphibian) and Redd Trampling**

Sensitive species are those plants and animals identified by the Regional Forester for which population viability is of concern. Fish species listed as 'sensitive' on the GNF include Arctic grayling (*Thymallus arcticus*), westslope cutthroat trout (*Oncorhynchus clarki lewisi*), and Yellowstone cutthroat trout (*O. clarki bouvieri*). Of the fish species listed as 'sensitive' on the GNF, only Yellowstone cutthroat trout (*O. clarki bouvieri*) are native to the Yellowstone River drainage. Streams throughout the project area are within historically occupied habitat for Yellowstone cutthroat trout. Yellowstone cutthroat trout surveys have been conducted in all streams throughout the project area (see Affected Environment narrative). Yellowstone Cutthroat trout are currently only present in Lower Deer Creek and a few of its smaller tributaries when and where flows are sufficient to provide suitable habitat. These include Placer Gulch, Fire Gulch, West Fork Lower Deer Creek, and Davis Gulch. Brown trout, which compete with and prey on cutthroat trout are present in Lower Deer Creek and comprise about 67% of the fish assemblage on National Forest System Lands prior to 2011 (MFWP 2010). Moreover, low levels of hybridization with nonnative rainbow trout were detected in 2005. To secure the long-term viability of this population, a barrier was constructed in 2010 downstream from the National Forest Boundary to prevent upstream invasion of nonnative fish. Subsequently, cutthroat rescue and brown trout removal efforts were initiated in 2011, securing a total of approximately 20 miles of habitat upstream from the constructed barrier free of non-natives.

There are two sensitive amphibian species found on the GNF, the northern leopard frog (*Rana pipiens*) and the Boreal (Western) toad (*Bufo boreas*). Northern leopard frogs breed from mid-March to early June (Maxell 2000). Mating occurs when males congregate in shallow water and begin calling during the day (Maxell 2000). Eggs are laid at the water surface in large, globular masses of 150 to 500 (Maxell 2000). Young and adult frogs often disperse into marsh and forest habitats, but are not usually found far from open water (Maxell 2000). Overwintering habitat is the bottom of permanent water bodies, under rubble in streams, or in underground crevices. During a Gallatin National Forest survey in 1999, northern leopard frogs were found only on the Bozeman Ranger District with a second potential sighting on the Gardiner Ranger District. None have been found in or near the project area; however, suitable habitat exists throughout the project area.

Western toads inhabit all types of aquatic habitats ranging from sea level to 12,000 in elevation (Maxell 2000). They breed in lakes, ponds, and slow streams, preferring shallow areas with mud bottoms (Maxell 2000). Western toads breed from May to July, laying long, clear double-strings of eggs (Maxell 2000). Tadpoles metamorphose in 40 to 70 days (Maxell 2000). Because of their narrow environmental tolerance (10-25 degrees Centgrade throughout the year), adults must utilize thermally buffered microhabitats during the day, and can be found under logs or in rodent burrows (Maxell 2000). Adults are active at night and can be found foraging for insects in warm, low-lying areas (Maxell 2000). Western toads overwinter in rodent burrows and underground caverns. Western toads have not been found on the east side of the Gallatin Range (Atkinson and Peterson 2000); however, suitable habitat exists throughout the project area.

Management Indicator Species (MIS) are those species whose habitat is most likely to be affected by management practices thereby serving as indicators of habitat quality. The Gallatin National Forest Plan directs that habitat is provided for identified management indicator species and those native indigenous species that use special or unique habitats. For coldwater habitats, all species of wild trout (self-perpetuating populations) whose life cycle

includes construction of intra-streambed spawning nests (redds) are listed by the 1987 GNF Forest Plan as management indicator species (GNF 2011). These include brook, brown, rainbow, golden, and cutthroat trout.

Incubation of trout eggs and embryos within stream gravels makes them particularly sensitive to habitat disturbance that increases fine sediment delivery to streams where these species spawn. Yellowstone cutthroat trout, brown trout, and brook trout are present within the Carey Gulch and West Bridger Allotments as described in the affected environment for stream form and function narrative and sensitive species analysis. Because all project area streams were at PFC prior to the 2011 flood event, grazing related effects to fish habitat were minimal. Alternatives 1, 2, and 3 would have a low level of effects to streams, similar to those observed prior to the 2011 flood event, with minimal grazing related impacts to fish habitat. These minor effects would be immeasurable and indiscernible from those incurred by the 2011 flood event.

Recent studies have shown that redd trampling by cattle in some streams can significantly impact spawning redds and incubating eggs. Many allotment streams or stream reaches on the east side of the Gallatin National Forest (GNF), have limited cattle access that is precluded by topography or dense riparian vegetation. For streams supporting Yellowstone cutthroat trout in the West Bridger Allotment, (i.e., Lower Deer Creek), redd trampling is not an issue because cattle access to those streams is limited. For all other streams (e.g., West Bridger Creek, Derby Gulch), fish assemblages are comprised of nearly 100% brook trout. Brook trout spawn in the fall after cattle are removed from the allotments, and fry emerge in the spring prior to when cattle are put on the allotment. For all streams in the allotments potential for redd trampling is minimal or non-existent. Therefore, this issue is dismissed from further detailed study in this analysis.

### **Climate Change**

Generally speaking, climate change can present a threat to aquatic habitat with projected long-term effects on water temperature and quantity. Recent warming has already driven significant changes in the hydro-climate, with a shift towards more rainfall and less snow in the western U.S. (Knowles et al. 2006). Likewise, the peak of spring snowmelt is two weeks earlier in recent years, and this trend is anticipated to continue (Stewart et al. 2004). Probable effects of climate change in the western U.S. will be increased water shortages and warmer water temperatures over time. These conditions may further restrict distribution of cold water dependent species such as bull trout (Rieman et al. 2007) and cutthroat trout (Williams et al. 2009) while increasing distribution of species more tolerant of warmer temperatures such as brook trout and brown trout (Rahel et al. 2008). In addition, changes in timing of spring runoff and temperature may alter spawning cues that have maintained temporal segregation of native and nonnative species.

However, in highly dissected mountainous areas, such as those found within the project area, local responses are highly variable (based on flow regimes, topography, and geology), and current climate models cannot reasonably predict responses at a practical scale. The past and present effects of climate change on the project area aquatic resources and fishery populations are reflected in the affected environment discussions. Within the temporal bounds of this analysis, effects due to climate change are not expected to significantly alter stream conditions or fish populations and therefore are not considered to be an issue needing further detailed analysis.

## *Scale of Analysis*

### **Spatial Bounds**

The spatial bounds considered for the effects analysis for fishery and aquatic resources include the downstream extent of where management actions may directly or indirectly effect channel morphology, aquatic habitat, or fish populations. Therefore, the analysis areas only include stream segments located within the allotment boundaries. The rationale for setting these boundaries is that grazing effects are minimal and local, and do not extend beyond the allotment boundaries.

### **Temporal Bounds**

The temporal bounds for analyzing cumulative effects on fisheries and aquatic resources for this project includes the period for which listed past, present, and reasonably foreseeable activities have and will occur and have environmental effects that influence streams in the project area (e.g., past grazing, 2006 Derby fire, 2005 and 2011 flood event) and throughout the allotment management plan (AMP) timeframe of approximately 2013-2022.

## *Methodology of Analysis*

Stream habitat and fish population; channel type and sensitivity; existing versus anticipated bank and channel stability by alternative; and existing versus anticipated riparian use by alternative were measured and observed, as well as the potential to meet DFC. Streams have considerable variability in their inherent sensitivity to disturbance, the role that riparian vegetation plays in maintaining their stability, and the ability to recover from grazing induced damage. Some stream or channel types are inherently very stable and not susceptible to grazing impacts, while other channel types are more susceptible to alteration. Thus, it is important to understand the sensitivity of individual streams and reaches within streams in order to evaluate past, present and future grazing effects on channel stability and fish habitat quality. The affected environment descriptions include a channel type classification and sensitivity analysis.

Likewise, depending on topography and vegetative patterns throughout the allotments, cattle may or may not use riparian corridors along various stream segments. In some cases, the stream or stream reaches may be inaccessible due to steep topography or deadfall. 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 used as access routes to suitable rangeland. Thus, in order to evaluate potential stream and riparian related grazing effects within an allotment, it is important to know what reaches of the streams in question receive continuous or transitory use and which reaches are more susceptible to grazing induced impacts. To do this, a GIS mapping exercise was completed using suitable forage and stream gradient overlays to identify potential accessible and sensitive stream reaches for field surveys. Stream gradient was used as a measure of sensitivity. As such, survey work focused on stream reaches most susceptible to grazing impacts.

The Forest Plan (MA7) requires the GNF to "manage riparian vegetation, including overstory tree cover, to maintain streambank stability and promote filtering of overland flows"(Forest Plan page III-21). Monitoring Item #5 in the Forest Plan monitoring requirements (Forest Plan Table IV-1, page IV-5) lists two guidelines which relate to limits of cumulative allowable management caused change to sediment filtration (i.e., more than a 25% loss in effective streambank cover), and stream channel stability. These guidelines are compared with monitoring data to determine whether the narrative standard above is being met.

Surveys of streams within the allotments were conducted during summer 2008, 2009, 2010, and 2011. Surveys were conducted specifically to determine the extent of grazing related riparian, channel and streambank impacts and conformance with the existing Forest Plan standards and guidelines. This information was used to determine both existing condition and desired future condition for stream and riparian resources. Channel types for streams were determined using Rosgen 1996 to determine whether major departures existed relative to channel form and function. Channel type information is also used to assess the inherent stability or resiliency of channels to grazing related impacts, and to help determine recovery potential. These data are then used in conjunction with a Proper Functioning Condition (PFC) assessment (Prichard 1998) to help determine a streams similarity to a desired future condition (DFC). PFC assessments and Rosgen surveys were repeated in stream reaches deemed sensitive to flood-related impacts in summer 2011 to reevaluate existing conditions after the 2011 flood event. In addition, streams within the analysis area were surveyed to determine fish species composition and relative abundance to help assess relative resource values.

The functioning condition of riparian-wetland areas is a result of interactions among geology, soil, water and vegetation. The Proper Functioning Condition (PFC) evaluation is a qualitative method for assessing the condition of riparian-wetland areas that considers hydrology, vegetation, and erosion/deposition attributes and 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 streams throughout the allotments. If a stream is in properly functioning condition (or at PFC), it is considered to be resilient enough to allow a riparian-wetland area to hold together during high flow events with a high degree of reliability. This resiliency also allows an area to then produce desired values, such as fish habitat, forage, and habitat for other riparian dependent species. It does not mean that the stream is in pristine condition. Potential Natural Condition (PNC) defines nearly pristine conditions. If a riparian-wetland area is not in PFC or is not “properly functioning”, it is placed into one of three other categories:

- Functioning 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...
- Unknown – Riparian-wetland areas that managers lack sufficient information on to make any form of determination.

### *Direct/Indirect Effects*

#### **Alternative One: No Grazing**

Alternative 1 would terminate the term grazing permits in both allotments and eliminate maintenance of structural improvements on National Forest land after a two year phase out period.

Implementation of Alternative 1, the no grazing alternative, would eliminate all potential for direct or indirect livestock grazing related affects to fish habitat or populations in stream reaches within the analysis area on National Forest land. Individuals, however, may continue to graze

livestock on their adjacent private land. Generally speaking, fish populations that are limited by livestock grazing impacts respond positively to improved habitat conditions. However, there is no evidence to suggest that fish populations within the analysis area have been limited by livestock grazing. The desired future condition of all stream segments throughout the allotments, as described above, would be achieved assuming natural recovery from recent flood events continues. All Forest Plan Standards relative to grazing and riparian areas would be met. Currently, all stream segments within the analysis area that are not at Proper Functioning Condition experienced a departure from desired condition from flood events rather than grazing-related impacts.

Implementation of Alternative 1 would have “*No Effect*” to stream channel stability or water quality for either of the West Bridger or Carey Gulch Allotments. With Alternative 1, there would be “*no impact*” to Yellowstone cutthroat trout and wild trout population viability would not be affected. Riparian health is anticipated to remain in a healthy, functional condition. As such, it is reasonable to assume that habitat conditions for amphibians will remain suitable where they occur. Even though neither northern leopard frogs nor western toads have been found in the project area, habitat for both species would be suitable. Therefore, no effects are anticipated for either species.

### **Alternative Two: Current Management**

Inherent stability for streams throughout the analysis area varies with stream type, existing riparian vegetation community types, and the magnitude and extent of impacts from the 2011 flood event. Many of the stream reaches surveyed are dominated by conifers, woody shrubs, grasses and forbs and have channel types that are inherently stable. Conversely, stream channels severely degraded from the 2011 flood event will remain unstable for several years until they recover naturally. Table 15 lists streams with channel types, riparian vegetation types, and their inherent stability or susceptibility to grazing impacts.

#### ***West Bridger Allotment***

Based on stream channel sensitivity analysis, field reviews, and PFC evaluations, the existing grazing management strategy (Alternative 2) within the West Bridger Allotment has had only minor localized impacts on riparian vegetation and streambank stability. All surveyed streams within the allotment were at Proper Functioning Condition prior to the 2011 flooding with some limited/localized bank trampling observed in Lower Deer Creek near the Tomato Can Trail, and in a 250-foot reach of North Derby Gulch. However, these impacts have not been of sufficient magnitude to impact stream habitat attributes in these streams, retard stream channel recovery from the 2005 flood event, or affect fish populations (Fish are not present in North Derby Gulch). It is unlikely that grazing at existing levels would retard stream channel recovery from the more recent 2011 flood or attainment of DFC's (See cumulative effects below). The North Derby Gulch enclosure, constructed during 2011, would eliminate grazing related impacts in the reach of concern by keeping livestock out of the impacted riparian area.

Continued grazing under the current management strategy (Alternative 2) would result in “*no effect*” to water quality or stream channel stability. Continuing grazing under current management likewise would have “no impact” on Yellowstone cutthroat trout and wild trout population viability would not be affected. Detailed rationale for this determination is included in the affected environment portion by individual stream. Under existing grazing management, there is minimal effect to potentially occupied amphibian habitat. Thus,

continued grazing under Alternative 2 would have no effect on Western toads or northern leopard frogs.

### ***Carey Gulch Allotment***

Based on stream channel sensitivity analysis, field reviews, and PFC evaluations, the existing grazing management strategy within the Carey Gulch allotment has had no detrimental impact on riparian vegetation, streambank or channel stability, channel form and function, or overall aquatic habitat quality. As of fall 2010, existing habitat conditions exceeded 90% of the streams inherent habitat capability for attributes influenced by grazing. Given the recovery of stream channels that occurred from the 2005 flood event under the current grazing regime, it is unlikely that grazing at existing levels would retard stream channel recovery from the 2011 flood or attainment of DFC's. As such, habitat conditions meet Forest Plan Implementation guidelines for habitat quality. Some localized trampling and grazing may occur on banks which were eroded from the flood event (See cumulative effects below). However, effects of localized trampling on streambank stability and sediment delivery to stream channels would be minimal relative to 2011 flood effects.

Continued grazing under the current management strategy associated with Alternative 2 would result in "*no impact*" to water quality or stream channel stability. Implementation of Alternative 2 would have "no impact" on Yellowstone cutthroat trout and wild trout population viability would not be affected. Detailed rationale for this determination is included in the affected environment portion by individual stream. Under existing grazing management, there is minimal effect to potentially occupied amphibian habitat. Thus, grazing under Alternative 2 would have no effect on Western toads or northern leopard frogs.

### **Alternative 3: Adaptive Management**

Adaptive Management is the process of utilizing monitoring data to determine if management changes are needed to improve resource conditions within allotments, and if so, what changes, and to what degree. Alternative 3 would allow for flexibility in the management of the allotments based on monitoring results to adjust livestock numbers, season of use, and/or installation of grazing related improvements within the allotments if impacts were to occur in the future. Under Alternative 3 (Adaptive Management), livestock grazing would be permitted under management systems designed to meet Forest Plan standards and guidelines focusing on end results described in terms of "Desired Future Conditions". A series of adaptive management practices are prescribed in phases in order to meet DFC's.

Phase I of Alternative 3, as described on pp. 25-28, would entail reissuance of term permits at the current stocking rates on the Carey Gulch and West Bridger Allotments and require monitoring of such. Monitoring would be conducted as proposed in the monitoring section (Tables 7 & 8) to evaluate whether DFC is being met, and if not, whether conditions are trending toward DFC. Monitoring, conditions would be re-evaluated (using field monitoring data) to determine whether further actions are necessary to achieve DFC, such as a reduction in livestock numbers and/or season of use. If monitoring determines that grazing management is retarding the attainment of DFC, then additional management actions, including additional riparian fencing or water developments would be implemented under Phase II. Monitoring would continue under Phase II to evaluate existing conditions relative to DFC.

### ***West Bridger Allotment***

Based on stream channel sensitivity analysis, field reviews, and PFC evaluations, implementation of Alternative 3-Phase I under existing stocking rates would have no detrimental impact to aquatic habitat attributes or fish populations. Given the recovery of stream channels that occurred from the 2005 flood event under the proposed 320 cow/calf pairs, it is unlikely that grazing at this level would retard stream channel recovery from the 2011 flood or attainment of DFC's. If monitoring in sensitive areas such as Lower Deer Creek near the Tomato Can Trail indicates that grazing is negatively affecting aquatic habitat, then cattle numbers, season of use, or infrastructure would be adjusted to ensure DFC's are met.

The adaptive management strategy associated with Alternative 3 would be expected to prevent/reduce any grazing related impacts in order to continue meeting Forest Plan standards and DFC's. Grazing under Alternative 3 would result in "no effect" to water quality, stream channel stability on the West Bridger Allotment. There would be "no impact" to Yellowstone cutthroat trout and wild trout population viability would not be affected. Detailed rationale for this determination is included in the affected environment portion by individual stream. Riparian health is anticipated to remain in a healthy, functional condition. As such, it is reasonable to assume that habitat conditions for amphibians will remain suitable where they occur. Even though neither northern leopard frogs nor western toads have been found in the project area, habitat for both species would be suitable. Therefore, no effect is anticipated for either species.

### ***Carey Gulch Allotment***

Based on stream channel sensitivity analysis, field reviews, and PFC evaluations, implementation of Alternative 3-Phase I with existing stocking rates would have no detrimental impact on riparian vegetation, streambank or channel stability, channel form and function, or overall aquatic habitat quality. Given the recovery of stream channels that occurred from the 2005 flood event under the proposed 47 cow/calf pairs, it is unlikely that grazing at this level would retard stream channel recovery from the 2011 flood or attainment of DFC's. If monitoring indicates streambank trampling and grazing are occurring at sufficient levels to be limiting streambank or channel recovery from the 2011 flood, or attainment of DFC's, then management actions could be implemented in a timely manner to prevent habitat degradation. Under Alternative 3, modifications to stocking rates or infrastructure can be accomplished without waiting until the end of the ten-year permit period or initiating additional NEPA. In this manner Alternative 3 provides flexibility to respond to changed conditions thus ensuring DFC's are met.

Grazing under Alternative 3 would result in "no effect" to water quality or stream channel stability in the Carey Gulch Allotment. There would be "no impact" to Yellowstone cutthroat trout and wild trout population viability would not be affected. Detailed rationale for this determination is included in the affected environment portion by individual stream. Riparian health is anticipated to remain in a healthy, functional condition. As such, it is reasonable to assume that habitat conditions for amphibians will remain suitable where they occur. Even though neither northern leopard frogs nor western toads have been found in the project area, habitat for both species would be suitable. Therefore, no effect is anticipated for either species.

### ***Cumulative Effects (by Alternative)***

A detailed evaluation of past, present, and reasonably foreseeable actions occurring within the analysis area was conducted to determine which actions may have cumulative effects with the proposal (See Aquatics Cumulative Effects Worksheet). Those actions that potentially could have cumulative effects with the proposal include the 2006 Derby Fire and the 2011 flood event and are discussed by alternative below.

**2006 Derby Fire:** There was a large wildfire in the project analysis area in summer of 2006. The Derby Fire burned 200,000 acres including approximately 90% of the lands within the West Bridger and Carey Gulch Allotments. Many of the fences and range improvements were destroyed in this fire, many of which have been replaced or are in the process of being replaced.

Mid-term effects of wildfire (first decade post-fire) on aquatic ecosystems typically include increased water yield and sediment routing, channel modification, erosion and mass wasting, decreased riparian shading and increased stream temperature, and increased large woody debris recruitment (Gresswell 1999). Similarly, grazing can effect streamside vegetation, sediment yield and routing, and may result in channel modification. Because the similar effects of wildfire and grazing may overlap in time and space, there is potential for cumulative effects with the action alternatives.

**2011 Flood Event (Deer Creek Range):** This catastrophic flood event washed out sections of the Main Bridger, West Bridger, and Derby Gulch road systems and caused significant channel erosion in portions of Bridger Creek, Derby Creek, and West Bridger Creek. Culverts were not damaged, but were not able to accommodate the extremely high flow levels. A project was initiated by the County and the Forest Service and most of the damaged roads are in the process of restoration. The affected streams and riparian vegetation, which had recovered by fall of 2010 from the 2005 spring flood event, will need time for recovery.

Segments of some stream channels within the project area, particularly Derby Gulch and North Derby Gulch, were substantially altered by the 2011 flood event. In extreme cases, the flooding resulted in conversion of stable channel types to unstable channel types in some stream reaches. Grazing and flooding have similar effects on aquatic habitat attributes. Generally, speaking, grazing has the potential to retard reestablishment of streamside vegetation and recovery of channel stability.

It is important to discern flood effects from grazing effects and determine where both may cumulatively affect aquatic habitat.

### **Alternative 1: No Grazing**

#### ***West Bridger and Carey Gulch Allotments***

Riparian areas and stream channels would recover naturally over time from both the 2006 Derby Fire and 2011 flood. Because livestock grazing would be phased out after two years under Alternative 1, there is no potential for cumulative effects.

## **Alternative Two: Current Management**

### ***West Bridger and Carey Gulch Allotments***

Riparian vegetation in areas burned by the Derby Fire has made a tremendous recovery during the five post-fire years under the existing grazing regime; thus Alternative 2 is not anticipated to retard continued vegetative or hydraulic recovery from the Derby Fire. Burned areas most sensitive to grazing disturbance would be monitored to evaluate grazing related impacts to streamside vegetation, streambank stability, and channel morphology.

Riparian vegetation and channel stability have also shown rapid recovery from the 2005 flood event under the existing grazing plan; thus cumulative effects are not anticipated with Alternative 2. This is largely because a majority of stream segments within the project area are comprised of channel types with cobble stream banks, which are not sensitive to grazing impacts. In more sensitive stream segments, cumulative effects of the 2011 flood event with the proposal are possible but not probable. Because grazing effects would be localized and temporary, the level of any potential cumulative effect would be negligible relative to the large scale streambank erosion and channel instability from the 2011 flood. Stream segments most affected by the 2011 flood event that are sensitive to grazing disturbance would be monitored.

## **Alternative 3: Adaptive Management**

### ***West Bridger and Carey Gulch Allotments***

Riparian vegetation in areas burned by the Derby Fire has made a tremendous recovery during the five post-fire years under the stocking rate proposed in Alternative 3-Phase I. The adaptive management alternative is not anticipated to retard continued vegetative or hydraulic recovery from the 2006 Derby Fire. Areas most sensitive to grazing disturbance would be monitored and necessary grazing adjustments would be made to reduce any perceived impacts to streamside vegetation, streambank stability, and channel morphology.

Because riparian vegetation and channel stability have shown rapid recovery from the 2005 flood event under the stocking rate proposed in Alternative 3-Phase I, cumulative effects are not anticipated. This is largely because a majority of stream segments within the project area are comprised of channel types with cobble stream banks which are not sensitive to grazing impacts. Stream channels most affected by the 2011 flood event that are sensitive to grazing disturbance would be monitored and grazing would be adjusted as needed. Therefore, cumulative effects of the 2011 flood event with the proposal are possible but not probable, and if present would be ameliorated through adaptive management.

## ***Compliance with Laws, Regulations and Guidelines***

### **Gallatin Forest Plan**

The Gallatin Forest Plan provides broad direction for the management of forest fishery resources and more specific direction for management of sensitive species.

#### ***Applicable forest wide standards (Forest Plan pp. II-18,19,20,23)***

- Emphasis will be given to the management of special and unique wildlife habitats such as wallows, licks, talus, cliffs, caves, and riparian areas.

- Habitat that is essential for species identified in the Sensitive Species list developed for the Northern Region will be managed to maintain these species. These species include: Trumpeter Swan, Westslope and Yellowstone Cutthroat trout, Western Pearlshell Mussel, Western Big Eared Bat, Spotted Bat, Ferruginous Hawk, Harlequin Duck, Boreal Owl, and Common Loon.
- Livestock grazing in riparian areas will be controlled at levels of utilization listed in Management Area 7 (see FP page III-19).
- Allotments with continuous grazing during the growing period will be evaluated and alternative grazing systems will be applied.
- Best management practices will be used on all Forest watersheds in the planning and implementation of project activities (see FP Appendix C and planning records – “Watershed Management Guidelines for the Gallatin National Forest”).

***Riparian Area (Management Area 7) applicable standards (Forest Plan page III-19,20,21)***

- Maintain suitable habitats for those species of birds, mammals, and fish that are totally or partially dependent upon riparian areas for their existence.
- Range improvements such as fences and water structures may be constructed to help meet the forage utilization standards listed below (see FP page III-20).
- Salting for livestock distribution will be outside of riparian areas.
- Concentration of livestock will be kept at a level compatible with riparian zone-dependent resource needs through development of pasture systems and associated improvements.
- Livestock utilization in riparian areas will follow these guidelines (see table in FP page III-20).
- Manage riparian vegetation, including overstory tree cover, to maintain streambank stability and promote filtering of overland flows.

Water quality and aquatic life standards for the GNF have recently been revised as part of the Travel Plan EIS Record of Decision. These new standards complement Forest Plan direction, and provide more specific guidance. All of the alternatives being considered for this project would comply with the above-mentioned standards.

**State of Montana Water Quality Act**

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 Montana Department of Environmental Quality has designated all of the streams in the West Bridger and Carey Gulch allotments as B1 Classification <http://www.deq.mt.gov/dir/Legal/Chapters/CH30-06.pdf>. Waters classified as B1 must be suitable for 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. A 5 NTU turbidity increase above naturally occurring turbidity is allowed in B1 waters. The Montana water quality standards (ARM 17.30.602 (19)) define naturally occurring as “conditions or material present from runoff or percolation over which man has no control or from developed land where all reasonable

land, soil, and water conservation practices have been applied”. The Montana water quality standards (ARM 17.30.602 (25)) define reasonable land, soil, and water conservation practices as “means, methods, measures, or practices that protect present and reasonably anticipated beneficial uses. These practices include but are not limited to structural and non-structural controls and operation and maintenance before, during, or after pollution producing activities.” <http://www.deq.mt.gov/dir/Legal/Chapters/CH30-06.pdf> These Montana water quality standards require the use of effective BMP’s so that water quality changes, if any, would be considered “naturally occurring”.

All of the alternative associated with this project would be in compliance with the State of Montana Water Quality Act.

### **Issue 3-Wildlife Species (Threatened & Endangered, Sensitive, Management Indicator Species, Migratory Birds) & Habitats (Sagebrush, Aspen, Riparian)**

Continuation of livestock grazing in the West Bridger /Carey Gulch Allotments has the potential to affect various wildlife species and their habitat. The analysis for wildlife species focuses on the three alternatives which include the current level and management of livestock grazing, the full scope of the identified adaptive management alternative, and the effects of no grazing. The analysis considers predicted effects of these disturbances on the appropriate analysis area for the individual species that may use those affected habitats. It is unrealistic to individually analyze every species that may be present within the defined analysis area. Therefore, the analysis focuses on those species in decline (threatened, endangered, sensitive, migratory birds), and other forest plan management indicator species (elk , bald eagle, pine marten, and northern goshawk). In addition, sagebrush obligate, aspen, and riparian species were considered because species associated with these habitat conditions were brought up in comment and the project may affect those habitat components. Not all wildlife species for which there is special management designation or concern are found within the project area and several would not be affected by proposal or would only be affected slightly; these species are briefly discussed and were dismissed from detailed analysis.

#### ***Affected Environment***

##### **General Landscape and Habitats**

The wildlife analysis area for the project includes habitat on both private and public lands for a wide array of wildlife species including songbirds, game birds, raptors, small mammals, forest carnivores, and big game animals. Areas that would be impacted by livestock grazing comprise of a variety of habitats, including low elevation coniferous forest, open grassland, sagebrush shrubland, aspen, and riparian areas.

##### ***Coniferous Forest***

In 2006, the Derby Fire burned through the majority of the National Forest and private lands within the allotment boundaries, resulting in various age classes of regenerated forest. Prior to the 2006 Derby Fire, forested types were extensive within the West Bridger and Carey Gulch Allotments. Early seral coniferous habitat is still recovering and may take many years to grow to mature forest. Some of these stands are on steep slopes, have substantial amounts of downfall, or are becoming stocked with trees. Due to lack of palatable forage and access, livestock use of this type is minimal and forest interior habitats are little affected by

livestock. Stands of timber that are relatively open receive more use by livestock for shade, and bedding, however, most of the ground cover in these areas consists of pinegrass and elk sedge and does not provide adequate or palatable forage for livestock. There would be little, if any, change in any conifer forest habitats associated with the implementation of any of the alternatives.

### ***Grassland and Shrublands***

Many species of wildlife depend on a variety of grassland and shrubland habitats. Some species require dense, lightly grazed grass stands while others require moderate to extensively grazed areas. The West Bridger and Carey Gulch Allotments consist of incised drainages and grassy ridges, plateaus, and benches between the drainages. Of the total acreage of suitable range, grasslands make up approximately 25%, shrub/grass 47%, and forested forage 28% on the West Bridger Allotment and approximately 3%, 66%, and 31% respectively on the Carey Gulch Allotment. Timothy, a non-native grass that has naturalized within the ecosystem, is the major livestock forage species at lower elevations. Noxious weeds and other non-native vegetation such as cheatgrass are creating downward trends in some areas, although most grassland and other upland grazing areas are in good condition on the West Bridger Allotment and are in fair condition on the Carey Gulch Allotment under current management.

Sagebrush shrublands were a climax vegetation type within the allotments prior to the Derby Fire of 2006; however, shrubs within a grassland matrix no longer represent a major component in the West Bridger and Carey Gulch Allotments. Ninebark, a shrub with no livestock forage palatability, is dominant in areas that contained a timbered pre-fire overstory.

Deferment and rotation of livestock grazing has provided for a mosaic of vegetative structural patterns (grazed and ungrazed) across the landscape. Although this mix of grassland and shrubland structure is most likely different than historic patterns, it is unclear how contemporary livestock grazing (as well as big game species) compares with the historic grazing regime. For the purposes of this analysis, the categories of grasslands and sage steppe habitat are combined into one category (sagebrush) because upland grasslands are in good condition with no issues relative to livestock grazing

### ***Riparian Habitat***

Streamside habitats, wet meadows, seeps, and springs all attract wildlife and are used as foraging sites, nesting habitat, and cover. These riparian habitats occur where drainage bottoms broaden, in micro-meadows within timber, or on otherwise dry slopes. Optimal riparian dominated vegetation consists of native grass-like plants, grasses, forbs, and shrubs. Dense timber, boulders, steep slopes, downed trees, and pooled water decrease accessibility and are less attractive to livestock. Where livestock have access, the riparian vegetation may be impacted. Impacts at these sites include introduction of non-native species, bare ground, reduced vigor of shrubs, decreased structural diversity, and altered vegetation composition.

Streams within the allotment boundaries include portions of Lower Deer Creek, West Fork Lower Deer Creek, Bear Gulch, Fire Gulch, Placer Gulch, Tie Cutter Gulch, Jims Gulch, West Bridger Creek, Derby Gulch, North Derby Creek and unnamed tributaries, and portions of Carey Gulch and Blind Bridger Creeks. The FS administered portion of the Carey Gulch Allotment contains very little water. Natural disturbances of wildfire and flooding have impacted these allotments and influenced the existing condition. Prior to the flood event in

spring of 2011, the majority of riparian areas were in proper functioning condition but lacked age class diversity and/or plant vigor. Since that time, field reviews determined that stream systems are once again recovering from a major natural disturbance at the landscape scale. While some streams are still at proper functioning condition, others are functioning at risk or nonfunctional (Rock 2011, unpublished paper). Although early seral cottonwood, aspen, and other vegetation communities are regenerating from these events, riparian vegetation is still lacking the desirable grass, form, and shrub components, age class diversity, and/or plant vigor.

### ***Aspen***

With the exception of riparian areas, aspen is considered the most biologically diverse ecosystem in the Intermountain West. Aspen occurs in the West Bridger and Carey Gulch Allotments in small, isolated clones. The relative health of the aspen is variable with several clones burned in the 2006 Derby Fire expressing regeneration and other stands decadent and dying due to lack of disturbance and colonization by conifers. Livestock foraging in aspen understory is occurring, but is not excessive. Moose, elk, and deer browsing are also evident. Field reconnaissance data indicates that most of the regenerating aspen patches are associated with perennial, intermittent, or ephemeral streams. For the purposes of this analysis, the category of aspen will be analyzed with migratory birds.

## ***Scale of Analysis***

### **Spatial boundary**

The general wildlife analysis is limited to those species that utilize all or a portion of the areas impacted by the proposed project activity, or for which comprehensive analysis is required. For the West Bridger and Carey Gulch Allotment revision analysis, grassland/shrubland on slopes >30%, and higher elevation Douglas fir, lodgepole and/ or spruce/ fir forest are not classified as suitable range for livestock (Rock 2011, unpublished paper). Therefore, these upland habitat types would not be affected by livestock grazing because livestock do not use these areas. The suitable vegetation types for livestock grazing within the allotments include grasslands, sagebrush/shrublands, open conifer forest with forage understory, aspen, and riparian areas, consisting of a total of approximately 1,904 acres.

### **Temporal boundary**

The wildlife analysis is limited to a ten year timeframe (typical allotment grazing permit), which is a reasonable amount of time to observe vegetative trends being impacted by grazing. The Derby Fire of 2006 and floods of 2005 and 2011 are natural disturbance events that also fall within the 10 year timeframe. The proposed adaptive management approach (Alternative 3) would incorporate monitoring that could lead to additional actions within this timeframe.

## ***Analysis Methodology***

Agency monitoring and surveying records were reviewed for documentation of presence or potential for presence of species of interest. The Montana Natural Heritage Program (MNHP) was consulted for species occurrence in the West Bridger and Carey Gulch allotments. Where data were available, habitat and/or species distribution was mapped using GIS tools from Montana Fish, Wildlife, and Parks website GIS data.

Geographic Information System (GIS) data queries were used to analyze impacts to lynx, flammulated owl, wolverine, bighorn sheep, pine marten, whitebark pine, and big game (elk). Data used for these efforts are typically generated from the Timber Stand Management Record System (TSMRS) database or Region 1 Vegetation Map (R1-VMap). Model results and maps are located in the project file.

Site visits were made to review the proposed adaptive management actions for the livestock grazing. Potential suitable habitat conditions for wildlife species were assessed at this time. These field reconnaissance visits were also used to determine the existing vegetative condition within the project area and look for evidence of wildlife use and any special features (e.g. nest sites, den sites, mineral licks, wet sites, wallows, cavity trees, foraging areas, staging areas, security cover, and travel corridors) that might need protection through mitigation or that would be adversely affected by the proposal. Field visits were documented and any special features were mapped using GIS tools. Surveys for sensitive plants were conducted.

### ***Wildlife Species, Habitats, and Other Issues Considered***

The analysis for terrestrial species focuses on the three alternatives, which include the current level and management of livestock grazing (Alternative 2), the full scope of the identified adaptive management (Alternative 3), and the effects of no grazing (Alternative 1). This analysis considers predicted effects of these disturbances on the appropriate analysis area for the individual species that may use the affected habitats. It is unrealistic to individually analyze every species that may be present within the defined analysis areas. Therefore, for the purpose of this project, threatened, endangered, sensitive, management indicator species, and migratory birds are analyzed to represent those that utilize similar habitats. In addition, sagebrush obligate species were considered and qualitatively discussed. Not all wildlife species for which there is special management designation or concern are found within the project area and several would not be affected by proposal or would only be affected slightly; these species were dismissed from detailed analysis.

The West Bridger and Carey Gulch Allotment revision suitable range areas do not provide suitable habitat, or will not affect habitat to any measureable or predictable degree, for the bald eagle, trumpeter swan, harlequin duck, peregrine falcon, black-backed woodpecker, flammulated owl, wolverine, bighorn sheep, pine marten, gray wolf, and Northern goshawk. Thus, these species were dismissed from detailed analysis with a short summary with rationale of why there are no effects or immeasurable effects to individual species and their habitat from the proposed allotment revision and the alternatives (pp. 92-98). Effects to sensitive plant species, including whitebark pine, were also considered and dismissed for similar reasons and are summarized below.

For those species that are present, or have the potential to be present and affected, information on habitat use and possible impacts associated with livestock grazing review was reviewed and disclosed. The species that will be further addressed in this EA include those species listed as threatened and endangered (grizzly bear and Canada lynx); sensitive species (gray wolf), management indicator species (elk), and migratory birds relative to the relationship of livestock grazing in areas that provide migratory bird habitat, including riparian and sagebrush habitat.

### **Threatened and Endangered Species (TES)**

Threatened and endangered species are managed under the authority of the Federal Endangered Species Act (PL 93-205, as amended) and the National Forest Management Act (PL 94-588). Section 7 of the Endangered Species Act directs Federal departments and

agencies to ensure actions authorized, funded, or carried out by them are not likely to jeopardize the continued existence of threatened or endangered species or result in the destruction or adverse modification of their critical habitats (16 USC 1536). In addition, Forest Service policy requires that all Forest Service programs and activities need to be reviewed for possible effects on threatened or endangered species (FSM 2672.4). Species to be considered during project analysis was provided through the FWS website (USDI 2011c) (last updated November 2, 2011), [http://www.fws.gov/montanafieldoffice/Endangered\\_Species/Listed\\_Species/Forests/Gallatin\\_sp\\_list.pdf](http://www.fws.gov/montanafieldoffice/Endangered_Species/Listed_Species/Forests/Gallatin_sp_list.pdf)) and include the Canada lynx, lynx critical habitat, and grizzly bear as threatened species and the wolverine as candidate species. Candidate species are given the designation of 'sensitive' until given a threatened or endangered listing; none of the substantive or procedural provisions of the Act apply to candidate species.

### ***Canada Lynx***

The Canada lynx is a medium sized cat associated with forested environments. Lynx require a range of habitat conditions for survival and reproduction. Forest cover is preferred for travel, resting and hunting. In general, lynx habitat on the Gallatin National Forest is defined as coniferous forest in the elevation range between 6,000 and 8,800 feet with habitat types where spruce or subalpine fir is the indicated climax species.

On March 24, 2000 the U.S. Fish and Wildlife Service (FWS) published its determination on the status for the contiguous U.S. distinct population segment of the Canada lynx. The lynx has since been listed as a threatened species in the contiguous United States. On March 27, 2009, the final rule designating revised critical habitat for lynx became effective. Lynx management direction comes from the Northern Rockies Lynx Amendment (NRLA) Management Direction Record of Decision (ROD) which was published in March 2007 (USFS 2007). This decision amended the Gallatin Forest Plan by incorporating goals, objectives, standards and guidelines for lynx habitat management. There are no Terms and Conditions outlined in the Biological Opinion for the NRLA (USDI 2007) related to livestock grazing and are not applicable to this analysis. The Final Rule (USDI 2009) for lynx critical habitat identifies Primary Constituent Elements (PCE), which are those physical and biological features that are essential to the conservation of the species, and that may require special management considerations or protections.

A portion of the West Bridger Allotment is located in Unit 5, Greater Yellowstone Area, which is designated critical habitat for lynx within the East Boulder Lynx Analysis Unit (LAU). LAUs are intended to provide the fundamental scale at which to evaluate and monitor the effects of management actions on lynx habitat. LAUs do not depict actual lynx home ranges, but their size generally approximates the scale of area used by an individual lynx. LAUs should be in contiguous lynx habitat and contain habitat components necessary for year-round use. LAUs are typically larger in less contiguous, poorer quality or naturally fragmented habitat. LAUs on the Gallatin Forest are typically larger than found elsewhere in Montana, since habitat here is naturally more fragmented.

The East Boulder LAU is approximately 84,764 acres. Lynx habitat in this LAU is patchily distributed and tends to be concentrated in a mid-elevation band between warmer, drier montane forest near the valley bottoms, and alpine habitat above treeline in the high plateau and mountain peak areas. Because of this patchy distribution, only

about one third of the LAU is mapped as lynx habitat in the form of moist, cool coniferous forest types, plus small inclusions of important non-forest types such as sage fields and willow/riparian habitat. The remainder of the LAU that does not provide lynx habitat consists of dry forest types and large open areas of meadow, rock or water. There is one known lynx recorded with the Montana Natural Heritage Program taken from fur harvest data during the winter of 1981-1982 approximately one mile north of the National Forest boundary and the West Bridger and Carey Gulch Allotments project area.

Due primarily to effects from the Derby fire of 2006, there are roughly 5,858 acres of lynx habitat in a currently unsuitable condition<sup>3</sup>, which affects approximately 20% of the mapped lynx habitat in the East Boulder LAU. Approximately 2,280 acres of mapped lynx habitat fall within the West Bridger portion of the East Boulder LAU. These areas have the potential to be forested and therefore, not conducive to livestock grazing. Other habitat components contiguous with modeled conifer habitats include sagebrush, aspen, and willow, which are also present on the allotment. Carey Gulch is outside of any LAU and contains no mapped lynx habitat. Table 17 below summarizes the National Forest (FS) lands within each allotment that are mapped as lynx habitat and how they overlap with suitable livestock grazing lands. The intersection was derived from overlapping mapped lynx habitat and suitable livestock grazing land.

**Table 17—East Boulder LAU Lynx Habitat within the Allotments**

Allotment Name	Total FS Acres Suitable for Livestock	Total FS Acres Lynx Habitat	Intersection of Suitable and Lynx Habitat
<b>West Bridger</b>	1,521	1,806	0
<b>Carey Gulch</b>	149	0	0

As indicated in Table 17 above, there is no overlap between suitable livestock grazing land and lynx habitat. The potential lynx habitat on the allotments tends to be heavily forested and therefore, not conducive to livestock grazing. Areas of conifer with grass understory are in a dry forest type and would generally not be considered lynx habitat due to the inherent low moisture regime that supports grass over vegetation needed to support snowshoe hare. Other lynx habitat components contiguous with modeled conifer habitats include sagebrush and aspen, which are present in very small quantities on the West Bridger and Carey Gulch Allotments. Riparian areas or areas of conifer with grass understory were not part of this model and tend to be linear features that are clumped with the adjacent vegetation communities. While the intersection does not take in all the factors related to how lynx and livestock use the landscape, it was a way to surmise the potential risk of adverse grazing effects on lynx habitat.

<sup>3</sup> Lynx habitat in an unsuitable condition consists of lynx habitat in a stand initiation structural stage where the trees are generally less than ten to 30 years old and have not grown tall enough to protrude above the snow during winter.

Livestock grazing effects on lynx or lynx critical habitat are also addressed in the programmatic biological assessment (USDA 2010 and USDI 2010b). Proposals that include livestock grazing must follow screening criteria as identified in the NRLA and programmatic BA (Appendix B, Part 1 and 2, Table D1) to receive a determination of “no effect” or “not likely to adversely affect” lynx or lynx critical habitat. Project planning standards and guidelines direct management of livestock grazing mirror the NRLA and include: 1) ensure aspen sprouting and survival sufficient to perpetuate long-term viability of the clones, 2) maintain or achieve mid-seral or higher condition shrub-steppe to provide lynx habitat matrix, and 3) maintain or achieve mid-seral or higher condition riparian areas or willow carrs to provide cover and forage for prey species. These criteria also adequately address the primary constituent elements of lynx critical habitat (USDI 2009).

### ***Grizzly Bear***

Land management direction specific to grizzly bear habitat is contained in the Gallatin Forest Plan, Appendix G: Grizzly Bear Standards and Guidelines (USDA 1987), Appendix H: US Fish and Wildlife Service Biological Opinion (USDI 1986), Forest Plan Amendment No. 19 (USDA 1996) and the Biological Opinion on Amendment No. 19 (USDI 1995). This direction pertains to land management activities *within* the grizzly bear recovery zone. There is limited Forest Plan direction specific to grizzly bear habitat management *outside* the recovery zone. The Gallatin National Forest Travel Management Plan (USDA 2006) provides direction pertaining to the construction and use of roads for projects both within and outside the recovery zone. This direction is not applicable to the West Bridger and Carey Gulch Allotment revision analysis. In addition, a forest-wide Special Order (#07-11-00-01) regulates the storage of food and other attractants on National Forest System lands within the entire Gallatin Forest boundary, for the purpose of minimizing adverse interactions between humans, bears and other wildlife. This direction is not applicable to the West Bridger and Carey Gulch Allotment revision analysis. Also, the US Fish and Wildlife Service has issued two Biological Opinions, each with terms and conditions that apply to Gallatin National Forest management actions outside the grizzly bear recovery zone (Effects of the Gallatin Forest Plan on Grizzly Bears that Occur Outside the Greater Yellowstone Area Recovery Zone (USDI 2004) and Gallatin National Forest Travel Management Plan (USDI 2006)).

Finally, the Conservation Strategy (ICST 2003) is taken into consideration. The Conservation Strategy led to the signing of a Memorandum of Understanding to seek implementation of the Conservation Strategy. Subsequently, the Conservation Strategy underwent the NEPA process to amend the Forest Plans in the Yellowstone area and replace current Forest Plan direction for grizzly bears. Since this Record of Decision was tied to the ultimate delisting of the grizzly bear, it is not currently valid. While not currently our management direction, it is considered the best science in the management of grizzly bear. Similar to the current Forest Plan standards, these management standards do not apply to the area outside the “primary conservation area” (PCA); there is no direction for livestock grazing management outside the PCA.

The GYA grizzly bear population met stated objectives, and was petitioned for delisting by the FWS in 2005. A Final Rule designating GYA grizzlies as a DPS and removing this segment was published in March 2007. However, a recent court order vacated the delisting and remanded the decision back to the Service. Therefore, as of the date of the

court decision (September 21, 2009), and subsequent Federal Register publication (USDI 2010a), GYA grizzly bears are again listed as threatened under the ESA. There is no critical habitat designation for grizzly bears in the GYA recovery zone.

The grizzly bear was listed as a threatened species under the ESA in the lower 48 states in 1975 (40 Fed. Reg. 1975:31736). The Grizzly Bear Recovery Plan (USDI 1993) delineated grizzly bear recovery zones, including the Greater Yellowstone Area. The GYA grizzly bear recovery zone covers parts of Montana, Idaho and Wyoming, and includes portions of six national forests (including the Gallatin), two national parks, state and private lands, and lands managed by the BLM. Grizzly bears also frequently use areas outside the designated GYA recovery zone. Agency actions must be evaluated for potential effects to grizzly bears wherever the bears are known or suspected to occur. The West Bridger and Carey Gulch allotments do not lie within the recovery zone for grizzly bears. However, the project area is within the area where bears are known to occur, south of Interstate-90 (USDI 2011c) and north of the Boulder/Slough #1 subunit of the Gallatin Bear Management Units (BMU).

Generally, in the Greater Yellowstone Area, grizzly bear occurrence and reports of occurrence outside the recovery zone boundary have been increasing over time, throughout the ecosystem. Grizzlies are well established and known to inhabit the wilderness to the south of the West Bridger and Carey Gulch Allotments. Suitable habitat existed prior to the Derby Fire of 2006 but it is unlikely that grizzly bears frequent this area now or are present during the livestock grazing season due mostly to the lack of cover. Grizzly bears were rarely to occasionally known to occur outside the wilderness in the Lower Deer Creek area during the spring emergence period (March through May) where bears exit their dens and cover large areas in search of food. However, they are not known to be consistently present in areas of suitable livestock forage. There are no known grizzly bear sightings recorded with the Montana Natural Heritage Program in the vicinity of West Bridger and Carey Gulch Allotments project area.

Grizzly bear issues related to livestock grazing generally involve depredation of livestock by grizzly bears, disposal of livestock carcasses, storage of human food and stock feed, and grizzly bear habituation, food conditioning and mortality risk associated with these activities (ICST 2003). Grizzly bears are more likely to feed on dead livestock that died for other reasons than to prey on live cattle. A grizzly bear clause was added to those livestock permits within the recovery zone in the early 1980's when the grizzly bear was first listed as a threatened species in order to prevent confrontation or conflict between humans and grizzly bears. No livestock related grizzly bear mortalities have occurred within the West Bridger and Carey Gulch allotments through 2011.

Issues of livestock depredation are dealt with by USDA Wildlife Services Agency (WS) whose goal it is to minimize man-wildlife conflicts. WS and the Forest Service have a signed Memorandum of Understanding (MOU) to identify responsibilities and establish guidelines for the management of wild vertebrates causing damage on National Forest lands. According to the Annual Wildlife Damage Management Work Plan provided by the Animal and Plant Health Inspection Service's Wildlife Services (USDA, APHIS 2011), all control actions undertaken by WS regarding grizzly bears are done under the authority of a sub-permit granted by the Grizzly Bear Recovery Coordinator and conditions as described in Section (i)(C) and (D) of the grizzly bear 4(d) rule, 50 CFR

17.40(b), and an MOU between MFWP and WS regarding a cooperative wildlife damage management program for grizzly bears. On the private land areas adjacent to the Gallatin National Forest, grizzly bears killed 2 calves valued at \$1,300. There were no grizzly bears taken on National Forest lands. The WS understands that on the Gallatin National Forest, grizzly bears are reasonably expected to occur on the Forest anywhere south of I-90. Therefore, USFS and WS will share information, and update maps as needed, for areas where grizzly bears are likely to occur.

Similar to that described for lynx, the effects of livestock grazing on the grizzly bear was considered per the Programmatic Biological Assessment for Activities that are Not Likely to Adversely Affect Listed Terrestrial Species (USDA 2010), use of decision screens, and concurrence letter (USDI 2010b) for those projects that fit within the programmatic screening process. The scope of this programmatic biological assessment applies to areas where grizzly bears are expected to occur; i.e., it's not limited to the PCA boundaries but rather includes the expanded occupied habitat. Proposals that include livestock grazing must follow screening criteria as identified in the programmatic BA (Appendix A, Part 1 and 2, Table D1) to receive a determination of "no effect" or "not likely to adversely affect" grizzly bear. Project planning standards and guidelines direct management of livestock grazing and include: 1) maintaining or reducing existing livestock grazing or changes livestock class to a less vulnerable species, and 2) no history of depredation or control actions. These screening criteria provide valuable guidance and were considered to determine if livestock grazing has an effect on grizzly bears that occur outside the PCA but within the distribution area of grizzly bears.

### **Sensitive Species**

Sensitive species are those animal species identified by the Regional Forester (USDA 2011b) for which population viability is a concern as evidenced by a significant current or predicted downward trend in population numbers, density, or in habitat capability that will reduce species' existing distribution (FSM 2670.5.19).

The analysis considers how the action provides for diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple use objectives, and within the multiple use objectives of a land management plan adopted (16 USC 1604 (g)(3)(B)).

#### ***Bald Eagle***

The bald eagle is typically associated with large lakes (> 80 acres) and major river courses (USDI 1994). They feed primarily on fish and carrion. The West Bridger allotment revision project area lies within the Bighorn Recovery Zone as identified in the Montana Bald Eagle Management Plan 1994 (USBOR 1994), which has a target of 11 nesting pairs. The target was achieved several years ago. The bald eagle was delisted from the Endangered Species Act and is considered fully recovered with 63 breeding territories reported in 2008 (MBEWG 2010b). The bald eagle exceeds recovery criteria and is protected by adherence to the Montana Bald Eagle Management Plan and the Addendum which provides guidelines (MBEWG 2010a).

The bald eagle has been addressed as a designated sensitive species since the delisting by the FWS officially occurred in August of 2007. The delisting determination was

based on a thorough review of the best available scientific and commercial information, which indicates that the threats to this species have been eliminated or reduced to the point that the species has recovered. After delisting, the Bald and Golden Eagle Protection Act (Eagle Act) (16 U.S.C. 668-668d) becomes the primary law protecting bald eagles in conjunction with other regulatory mechanisms including the Migratory Bird Treaty Act and Montana State Nongame and Endangered Species Act (MCA 87-5) (MBEWG 2010a).

Parameters to consider for effects analysis for the bald eagle include proximity to nesting areas (potential or known territories), juxtaposition with foraging areas, and presence of mortality risks such as structures or vehicle traffic.

Bald eagles are known to occur yearlong along the Yellowstone River, located north of the project area. There are not any identified bald eagle nesting territories within the project area. There are no bald eagle nest site management zones within the West Bridger and Carey Gulch Allotments, no alternative would permit structures that pose a risk to bald eagles or their prey within foraging areas, and there would be no increased road kills in foraging habitat. Continued livestock grazing, or the removal of livestock, is not expected to have any effect on this species or its habitat. Therefore, the bald eagle is dismissed from detailed analysis.

#### ***Peregrine Falcon***

There may be suitable habitat within the project area for peregrine falcon. However, there are no known eyries or suitable cliff habitat within reasonable proximity to water sources that could serve as potential eyries. Peregrine have been observed flying overhead mid-summer, but it is unknown where these birds may be nesting. Regardless, livestock do not generally affect nesting habitat of falcons due to the steep location of nest sites. Any cliffs used for potential eyries would not be considered suitable grazing land. No direct effects are anticipated and any indirect effects would be immeasurable. All of the activities proposed with the alternatives would lead to maintenance or recovery of riparian and upland habitats, which provide niches for prey species. Foraging habitat would be maintained or improved through proposed livestock grazing practices. The issues relative to livestock grazing effects on peregrine falcon can be dismissed from detailed analysis.

#### ***Trumpeter Swan***

Trumpeter swan would not be affected because suitable habitat does not exist in the area. Habitat requirements include fairly large bodies of water. Issues relative to effects on trumpeter swan are dismissed from detailed analysis.

#### ***Harlequin Duck***

Harlequin duck inhabits swift streams, which do not occur on any of the allotments. Presently, the harlequin duck is only found to nest along the Boulder River. The streams within the project area are very small and are not typical of their preferred habitat; therefore, issues relative to effects on harlequin duck are dismissed from detailed analysis.

### ***Flammulated Owl***

Associated with seral and climax late-successional forests, flammulated owls are a secondary cavity nester that feed almost exclusively on insects, are strongly associated with open ponderosa pine habitat, and also use aspen and dry open Douglas-fir habitats. The greatest impact to flammulated owl that has occurred on the Gallatin National Forest is the Derby Fire of 2006 wherein 207,650 acres burned, some of which was dominated by Ponderosa pine and considered suitable habitat. Modeling indicates that approximately 1,100 acres of potential flammulated owl habitat was located within the West Bridger and Cary Gulch Allotments prior to the Derby Fire. All of this was consumed to some degree, with no substantial forested stands remaining to offer adequate nesting habitat. While these areas are slowly regenerating, habitat for flammulated owls will not be available for a long time.

Survey efforts have been conducted, but no occurrences have been documented within the project area. A 2005 (pre-Derby Fire) Region-wide survey effort to detect flammulated owls conducted in the adjacent Deer Creek/West Bridger drainages also did not detect any flammulated owls. There are no element occurrence data of flammulated owls in this area recorded with the Montana Natural Heritage Program.

No direct or indirect effects on nesting, foraging, or roost sites are anticipated. There would be a very small risk of indirect effects due to changes in vegetative composition that may alter the availability of prey species. However, flammulated owl habitat in the West Bridger and Carey Gulch Allotments is not currently suitable and the grassland vegetation communities are in good condition. Implementation of proper livestock levels, management actions such as deferment, and use of adaptive management strategies would maintain flammulated owl habitat and would not influence the re-growth of future flammulated owl nesting, foraging, or roosting habitat, therefore, the issues relative to flammulated owl are dismissed from detailed analysis.

### ***Wolverine***

Wolverines are medium sized forest carnivores thought to be secretive and to stay in forest cover as much as possible. Generally speaking, wolverines are opportunistic omnivores in summer and primarily scavengers in winter. During summer wolverines are associated with high elevation and alpine areas. During the winter they occupy areas where prey is available. Females den at relatively high elevations in mature and old growth forests, as well as large-boulder talus fields and mountain cirques, which would not be considered suitable grazing land that livestock would utilize. While wolverines are basically habitat generalists with an opportunistic foraging strategy, the West Bridger and Carey Gulch Allotments do not offer any high elevation forested cover that a wolverine would select to use. Modeling indicates that the allotments do not provide habitat for wolverine, not even before the Derby Fire of 2006. No direct or indirect effects of livestock grazing would be expected. The issues relative to wolverine are dismissed from detailed analysis.

### ***Black-backed Woodpecker***

Black-backed woodpeckers are primary cavity nesters and prefer burned or dead forest with numerous snags containing wood boring insects. Samson (2006) conducted a conservation assessment for the northern goshawk, black-backed woodpecker,

flammulated owl and pileated woodpecker in Region 1. Short-term viability is not an issue as well-distributed and abundant habitat exists on the current landscape for these species. The long-term viability assessment relates to the sustainability of habitat conditions in which the species have persisted for an extended period of time (>100 years). Due to changes in habitat moving away from historic, such as loss of grasslands and the increases in intermediate-aged forests and the increased connectivity of the landscape, Samson (2006) gave a low for habitat representativeness, redundancy and resiliency in the long-term. Since that time, abundant burnt habitat for the black-backed woodpecker has been created within the West Bridger and Carey Gulch Allotments and the greater vicinity through recent wildfire events. However, the habitats woodpeckers use are not considered suitable for grazing, and are not likely to be impacted by grazing. The issues relative to grazing effects on black-backed woodpecker are dismissed from detailed analysis.

### ***Bighorn Sheep***

Bighorn sheep occur in a diversity of habitats throughout Montana but focus on rough, rocky terrain with steep cliffs in association with meadows or grasslands. There is no bighorn sheep habitat within the West Bridger and Carey Gulch Allotments. In addition, the West Bridger and Carey Gulch Allotments are cattle not sheep allotments, and there are no disease transmission concerns between bighorn sheep and cattle. Furthermore, according to the Montana Fish, Wildlife, and Parks GIS data (MFWP 2008), bighorn sheep distribution and subsequent hunting districts are located south of these allotments at higher elevation areas within the Absaroka-Beartooth Mountains. Therefore, issues relative to effects on bighorn sheep are dismissed from detailed analysis.

### ***Townsend's Big-eared Bat***

Big-eared bats forage for insects at night, often in and above open-grown mature forests. They are very sensitive to human disruption of roosts and hibernacula. Limestone cliffs and rock outcrops which may provide roosting and hibernating habitats are not known to occur on any of the allotments. Individuals may also roost in snags and old trees. The biggest risks to cave-using bats are loss of suitable roost sites and direct disturbance of bats in caves.

If the Townsend's big-eared bat does occur in the allotments, no known direct effects to Townsend's big-eared bats or their habitat due to livestock grazing are anticipated. Minor indirect effects may occur due to altering the prey base of bats (insects) or alteration of water resources (Torquemada and Cherry, unpublished paper) but these are immeasurable. Implementation of actions proposed such as improving livestock distribution, constructing additional water sources, implementation of riparian utilization guidelines, and adaptive management strategies would maintain or improve riparian and upland conditions, thus maintaining or improving foraging opportunities for the Townsend's big-eared bat. Proposed allotment revision would serve to maintain or improve riparian habitats, which would increase foraging habitat. The issues relative to effects on Townsend's big-eared bat are dismissed from detailed analysis.

### ***Gray Wolf***

The Gray Wolf Recovery Plan was approved in 1987 (USDI 1987). The plan delineated three recovery zones within Idaho, Montana and Wyoming. Gray wolves were

reintroduced to the Greater Yellowstone Ecosystem in 1995 and 1996 as a non-essential, experimental population under the ESA. The Yellowstone Ranger District is within the Greater Yellowstone Wolf Recovery Area and wolves were listed as a non-essential experimental population. Since the original animals were released in Yellowstone National Park, they have spread throughout the ecosystem as expected. Population objectives for the recovery of the gray wolf have been met.

Wolves were delisted on March 28, 2008 from the ESA in Montana and the management of wolves was transferred to the State. A Federal court decision reinstated the ESA protection for wolves on August 5, 2010. On April 15, 2011, President Obama signed the Department of Defense and Full-Year Appropriations Act, 2011 which included a section that directed the Secretary of the Interior to reissue within 60 days of enactment the final rule published on April 2, 2009, that identified the Northern Rocky Mountain population of gray wolf (*Canis lupus*) as a distinct population segment (DPS) and to revise the List of Endangered and Threatened Wildlife by removing most of the gray wolves in the DPS (USDI 2011b). Therefore, as of May 5, 2011, gray wolves in Montana and Idaho, as well as portions of eastern Oregon, eastern Washington, and north-central Utah, are removed from the ESA.

Gray wolves are habitat generalists, and make use of a wide variety of habitat types throughout the course of their lives. Habitat for the gray wolf is available in the West Bridger and Carey Gulch Allotments. Wolves have been observed on National Forest lands in the Absaroka and Beartooth Mountain Ranges. The Moccasin Lake pack was established in the East Boulder vicinity in approximately 2004. Denning and rendezvous sites were located in an adjacent drainage to the north. Livestock depredations occurred and wolves were removed by 2009. Since that time, the only known established wolf pack that has been documented is located near Baker Mountain in the Main Boulder River drainage. These pack locations and associated denning and rendezvous sites are not within the West Bridger and Carey Gulch Allotments.

### *Sensitive Plants*

The issue is the potential effect of livestock grazing on sensitive plants that may occur on the allotments. Currently there are 18 plant species designated as sensitive on the Yellowstone Ranger District. Sensitive plant surveys were conducted in the allotment project area in 1998, 2000, and 2008 (West Bridger) and 1994 and 2008 (Carey Gulch). No sensitive plants were found on the allotments during any of the surveys.

Sensitive plant species that were targeted for survey in 2008, based on potential habitat include *Balsamorhiza macrophylla* and *Polygonum douglasii* ssp. *austiniae*. Surveys conducted during 2008 focused on riparian areas, sagebrush areas, grassland, aspen, and timber/range types. During these surveys, an attempt was made to list all plant species found with special attention to riparian areas. Surveyors noted that there was limited suitable habitat and low probability for occurrence for sensitive plants.

Sensitive plant species that have a moderate vulnerability to grazing include: *Gentianopsis simplex*, *Juncus hallii*, *Salix barrattiana*, and *Eriophorum gracile*. Only one occurrence is documented for *Eriophorum gracile* and *Gentianopsis simplex* (Madison County and the Bridger Mountains respectively) on the Gallatin Forest. No occurrences of *Juncus hallii* or *Salix barrattiana* exist for the Gallatin Forest, and the West Bridger and Carey Gulch Allotments do not have habitat potential for these species.

In addition to these grass, forb, and shrub species, whitebark pine was designated a sensitive species, effective December 24, 2011 (USDA 2011a). On July 19, 2011, the U.S. Fish and Wildlife Service (FWS) published in the Federal Register (USDI 2011a) its 12-month status review finding on a petition to list whitebark pine under the Endangered Species Act. After a review of all available scientific and commercial information, the FWS concluded that listing the species as threatened or endangered is warranted, but precluded by higher priority actions. Whitebark pine (*Pinus albicaulis*) is a five-needled, hardy, slow-growing, long-lived conifer that typically occurs on cold and windy high-elevation or high-latitude sites in western North America. Whitebark pine is typically found growing at alpine timberline or with other high-mountain conifers just below the timberline and upper montane zone and is found on the Gallatin National Forest. The West Bridger and Carey Gulch allotments are well below timberline or upper montane zones; whitebark pine is not found within these allotments and would not be impacted by livestock grazing.

Surveys and (lack of) potential habitat were considered to determine that livestock grazing in this project area would have “no impact” on any sensitive plant species suspected or known to occur on the Gallatin National Forest and will not be further addressed.

### **Management Indicator Species**

Management indicator species (MIS) are wildlife species whose habitat is most likely to be affected by management practices thereby serving as indicators of habitat quality. Five terrestrial species are identified as MIS in the Gallatin National Forest Plan 1987: II-19 (USDA 1987). These are the grizzly bear, bald eagle, Northern goshawk, pine marten and elk. As noted above, the bald eagle was dismissed from detailed analysis. The grizzly bear is analyzed in the threatened and endangered species section.

#### ***Northern Goshawk***

The Northern goshawk is ranked as a G5, S3 species by the MNHP, meaning that globally the species is widespread and abundant but not vulnerable, while in Montana, it is at risk because of limited and potentially declining numbers, extent, and/or habitat. This species was removed from the Regional Forester’s sensitive species list in 2007 because (1) habitat exists to support reproductive individuals on each Forest; (2) habitat is well-distributed; and (3) individual goshawks can interact with one another across the Region, and therefore, does not meet the Forest Service Manual (2670.5) definition of a sensitive species (USDA 2007). The goshawk continues to be considered as a management indicator species; however, there are no Forest Plan standards for the management of goshawk habitat.

The Gallatin Forest Plan lists the northern goshawk as the management indicator species (MIS) for dry Douglas-fir old growth habitats. A systematic random survey in Region 1 in 2005 showed that the goshawk is relatively common and well-distributed in the Northern Region (Kowalski 2006:9). Region-wide conservation assessments for the northern goshawk have been completed that indicate the short-term viability of the goshawk in the Northern Region is not an issue (Samson 2006:39-40 and Bush and Lundberg 2008). This was further confirmed by Gallatin Forest Plan Management Indicator Species Assessment (Canfield unpublished paper: 20) that summarized survey data and habitat threshold models specifically for the Gallatin Forest, and determined

that project level management activities are relatively inconsequential compared to natural events that could affect goshawk habitat.

Livestock are not expected to affect goshawk nesting habitat as goshawk primarily nest in mature conifer forests. Goshawks forage in a variety of open and forested communities and prey on small mammals and birds. These are habitats that seldom produce much forage and are considered unsuitable for livestock grazing but may be used by livestock for incidental forage and/or shade. Livestock could slightly alter grassland habitat where prey may be located. With the adaptive management alternative, implementation of utilization levels in riparian and aspen communities would maintain or improve goshawk habitat. Under current management, livestock are not impacting dry Douglas fir mature or old growth forest to any measurable degree. Habitat for goshawk, and other species dependent on dry Douglas fir old growth, would not be affected to any measurable degree by livestock grazing. The issue regarding the Northern goshawk is dismissed from detailed analysis.

### ***Pine Marten***

The pine marten is an indicator for mesic old growth habitat consisting of spruce/ fir forest types. The marten is strongly associated with forested habitat. Mature and old growth forested habitat types seldom produce palatable and accessible livestock forage and are considered unsuitable for livestock grazing. Livestock grazing is not expected to have any measurable effect on this species or its habitat. Modeling indicates that approximately 2,086 acres of preferred or suitable habitat was present (pre-Derby Fire) within the West Bridger and Carey Gulch Allotments. Very little modeled habitat overlapped with any suitable livestock grazing vegetation and more was present at higher elevations outside the allotments to the southwest. Regardless, all of this type of habitat was burned to some degree with the Derby Fire (2006).

Trapping is a mortality variable that may play a role in population trends, but is dependent on pelt prices, proper reporting, accessibility, and overall trapping pressure. Therefore, population trends are not necessarily a function of habitat. Marten are managed as a furbearer species by the State of Montana Fish, Wildlife, and Parks. Furbearer trapping season dates for District 5, which includes the project area, are December 1 to February 15. There is no limit on the number of marten that may be taken. According to the furbearer trapping and harvest reports from 1996-2008 (no report for 2004), there were 0-2.98 marten reportedly taken in Sweetgrass County (<http://fwp.mt.gov/hunting/planahunt/harvestreports.html#furbearer>).

According to the Gallatin Forest Plan Management Indicator Species Assessment (Canfield, unpublished paper:21), data received from MFWP indicate that since 2006, the statewide marten harvest continues to remain relatively stable and that pine marten population trends on the Gallatin appear to parallel statewide trends. Therefore, quantity and distribution of habitat across the Gallatin as a whole does not appear to be the limiting factor (Canfield, unpublished paper: 23). Bush and Lundberg (2008:11) looked at Forest Inventory Analysis (FIA) data and estimated that there is approximately 33.5% or 384,965 acres of pine marten habitat on the Gallatin Forest, adequate to maintain species viability. There is no global, state, or agency ranking that indicates a concern for the viability of this species. The project would not affect pine marten habitat so this species is dismissed.

### *Elk*

Elk are the MIS species designated as the indicator for big game habitat. Potential issues affecting elk from the proposed livestock grazing include competition for forage and space. The area encompassed by the West Bridger and Carey Gulch Allotments can serve as both summer range and winter range. Elk use of the allotments may occur year-round depending on elevational gradients and annual climatic patterns across the landscape in relation to allotment boundaries.

The West Bridger and Carey Gulch Allotments lie within Hunting District (HD) 560 of the Absaroka Elk Management Unit (EMU). According to the Montana Statewide Elk Management Plan (MFWP 2004), this EMU is approximately 2,420-square-miles, located on the north and west flanks of the Beartooth and Absaroka Mountains. It includes the Deer Creeks/Susie Creek herd which is adjacent to the West Bridger and Carey Gulch Allotments. There were 30-40 elk in the Deer Creeks/Susie Creek herd throughout the 1970s and early 1980s. The herd began increasing in the mid-1980s and by 1991, it was estimated that 120-130 elk were present. Subsequent increased antlerless harvest over the next few years reduced elk numbers to approximately 75-100 elk in the Deer Creeks/ Susie Creek area (Paugh 2010a). Starting in 1999, elk moved from the Deer Creeks/Susie Creek area into alfalfa fields along the Boulder River on private land during the winter months. Although elk have been observed during December and January, elk have not been using these alfalfa fields as consistently since the Derby Fire (Paugh 2010a). In addition to the Deer Creeks/Susie herd unit, another herd unit became established in the area between Bridger Creek and Lower Deer Creek. From 2006-2007 small bands of elk were using this area; in the winter of 2008/09 significant elk activity was reported. This new herd is the ‘Greycliff’ herd and now winters between Lower Deer Creek and Bridger Creek, on private land and well outside of the allotment boundaries.

Elk population objectives for the entire Absaroka EMU are to maintain the number of elk within 20% of 2,650 elk (2,120-3,180) (MFWP 2004). This is further broken down to objectives by each HD. Specifically for HD 560, the objective is 700 elk, with 100 being the target population for the Deer Creeks herd. No objective has been defined for the new Greycliff herd.

Issues affecting big game species other than elk include competition for forage and woody browse. Use by mule deer (and occasional whitetail deer) occurs throughout the West Bridger and Carey Gulch Allotments. Forage preferences for deer differ from livestock. Mule deer seek grasses early in the spring, but switch to forbs and shrubs as the grazing season progresses. Deer hunting regulations suggest that populations are thriving, as either sex and/or antlerless permits are offered (Paugh 2010b). Although there is some winter range on lower elevation national forest lands (below 6,000 feet elevation), most winter range is on low elevation private lands (Paugh 2010b). Moose are associated with deciduous riparian vegetation, aspen, and adjacent forest canopies. Moose may have been present prior to the Derby Fire, but would not be expected to frequent the allotments due to lack of cover and forage. Neither mountain goats nor bighorn sheep would find adequate habitat on the West Bridger or Carey Gulch Allotments. Therefore, livestock grazing is not affecting their presence or distribution across this landscape. Forage, woody browse, and spatial competition with big game

species (other than elk) were dismissed from further detailed analysis. Elk is further addressed under the effects analysis discussion below.

### **Migratory Birds**

Migratory birds are protected under the Migratory Bird Treaty Act (16 USC 703-711). A January 2001 Executive Order requires federal agencies to ensure that environmental analyses of federal actions evaluate the effects of actions and agency plans on migratory birds. Migratory birds are a diverse group including raptors, waterfowl, shore birds, game birds, and songbirds that utilize a vast array of habitats for nesting and foraging. Habitats found in the West Bridger and Carey Gulch Allotments that are most vulnerable and may be impacted by livestock are those associated with riparian vegetation and aspen. Migratory bird species tend to utilize these habitats; therefore analysis for migratory birds is based on the effects to riparian habitat. There are currently no Forest Plan standards specific to migratory birds.

Issues identified affecting birds include nesting habitat, food sources, and nest parasitism of neotropical migrants, adequate plant succession, and/or stubble height to produce a prey base (insects) for upland game birds, and grazing impacts on small mammal habitat and abundance serving as prey base for larger raptors.

### **Riparian**

For the West Bridger and Carey Gulch Allotment revision proposal and alternatives, migratory birds and sagebrush obligatory species were used as an indicator group to analyze effects on riparian and sagebrush shrubland habitats potentially impacted by livestock grazing. Streamside habitats, wet meadows, seeps, and springs all attract birds. Riparian areas are used as foraging sites, nesting habitat, and cover. Riparian areas are key habitats for migratory birds as more than half of western landbird species breed exclusively or primarily in deciduous vegetation associated with water. Migratory birds are especially vulnerable to degradation of riparian habitat due to their limited distribution and extent across the landscape. Migratory bird species that utilize vegetation communities degraded by grazing may experience fewer or lower quality nesting opportunities, less cover making them susceptible to predation, diminished feeding opportunities, and general disturbance.

According to Rock (2011, unpublished paper), the majority of riparian habitats on the West Bridger and Carey Gulch Allotments are meeting the desired future condition and are only lightly impacted by cattle. These areas exhibit a high similarity to the potential natural community because they are either inaccessible to livestock, produce forage that is not suitable for livestock, or are grazed only in passing and not used for extensive periods for loafing and shade.

Prior to the flooding that occurred in 2011, the majority of streams were in proper functioning condition and meeting the desired future condition for vegetation. A few isolated areas in North Derby did not have the desired vigor or age class diversity for the shrub community (Rock, unpublished paper). Derby Creek, Lower Deer Creek, and parts of West Bridger Creek were also lacking age class diversity due to the 2005 flood event. Since the flooding event in 2011, the majority of streams are not meeting the desired future condition for riparian vegetation. Derby Gulch, upper North Derby Gulch, Jim's Gulch, and Lower Deer Creek went from proper functioning condition to functioning-at-risk; the lower part of North Derby Gulch is nonfunctional. Fortunately, the flooding caused channel instability and the vegetation providing migratory bird habitat remained intact (though

lacking some age class diversity as in 2010). The exception to this is lower Derby Gulch where excessive deposition created a bare floodplain where vegetation has not yet reestablished.

Two Montana Landbird Monitoring Program transects were located within the West Bridger and Carey Gulch Allotments. These transects follow an established protocol designed to conduct point counts as an effective way to determine presence of birds in the general area. One of these transects was established in Placer Gulch riparian habitat in 1995. Data from this transect indicate there were approximately 38 species of birds utilizing this area. This was prior to the two aforementioned flood events and the Derby Fire of 2006. This transect was monitored again in 2009 after these natural disturbance events, documenting that numbers and types of species changed to reflect the early successional stage created. In 2009, 12 species were recorded. Livestock grazing continued throughout this timeframe except for a two years rest immediately post-fire. Therefore, the difference in species abundance is most likely attributed to the loss of riparian habitat due to fire.

Riparian vegetation is also impacted in small patches around water developments where livestock have access. Impacts at these isolated sites include introduction of non-native species, bare ground, reduced vigor of shrubs, decreased structural diversity, and altered vegetation composition.

### **Aspen**

Aspen is considered a keystone species. Aspen, a deciduous tree, contributes to ecological diversity and supports a variety of plant associations. According to Campbell and Bartos (2001), Johnson (2005), and Kay (1997), aspen stands with the exception of riparian areas, are considered the most biologically diverse ecosystems in the Intermountain West. As aspen dominated landscapes covert to other cover types, tremendous biodiversity is lost.

Aspen stands provide important habitat for many species of wildlife (DeByle 1985b, Johnson 2005). Aspen provides forage, cover, shade, and nesting habitat for birds as well as small mammals, big game, and forest carnivores. Aspen provides habitat for many species of birds, some of which utilize the stand year-round while others use aspen during only a portion of the year (DeByle 1985b). Birds breeding in aspen stands include shrub or tree canopy nesters, cavity nesters, or ground nesters. Aspen trees offer more structural diversity than conifer forests (Johnson 2005). Snags provide perches for birds of prey and sites for cavity nesters. Bird communities vary with the size, age, and grazing history of aspen clones (Kay 1997).

Aspen stands provide forage and shade for both livestock and wildlife. The young aspen sprouts themselves are nutritious forage that can contribute to a large portion of both livestock and ungulate diets, particularly in the fall.

Aspen on the West Bridger and Carey Gulch allotments has increased since the Derby Fire of 2006. Habitat reconnaissance mapping indicated aspen regenerating by suckering of the overstory that was removed by fire. Prolific regeneration was observed along Derby Gulch, North Derby Gulch, West Bridger Creek, Tomato Can Gulch, Placer Gulch, and isolated clones throughout the allotments.

## **Sagebrush**

Sagebrush shrublands do not represent a major vegetative component in the West Bridger and Carey Gulch Allotments. Based on historical rangeland mapping, approximately 891 acres were displayed as sagebrush shrublands climax vegetation type within those areas considered suitable livestock range, and this estimate does not reflect the effects of the 2006 Derby Fire. Recent habitat reconnaissance, which specifically validated the current extent of sagebrush, determined that there are approximately 248 acres or 28% of the potential climax sagebrush within the suitable range component. According to Rock (2011, unpublished paper), what sagebrush shrublands that do exist are in good condition under current livestock management. The West Bridger and Carey Gulch Allotments include sagebrush habitat types with co-dominant grass species Idaho fescue, Timothy/ needle grass, and bluebunch wheatgrass/ Idaho fescue. Additional sagebrush shrublands occur on slopes >30% slope that are not considered suitable for livestock grazing, and are not within the spatial scope of this analysis. A portion of these sagebrush areas also were burned in the 2006 Derby Fire.

Research indicates that 20-30 years are required for sagebrush stands to show recovery from burning (Hoffman 1996). However, Paugh (personal communication) observed sagebrush seedlings from a couple inches to 6-8 inches tall in burned areas on the West Bridger Allotment that appeared green and vigorous. Dobkin (1992) asserts that fire occurred less frequently in shrub/steppe habitats than in grasslands but was necessary for this ecosystem to function normally. Fire, prior to domestic livestock grazing, created a landscape scale mosaic of habitats ranging from relatively grass dominated communities to shrub dominated communities. While wildfire has altered sagebrush historically, Welch (2005) provides a different interpretation of the recovery of shrub/steppe ecosystems after fire by summarizing "The length of fire interval in the big sagebrush ecosystem remains an active debate". USFS field crews also noted some sagebrush regeneration in this area (Rock 2011, unpublished paper). Therefore, the sagebrush that currently exists within the grassland matrix in the West Bridger and Carey Gulch project area may be representative of pre-livestock natural conditions.

Sagebrush community types provide a unique and important habitat for many species of wildlife. Some wildlife species are sagebrush obligates, which means that sagebrush is critical for the completion of their life cycle. Other species have a facultative association with sagebrush meaning that they use sagebrush habitat during portions of their life cycle. Dobkin and Sauder (2004) and Welch (2005) provide lists of both obligates and facultative species. Wildlife species that are sagebrush obligates include sage grouse, sage thrasher, sage sparrow, Brewer's sparrow, pygmy rabbit, and sagebrush vole. The Montana Natural Heritage Program (MNHP) was consulted for records of any of these species; none were documented to occur in the West Bridger and Carey Gulch Allotments. Also consulted was P. D. Skaar's Montana Bird Distribution (Lenard et al. 2003) publication, which shows breeding and wintering areas for every bird species ever observed in Montana. Records documented herein indicate that there are no records of current breeding or wintering evidence or any sightings of the sagebrush obligate bird species listed above. Between the two references, outside of the West Bridger and Carey Gulch Allotments (at lower elevations), sage grouse, sage thrasher, sage sparrow, and Brewer's sparrow were reported. Sage grouse distribution maps provided by the MFWP indicate that portions of the West Bridger and Carey Gulch Allotments fell within the historical sage grouse distribution areas, but are outside current known distribution areas for this species. The closest known sage grouse lek is a minimum of six miles to the north/ northwest of the West Bridger and Carey Gulch Allotments on private land.

In addition to observations documented by those cited above, and similar to the landbird transect established in 1995 in riparian habitat, there was a landbird transect established on Derby Ridge in a sagebrush/grassland mosaic. The Derby Ridge and Placer Gulch transects did not record any of the sagebrush obligate bird species. There was an incidental record for Brewer's sparrow on the Derby Ridge transect in a burned area without a lot of sagebrush and no cattle use; no additional auditory or visual sightings were recorded during subsequent visits.

Similarly, Foresman (2001) documented no collected records of either the pygmy rabbit or sagebrush vole in the West Bridger and Cary Gulch Allotments. The pygmy rabbit is a Great Basin species whose distribution occurs to the west and south. Sagebrush voles do occur east of the Continental Divide where suitable habitat exists; Sweetgrass County reflects probable occurrence based on broader North American range distribution. The MNHP has no records of these species within the West Bridger and Carey Gulch Allotments.

Facultative species include a variety of bird and small and large mammal species. Mule deer seek cover and forage from sagebrush during the winter months. Elk also use sagebrush during late fall and winter, but are more dependent on grassland types throughout the year (Mehus 1995). Sagebrush communities provide food, thermal cover, escape routes, and rearing sites for a variety of wildlife species. McAdoo et al. (2004) suggest that creating a mosaic of habitats with multiple-aged stands of sagebrush and varying degrees of shrub cover provides the diverse vertical and horizontal vegetation composition and structure required by a diversity of wildlife species.

## ***EFFECTS ANALYSIS***

### **Direct and Indirect Effects**

#### ***Alternative 1-No Grazing***

Under Alternative 1, there would be no livestock grazing on the West Bridger and Carey Gulch Allotments after a two year phase out period. Removing livestock from the allotments would eliminate any habitat alteration and human activity associated with permitted livestock grazing from occurring.

#### **Threatened and Endangered Species**

None of the associated habitats for lynx and grizzly bear would be affected by the no-grazing alternative because the removal of livestock grazing is not expected to have any measurable effects.

#### **Sensitive Species**

The project area does not provide suitable habitat or will not have any measurable effect on habitat for the bald eagle, peregrine falcon, trumpeter swan, harlequin duck, flammulated owl, wolverine, black-backed woodpecker, Townsend's big-eared bat, and bighorn sheep, so these species are only briefly addressed in this analysis. It was determined that all of the alternatives would have "no impact" on these species. Gray wolf is discussed below.

### ***Gray Wolf***

Parameters to consider for effects analysis for the gray wolf include maintaining or enhancing populations of wolf prey species (primarily ungulates), potential of increased mortality risk (due to changes in open road densities), and concerns about livestock grazing (due to vulnerable livestock species or potential depredation and subsequent control actions). These considerations are to be analyzed in relation to any proposed action. Since there would be no livestock grazing under this alternative, there would be no impacts to the ungulate populations, no changes in road densities, and no potential depredation or control actions. If wolves did move into the area, there would be no risk of wolf/livestock depredation and subsequent control actions.

### **Management Indicator Species**

The grizzly bear and bald eagle are also threatened or sensitive species and were analyzed separately as discussed above. Alternative 1 would have no effect to pine marten and northern goshawk habitat as discussed on pp. 94-95 and these species were dismissed from detailed analysis. Discontinuing livestock grazing under Alternative 1 would serve to maintain or somewhat decrease foraging habitats, thereby maintaining or decreasing the attractiveness and suitability of these sites to elk (See elk discussion on pp. 109-110).

### **Migratory Birds**

The effects of removing livestock may be beneficial for those migratory bird species that rely on complex riparian vegetation such as Lazuli bunting, willow flycatcher, common yellowthroat, and some sparrow or warbler species. For these species, the increase in diversity and biomass of vegetation would increase niche space for nesting and cover. Other species that respond favorably to grazing (robin, pine siskin, bluebird) may shift habitat use or move to other areas with livestock concentrations. Taylor (1986) stated that different strata of vegetation, which various bird species utilize, have different vulnerabilities to grazing. He found that bird species richness decreased with increased grazing, which seemed to be correlated to grazing impacts on shrub volume and heights.

However, by removing grazing on a landscape where vegetation evolved with native herbivores, the no grazing scenario may be less beneficial to migratory birds than continuance of some level of grazing at managed levels in order to maintain structural and plant species diversity without adverse impacts. This assumption is supported by Medin and Clary (1991), who compared breeding bird populations and community organization between an area grazed by cattle and a comparable adjacent area protected from grazing. They were unable to demonstrate any differences in total breeding bird densities or bird community attributes between grazed and ungrazed riparian habitats.

The risk of cowbird parasitism would decrease or be eliminated with Alternative 1 due to the absence of livestock. Some risk may still persist due to livestock grazing on adjacent private lands.

### **Riparian**

For the West Bridger and Carey Gulch Allotments, riparian reaches that are accessible to livestock would move toward developing structural layers made up of desired plant species with age class diversity, except for where ongoing natural disturbances take place. Canopy

cover, consisting of desired native sedges, grasses, and forbs would move toward desired conditions. Introduced species may persist, but at relatively low levels. Desired woody riparian species would grow vigorously as demonstrated by their robust establishment and successful reproduction. These changes may occur due to the absence of livestock grazing and subsequent recovery of areas that have a history of forage removal, trampling/ trailing, and physical presence. Those riparian reaches with physical site characteristics and plant communities that reflect generally low grazing disturbance regimes would maintain their potential natural community, except where other activities have compromised riparian habitat (i.e. flooding, fire).

### **Aspen**

The effects of removing livestock would be beneficial for those migratory bird species that depend on aspen. Aspen would still be browsed by deer and elk, but would not be subject to additional browsing by cattle.

### **Sagebrush**

There is debate over the effects of domestic livestock grazing on sagebrush communities. Dobkin (1992) stated that shrub/steppe communities did not co-evolve with grazing, and that the introduction of domestic livestock facilitated the spread of shrubs into grasslands, thus increasing the density of shrub cover. According to Mehus (1995), some field studies indicate that excessive livestock grazing has resulted in an overabundance of sagebrush by reducing the abundance of native grasses and increasing the frequency and canopy cover of sagebrush. Therefore, management practices that decrease or remove grazing pressure generally diminish the abundance of sagebrush.

Conversely, others believe that while removing livestock grazing may increase competition with grasses, it does not result in reduced abundance of sagebrush. Dobkin (1992) suggests that because of the extreme scarcity of ungrazed shrub/steppe that is not dominated by exotic vegetation, it is challenging to assess the historic effects of livestock grazing.

In the West Bridger and Carey Gulch Allotments, the uplands are generally in good condition (Rock, unpublished paper). Sagebrush was reduced in distribution and abundance by the 2006 Derby Fire, but there is evidence that regeneration is occurring within the expected timeframe. Removing livestock from these allotments will not have a measurable effect on sagebrush habitat. Cattle are grazers (feed on grasses), not browsers (feed on shrubs), and do not select for sagebrush. Also refer to the effects discussion for Alternatives 2 and 3.

## **Direct and Indirect Effects Common to Action Alternatives**

### ***Alternative 2 (Current Management) & Alternative 3 (Adaptive Management)***

#### **Threatened and Endangered Species**

None of the associated habitats for lynx and grizzly bear would be affected by either of the action alternatives (Alternatives 2 & 3) as livestock grazing is not expected to have any measurable effects.

### *Lynx*

According to Ruediger and others (2000), livestock may reduce or eliminate forage resources available to snowshoe hares and other prey species in these habitats if it alters the structure or composition of native plant communities, particularly aspen. Grazing throughout the Rocky Mountains has contributed to the decline of aspen, which as a well-developed young stand provides quality habitat for snowshoe hares and other lynx prey items (Ruediger and others 2000). In contrast, the NRLA management direction (USDA 2007b) determined that management direction for livestock grazing in lynx habitat should be in the form of guidelines because there was no evidence that grazing adversely affects lynx, i.e. there are no required standards. The guidelines provide project design criteria and are designed to minimize potential adverse effects to individual lynx and improve habitat conditions. The FWS found that with the application of these measures there would be no, or discountable, effects to lynx.

Alternatives 2 & 3 both include utilization standards for upland and riparian areas, as well as potential range improvement structures designed to maintain or improve rangelands through better livestock distribution. Where livestock grazing occurs near lynx habitat, these proposals will ensure regeneration of shrubs and trees where fire has occurred, provide for aspen sprouting and survival sufficient to perpetuate long-term viability of the clones, maintain or achieve mid-seral or higher condition shrub-steppe to provide lynx habitat matrix, and maintain or achieve mid-seral or higher condition riparian areas to provide cover and forage for prey species. These conditions currently exist and/or would be maintained under both action alternatives. Continued livestock grazing, or the removal of livestock, is not expected to create further impacts than what has already occurred over time. The actions proposed with Alternative 3, such as improving livestock distribution, constructing additional water sources, implementation of riparian utilization guidelines, and adaptive management strategies would further maintain or improve riparian and upland conditions, thus maintaining or improving foraging opportunities for lynx prey. Therefore, the Forest Service is adhering to direction in the NRLA (USDA 2007) and the Programmatic BA, including lynx critical habitat. The programmatic BA with concurrence letter and the Consultation Summary Sheet for Programmatic Biological Assessment from the FWS are located in the Project File. Issues relative to livestock grazing effects on the lynx may be eliminated with both action alternatives due to all design criteria guidelines being met and were dismissed from further detailed analysis.

Table 18 responds to applicable management direction for lynx pertinent to the West Bridger and Carey Gulch Allotment revision Alternatives 2 & 3.

**Table 18—Management Direction for All Management Practices/ Activities, and Compliance with Alternatives 2 & 3**

NRLA Management Direction and Programmatic BA Criteria	Alternatives 2 & 3 Compliance
<b><i>ALL MANAGEMENT PRACTICES AND ACTIVITIES</i></b>	<b><i>Y/N</i></b>
Objective ALL O1 Maintain or restore lynx habitat connectivity in and between LAUs, and in linkage areas.	Y
Standard ALL S1 New or expanded permanent developments and vegetation management projects must maintain habitat connectivity in an LAU and/or linkage area.	N/A
Guideline ALL G1 Methods to avoid or reduce effects on lynx should be used when constructing or reconstructing highways or forest highways across federal land. Methods could include fencing, underpasses, or overpasses.	N/A
Standard LAU S1 Changes in LAU boundaries shall be based on site specific habitat information and after review by the Forest Service Regional Office.	N/A
<b><i>LIVESTOCK MANAGEMENT (GRAZ)</i></b>	<b><i>Y/N</i></b>
Objective GRAZ O1 Manage livestock grazing to be compatible with improving or maintaining lynx habitat.	Y
Guideline GRAZ G1 Fire-and harvest-created openings, livestock grazing should be managed so impacts do not prevent vegetation regeneration.	Y
Guideline GRAZ G2 In aspen stands, livestock grazing should be managed to contribute to the long-term health and sustainability of aspen.	Y
Guideline GRAZ G3 In riparian areas and willow carrs, livestock grazing should be managed to contribute to maintaining or achieving a preponderance of mid- or late-seral stages, similar to conditions that would have occurred under historic disturbance regimes.	Y
Guideline GRAZ G4 In shrub-steppe habitats, livestock grazing should be managed in the elevation ranges of forested lynx habitat in LAUs, to contribute to maintaining or achieving a preponderance of mid- or late-seral stages, similar to conditions that would have occurred under historic disturbance regimes.	Y

<b>Lynx Critical Habitat</b>	<b>Alternatives 2 &amp; 3 Compliance</b>
<b><i>PRIMARY CONSTITUENT ELEMENTS</i></b>	<b><i>Y/N</i></b>
<p>Boreal forest landscapes supporting a mosaic of differing successional stages and containing:</p> <ol style="list-style-type: none"> <li>1. Presence of snowshoe hares and their preferred habitat conditions which include dense understories of young trees, shrubs or overhanging boughs that protrude above the snow, and mature multistoried stands with conifer boughs touching the snow surface;</li> <li>2. Winter snow conditions that are generally deep and fluffy for extended periods of time;</li> <li>3. Sites for denning that have abundant coarse woody debris, such as downed trees and root wads; and</li> <li>4. Matrix habitat (habitat types that do not support snowshoe hares), that occurs between patches of boreal forest such that lynx are likely to travel through such habitat while accessing patches of boreal forest within a home range.</li> </ol>	Y

***Grizzly Bear***

According to the programmatic biological assessment (USDA 2010), interactions between livestock and grizzly bears have historically led to the removal of grizzly bears. Most livestock depredations have involved sheep but grizzly bear removals/mortality due to cattle depredation has been reported. Grizzlies also feed on livestock carcasses, attracting bears to these areas, and potentially increasing human/bear conflicts.

According to the grizzly bear project screening elements, livestock grazing may be maintained or reduced from existing levels if no depredation has taken place historically. There is no history of livestock depredation or control actions on the West Bridger and Carey Gulch Allotments. Livestock grazing would not increase or occur in new areas. If increases in livestock grazing or new grazing areas were proposed where depredation is more likely, or there is a history of livestock depredation, the programmatic biological assessment would not apply and standard consultation would be necessary to obtain concurrence.

Alternatives 2 & 3 include utilization standards for uplands and riparian areas, as well as potential range improvement structures designed to maintain or improve rangelands through better livestock distribution. Where livestock grazing occurs, these proposals will maintain or reduce existing livestock grazing, and would ensure regeneration of shrubs and trees for cover where fire has occurred, provide for aspen sprouting and survival sufficient to perpetuate long-term viability of the clones, maintain or achieve mid-seral or higher condition riparian areas to provide forage and habitat for prey species. There is no history of depredation or control actions. Any livestock depredation of cattle by grizzly bear would follow the Interagency MOU guidance as described above. Continued livestock grazing, or the removal of livestock, is not expected to create further impacts than what has already occurred over time. The actions proposed with Alternative 3, such as improving livestock distribution, constructing additional water sources, implementation of riparian utilization guidelines, and adaptive management strategies would maintain or improve riparian and upland conditions, thus maintaining or improving foraging opportunities for grizzly bear. Therefore, the Forest Service is adhering to direction in the Programmatic BA. The

programmatic BA with concurrence letter and the Consultation Summary Sheet for Programmatic Biological Assessment from the FWS are located in the project file. Table 19 below responds to applicable management direction pertinent to the West Bridger and Carey Gulch Allotment revision proposal. Issues relative to livestock grazing effects on the grizzly bear may be eliminated from further detailed analysis.

**Table 19-Management Direction Compliance with Alternatives 2 & 3 for Threatened & Endangered Species**

<b>Programmatic BA Criteria</b>	<b>All Alternatives Compliance</b>
<b>Infrastructure development.</b>	Y
<b>Maintains or reduces existing livestock grazing or changes livestock class to a less vulnerable species, and no history of depredation or control actions.</b>	Y

### Sensitive Species

The project area does not provide suitable habitat, or will not effect to any measurable degree, habitat for the bald eagle, peregrine falcon, trumpeter swan, harlequin duck, flammulated owl, wolverine, black-backed woodpecker, Townsend's big-eared bat, and bighorn sheep so these species were only briefly addressed previously in this analysis. It was determined that the proposed livestock grazing associated with any of the alternatives would have "no impact" on these species as shown in Table 20. It was determined that the gray wolf or its habitat had the potential to be impacted by the action alternatives, so this species is further discussed below.

**Table 20-Summary of Effects for Sensitive Terrestrial Wildlife Species by Alternative**

<b>Species</b>	<b>Alt. 1 No Action</b>	<b>Alt. 2 Current Management</b>	<b>Alt. 3 Proposed Adaptive Management</b>
<b>Gray Wolf</b>	NI	MIH	MIH
<b>Bald Eagle</b>	NI	NI	NI
<b>Peregrine Falcon</b>	NI	NI	NI
<b>Black-backed Woodpecker</b>	NI	NI	NI
<b>Flammulated Owl</b>	NI	NI	NI
<b>Harlequin Duck</b>	NI	NI	NI
<b>Trumpeter Swan</b>	NI	NI	NI
<b>Bighorn Sheep</b>	NI	NI	NI
<b>Wolverine</b>	NI	NI	NI
<b>Townsend's big-eared bat</b>	NI	NI	NI

**NI** = No Impact

**MIH** = May Impact Individuals or Habitat, but will not likely contribute to a trend towards federal listing or loss of viability to the population or species

### *Gray Wolf*

The proposed livestock grazing and the alternatives are not expected to have any measurable effects on gray wolf. Parameters to consider for effects analysis for the gray wolf include maintaining or enhancing populations of wolf prey species (primarily ungulates), potential of increased mortality risk (due to changes in open road densities), and concerns about livestock grazing (due to vulnerable livestock species or potential depredation and subsequent control actions).

The elk population within the hunting district has been expanding into the West Bridger and Carey Gulch Allotments after the Derby Fire of 2006, formulating the Greycliff herd. Therefore, there is a natural prey base, which would provide for gray wolf if they were to hunt in this area. However, the presence of elk does not automatically assure the presence of wolves. The proposed livestock allotment revision and the alternatives do not change road densities as there are no associated proposals for road or trail construction, maintenance, or reconfiguration. There would be no increased mortality risk to wolves from road management, and there are no new areas proposed to be grazed by livestock.

The primary issue affecting the gray wolf is wolf/ livestock depredation within the allotments. There is also a concern that livestock will suffer wolf depredation causing economic loss to area ranchers and that the depredating predators will have to be removed, thus compromising wolf recovery. Wolf depredation on cattle has been confirmed on National Forest System lands on allotments outside of the project area. There are no known depredations from wolves associated with the West Bridger and Carey Gulch Allotments. The closest known wolf depredation was in Elk Creek, Dry Fork (upper East Boulder), and West Boulder. According to the Annual Wildlife Damage Management Work Plan provided by the Animal and Plant Health Inspection Service's Wildlife Services (USDA, APHIS 2011), Montana WS confirmed the loss of 1 calf valued at \$600 to gray wolves on USFS lands during 2010. However, there were no wolves taken on USFS lands.

In addition, Administrative Rules of Montana (ARM) adopted ARM 12.9.1305, Allowable Lethal Control of the Gray Wolf, which applies to the delisted population of gray wolves (MFWP 2008). This rule was applied on the date the gray wolf in Montana was no longer subject to federal jurisdiction under the ESA and when Montana Fish, Wildlife, and Parks department and the Fish and Game commission became the sole jurisdiction over the management of the gray wolf in Montana. The rules allow a person to kill a wolf that is attacking, killing, or threatening to kill a person or livestock, or that is in the act of attacking or killing a domestic dog. The person shall notify the department within 72 hours, preserve the scene, leave the carcass where it was killed until the department investigates the scene, and surrender the carcass to the department. USDA Wildlife Services will investigate and determine the cause of any injured or dead livestock. If wolves kill livestock, wolf control would take place as outlined in the Federal Register final rule. It is determined that livestock grazing "may impact individuals or habitat, but will not likely contribute to a trend toward federal listing or cause a loss of viability to the population or species".

*Sensitive Plant Species*

Surveys and (lack of) potential habitat were considered in the determination that livestock grazing in this project area would have "no impact" on sensitive plant species suspected or known to occur on the Gallatin National Forest and will not be further addressed. Table 21 below summarizes the various sensitive plant species considered and the determinations for each.

**Table 21- Sensitive Plant Species Considered & Determinations by Alternative**

Species	Alt. 1 No Grazing	Alt. 2 Current Management	Alt. 3 Adaptive Management
<i>Adoxa moschatellina</i> (musk-root)	NI	NI	NI
<i>Aquilegia brevistyla</i> (short-styled columbine)	NI	NI	NI
<i>Balsamorhiza macrophylla</i> (large-leaved balsamroot)	NI	NI	NI
<i>Cypripedium parviflorum</i> (small yellow lady's slipper)	NI	NI	NI
<i>Drosera anglica</i> (English Sundew)	NI	NI	NI
<i>Eleocharis rostellata</i> (Beaked spikerush)	NI	NI	NI
<i>Epipactis gigantea</i> (Giant helleborine)	NI	NI	NI
<i>Eriophorum gracile</i> (Slender cottongrass)	NI	NI	NI
<i>Gentianopsis simplex</i> (Hiker's gentian)	NI	NI	NI
<i>Goodyera repens</i> (Northern rattlesnake plantain)	NI	NI	NI
<i>Haplopappus macronema</i> var. <i>macronema</i> (Discoïd goldenweed)	NI	NI	NI
<i>Juncus hallii</i> (Halls' rush)	NI	NI	NI
<i>Mimulus nanus</i> (Dwarf purple monkeyflower)	NI	NI	NI
<i>Pinus albicaulis</i> (Whitebark pine)	NI	NI	NI
<i>Polygonum douglasii</i> spp. <i>austiniae</i> (Austin's knotweed)	NI	NI	NI
<i>Salix barrattiana</i> (Barratt's willow)	NI	NI	NI
<i>Shoshonea pulvinata</i> (Shoshone Carrot)	NI	NI	NI
<i>Thalictrum alpinum</i> (Alpine meadowrue)	NI	NI	NI
<i>Veratrum californicum</i> (California false-hellebore)	NI	NI	NI

NI = No Impact

## Management Indicator Species

The grizzly bear and bald eagle are also threatened or sensitive species and were analyzed and discussed separately. Pine marten and Northern goshawk were dismissed from detailed analysis in previous discussion.

### *Elk*

The Forest Plan has designated elk as a MIS for big game habitat under the premise that by managing for productive elk habitat, the FS will be managing for most big game species. These include mountain goat, moose, bighorn sheep, and mule deer. A Forest Plan Standard for Wildlife and Fish, (p. II-18, Section 6.a.6) includes: Allotment management plans will coordinate livestock grazing use with big game habitat needs. There is no indication that any big game species is facing threats relative to livestock grazing, or the removal of livestock, within the West Bridger and Carey Gulch Allotments, and no potential conflicts with big game have been identified.

Edge and Marcum (1990) presented an overview of interactions between elk and cattle. They found various researchers defining elk-cattle interactions as some form of competition, but that the conflict can be reduced through management. There can be high dietary overlap (exploitative competition) during the summer between livestock and elk, which can result in a reduction of annual forage and ultimately in a long-term change in forage composition to less desirable species or some species suffer reduced survival or lower reproductive success. Similarly, indirect forage competition may occur if forage required by elk was consumed by livestock in the previous grazing period and is not available during the winter or in riparian areas. The overlap is not often perceived as a problem where range conditions were good or intensity of cattle use was light (Edge and Marcum 1990). According to Rock (2011, unpublished paper), upland areas within the allotments are grazed within allowable use guidelines and are maintaining good condition.

Spatial competition may occur if both livestock and elk utilize areas during the same time period, or if livestock displace elk from preferred to more marginal grazing areas (disturbance competition). Elk tend to avoid livestock, but are better able to adapt to terrain that is less suitable for livestock or they may move to alternative habitats for security or thermoregulation needs. Spatial overlap may also produce positive effects of increased forage palatability of plants desired by elk due to the removal of litter by livestock. There is no indication that spatial competition is an issue in the West Bridger and Carey Gulch Allotments because forage competition would be least likely to occur during the summer months when elk generally use range at higher elevations than livestock are permitted to graze. Winter range generally occurs on open, south-facing, windswept ridges free of snow that are categorized as not suitable for livestock; primary livestock range consists of less steep terrain and bottoms that are normally unavailable to grazing animals during the winter due to snow cover. The majority of the 341 square miles of elk winter range within the Absaroka EMU occurs on small parcels of privately owned land used for cattle grazing and hay production.

Any direct or indirect competition between species is variable based on annual climactic conditions and may even serve to improve foraging conditions for elk through removal of residual vegetation. Prior to the 2006 Derby fire, an additional herd unit started to become established in the area between Bridger Creek and Lower Deer Creek. In 2006-

2007, landowner reports indicated small bands of elk using the area. Then in the winter of 2008-2009, significant elk activity was reported in this area, and survey efforts confirmed another herd, now termed the Greycliff herd, was wintering between Lower Deer Creek and Bridger Creek (Paugh 2010a). The Derby Fire decreased cover but overall also created some additional foraging opportunities in this new herd unit. The Greycliff herd is separate from the Deer Creeks/Susie Creeks herd and not previously identified in the Montana Statewide Elk Management Plan. In 2010, 123 elk were observed during the mid-winter elk survey (Paugh 2010a). Proposed livestock grazing under current management or with identified adaptive management practices would serve to maintain or improve foraging habitats, thereby maintaining or improving the attractiveness and suitability of these sites to elk.

### **Migratory Birds**

Potential direct effects to migratory birds include the overall reduction or alteration of vegetation structure, cover, or composition of vegetation used for nesting and foraging. Potential indirect effects include the loss of vegetation that supports prey (insects, small mammals). General effects of livestock grazing on migratory bird habitat are summarized in Dixon (unpublished paper) and are incorporated by reference.

Generally, various migratory bird species respond differently to livestock grazing impacts. The individual response is based on the type of habitat affected, the type of nest structure used by that species, and the type of foraging requirements. Some species respond negatively to grazing, some positively, while others show an inconsistent or weak response to grazing.

Livestock grazing has removed both upland and riparian vegetation in localized areas throughout the allotments, but it is unlikely that these changes have had measurable effects upon the diversity of habitats and migratory bird species that use them due to their limited extent and magnitude. Nothing proposed in either of the action alternatives would be expected to alter conditions substantially enough to measurably affect migratory birds at the landscape scale.

### **Riparian**

Riparian areas are key habitats for migratory birds as more than half of western landbird species breed exclusively or primarily in deciduous vegetation associated with water. Migratory birds are especially vulnerable to degradation of riparian habitat due to its limited distribution and extent across the landscape. The riparian areas affected by livestock include short reaches of West Bridger Creek, Tie Cutter Gulch, Derby Gulch, North Derby Gulch, Jim's Gulch, and Lower Deer Creek, and spring development sources.

Migratory bird species that utilize vegetation communities degraded by grazing may experience fewer or lower quality nesting opportunities, less cover making them susceptible to predation, diminished feeding opportunities, and general disturbance. Where livestock have concentrated in these productive and accessible streamside areas, vegetation communities are modified. Trampling, browsing, and grazing may retard development of healthy shrub communities. However, deferment and rotation of livestock grazing provides a mosaic of vegetative patterns across the landscape throughout the summer. Turn-on dates are late enough to allow nesting birds to produce a clutch prior to livestock use. During those years when livestock turn-on may be earlier in order to utilize introduced invasive

grass species (when range readiness allows), many riparian areas would still remain free of livestock use. Impacts from natural disturbances (i.e. flooding, fire) would persist over time and could not be corrected with changes in livestock grazing practices.

Several species that respond negatively to grazing are also subject to nest parasitism. Migratory birds in riparian habitat are vulnerable to parasitism, which may be attributed to population declines in some species. Cowbirds are obligate brood parasites that use small, passerine, open-cup nesters as hosts. Cowbirds are closely associated with agricultural landscapes and the presence of livestock. There is a positive association with livestock presence, foraging opportunities for cowbirds, and their egg laying period. The risk of cowbird parasitism would be low when livestock are not turned on to the allotments until after July 1 because most nesting would be completed or far enough along that cowbirds would not parasitize nests.

The current grazing alternative (Alternative 2) and the adaptive management alternative (Alternative 3) would not incur further impacts than those already occurring to some degree in the riparian habitats.

### **Aspen**

Both livestock and native herbivores modify aspen habitats by grazing understory vegetation, browsing developing aspen sprouts, and making regular use of stands for bedding and summer thermal cover. Direct effects of grazing include removal of plant cover and alteration of the plant community. Browsing reduces aspen growth, vigor, and numbers and can drastically reduce or eliminate sprouts (DeByle 1985a). Domestic livestock browse the aspen with increasing pressure through summer and fall. This impact is greatest on shrubs and young trees less than approximately thirteen feet tall. Trampling that inevitably occurs with grazing and browsing damages vegetation, compresses litter cover on the soil surface, and compacts soil.

Grazing within aspen stands can limit the optimal use to migratory birds. The effect of grazing in aspen stands on migratory birds and their habitat is similar to those incurred in riparian habitat. Ground nesting birds are very susceptible to habitat alteration and trampling by grazing animals (DeByle 1985b) as cover is reduced and predation increases. This may alter populations and relative species abundance (DeByle 1985a). Maintaining and restoring aspen is important because of its exceeding high biodiversity (Kay 1997). A decline in aspen on the landscape could lead to significant declines in nest success for birds (Struempf et. al. 2001).

The current grazing alternative (Alternative 2) and the adaptive management alternative (Alternative 3) would not incur further impacts than those already occurring to some degree in the aspen habitats.

### **Sagebrush**

As discussed under the no action alternative, the effect of livestock grazing on sagebrush is largely debated. Cattle are grazers so the effect on sagebrush is indirect; grazing effects perennial grasses, which in turn may (or may not) produce subsequent changes in sagebrush distribution and density. The implementation of either action alternative, which includes prescribed utilization levels, options for annual deferment and pasture rotation, would provide for maintenance of perennial grasses. These rangeland practices would provide a

mosaic of vegetative structural patterns across the landscape throughout the summer. Turn-on dates are late enough to allow most shrub nesting birds to produce a clutch prior to livestock use. If any incidental grazing of sagebrush plants occurs, the resulting heterogeneity mosaic would be consistent with McAdoo et. al. (2004). The effect of livestock grazing on sagebrush, and its indirect effect on wildlife species that are sagebrush obligates or facultative is, therefore, considered to be irrelevant.

### **Differences in Direct/Indirect Effects for Alternatives 2 & 3**

Potential differences in effects to wildlife species and their habitat between the two action alternatives are outlined below:

#### ***Alternative 2-Current Management***

With the continued implementation of current management (Alternative 2), those riparian reaches that are currently at their potential natural community would most likely be maintained. Current grazing of riparian areas is controlled through deferment, herd management practices such as salting, and limiting grazing intensity or timing. Alternative 2 would not incur further impacts than those already occurring to the riparian habitats. Upland areas would be maintained. Timothy grass would continue to compete with native perennials and likely increase coverage in areas where it is currently growing, if livestock do not utilize it when it is palatable. Native and non-native annuals, and invasive weeds, which have increased after the Derby Fire of 2006, would also persist over time (Rock, unpublished paper).

Migratory birds would continue to be impacted as current livestock levels and management would continue as they are today. Species dependent upon riparian areas would have slightly less habitat available to them in the areas that have been identified as not meeting desired conditions than with either the no action alternative or the adaptive management alternative because this alternative adheres to management actions described in the ten year special use permit and does not allow for flexibility in allotment management based on actual resource conditions. Other species would respond favorably to continued livestock grazing in riparian areas. The risk of cowbird parasitism would likely persist at current levels.

#### ***Alternative 3-Adaptive Management***

With the implementation of Alternative 3 (Adaptive Management), riparian reaches with a high similarity to the potential natural community would be maintained. Those areas with a moderate similarity would move toward a high similarity, including water development sources. Problem areas would be identified through required monitoring, and once livestock is excluded from impacted areas, the springs would recover fully. Structural layers would increase, and desired plant species would increase in vigor and compete with undesirable non-native plant species. A full complement of desired plant species adapted to some level of grazing would occur long-term. Willow and other desirable shrubs would also increase in vigor as livestock browsing and trampling is decreased through better distribution of livestock. More intensive resource monitoring associated with Alternative 3 would identify problem areas and flexibility in allotment management would allow for these improvements to resource conditions.

Changes to management would be dependent on monitoring results, and would be implemented when needed without additional analysis as long as they are within the scope of

this analysis. If monitoring indicates that current exclosures are not enough to allow the spring sources to recover to their full extent, or livestock are consistently exceeding utilization levels, then alternative water sources would be constructed or the tanks would be moved farther away from the source. This would provide for better livestock distribution and allow the areas to retain or achieve desired conditions. Spring sources at newly constructed water developments would also be protected to mitigate from additional livestock damage to these sensitive areas.

Migratory bird species that depend on riparian habitats would benefit from the implementation of the adaptive management practices that allow for flexibility in management. Other species that prefer shorter vegetation and are tolerant of some level of grazing would continue to be present on the allotments. By improving degraded areas to provide better structural and plant species diversity, yet still allow some level of grazing, the adaptive management alternative may be beneficial to a larger array of bird species.

With the option of early season grazing when range readiness conditions allow, there is the potential for livestock to be on the allotments during bird breeding and nesting periods. This may increase parasitism if cowbirds arrive on the allotments earlier in the bird breeding cycle. This would not occur every year, however, and would only occur within one pasture of each allotment, thus minimizing effects to nesting birds. In contrast, the removal of introduced non-native grasses such as Timothy through early grazing may increase the cover and vigor of native perennials, which in turn would provide additional niches for nesting and cover. The adaptive management alternative would have less negative effects to migratory songbirds and would improve habitat more than current management.

### **Cumulative Effects**

Cumulative effects assessment requires consideration of past, present and reasonably foreseeable events. Vegetation altering processes can have very long-lasting effects on wildlife habitat. Past impacts to wildlife habitat are reflected in the current baseline vegetation used for analysis. Past activities within the project area include historical livestock grazing for the last century; however, concurrent flood and fire events have had a greater impact on the landscape. Fire suppression, along with grazing, altered plant communities' biomass production, species composition, and diversity. This in turn may have led to levels of severity observed during the Derby Fire of 2006.

Noxious weeds were introduced and infestation levels have increased in some areas. Grazing and browsing by wildlife ungulates would continue and may increase as has been noted in the recent past. Wildlife management of big game populations has evolved to present day permits, seasons, and protections. Season setting and harvest limits will continue to be managed by the Montana Fish, Wildlife, and Parks through a permit system. Any future federal actions in the project area that are not being considered at this time, will undergo a separate analysis, based in part on an understanding of any consequences to wildlife habitat incurred by the currently proposed project.

Logging, farming, ranching, and development will continue on private lands. Reasonably foreseeable actions that may occur on private lands include some level of subdivision, private land development, and subsequent loss of habitat for migratory birds and other wildlife species. Private lands will continue to harvest timber, build roads, and conduct agricultural activities such as farming and ranching.

### **Alternative 1**

Alternative 1, the no grazing alternative would not directly, indirectly, or cumulatively affect any of the featured wildlife species or their habitat. For those species, there would be no acres of existing vegetation that would be manipulated to an unsuitable condition and no disturbance or displacement would occur.

### **Alternatives 2 and 3**

Livestock grazing associated with either Alternative 2 or 3 (action alternatives) would not add any cumulative impacts to wildlife habitat that have not already occurred under current management. No adverse effects on wildlife species are anticipated. The majority of species would not be impacted to a measurable degree, or would benefit from these proposals, so no cumulative effects are anticipated. Optimal use of riparian and aspen habitat by migratory birds can be affected by grazing, depending on the level of use. Both action alternatives have grazing prescriptions that limit livestock grazing to those compatible with maintenance of the range resource. The detailed analysis of wildlife effects focused on migratory birds within the riparian/aspen habitat context and is subsequently where the cumulative effects discussion is focused.

The combined effects of the past, present, and reasonably foreseeable activities in the allotments on migratory birds include the recent fire and flood events, removal of vegetation by grazing in riparian or aspen habitat on an annual basis, and use of the area by cowbirds, resulting in the subsequent parasitism of some migratory bird nests. Livestock grazing associated with the action alternatives would not cumulatively add to any impacts to migratory bird habitat that have not already occurred under current management and is within levels that are designed to sustain the range resource. Neither of the action alternatives would result in adverse cumulative effects on migratory birds.

## ***Compliance with Laws, Regulations and Forest Plan Direction***

### **Endangered Species Act**

Under Section 7 of the Endangered Species Act, each Federal agency must ensure that any action authorized, funded or carried out is not likely to jeopardize the continued existence of any threatened or endangered species. Implementation of Alternative 1 (no grazing) would have “*no effect*” on any endangered species. The action alternatives (Alternatives 2 & 3) “*may effect - not likely to adversely affect*” grizzly bear and lynx and lynx critical habitat. There are no plants listed as threatened or endangered in the project area.

### **National Forest Management Act**

The National Forest Management Act (NFMA) requires that actions provide for the diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple use objectives, and within the multiple use objectives of a land management plan adopted 16 USC 1604 (g)(3)(B). There are currently 12 terrestrial species identified as “sensitive” that are known or suspected to occur on the Gallatin National Forest. Alternative 1 (No Grazing) would have “*no impact*” on any sensitive wildlife or plant species because livestock grazing would be phased out on the allotments. With the implementation of the action alternatives (Alternatives 2 & 3), livestock grazing on the West Bridger and Carey Gulch Allotments would have “*no impact*” on bald eagle, peregrine falcon, trumpeter swan, harlequin duck, black-backed woodpecker, flammulated

owl, Townsend big-eared bat, bighorn sheep, and wolverine. The determination for gray wolf for the action alternatives would be “*may impact individuals or habitat, but will not likely contribute to a trend toward federal listing or cause a loss of viability to the population or species*”.

There will be “*no impact*” to sensitive plants within the West Bridger and Carey Gulch Allotments with any of the alternatives due to lack of potential suitable habitat or absence of plants based on completed surveys.

### **Migratory Bird Treaty Act**

On January 10, 2001, President Clinton signed an Executive Order outlining responsibilities of federal agencies to protect migratory birds. On January 17, 2001, the USDA Forest Service and the USDI Fish and Wildlife Service signed a Memorandum of Understanding to complement the Executive Order. Upon review of the information regarding neotropical migratory birds in the wildlife report and project file, livestock grazing on West Bridger and Carey Gulch Allotments would not result in a loss of migratory bird habitat or be an extirpation threat to any migratory birds. None of the alternatives would have measurable effects on migratory bird populations or habitat.

### **Gallatin Forest Plan**

#### ***General Direction***

Forest Plan Standard for Wildlife and Fish, page II-18, section 6.a.6 – Allotment management plans will coordinate livestock grazing use with big game habitat needs. No potential conflicts with big game have been identified with any alternative associated with the West Bridger and Carey Gulch Allotments.

Forest Plan Standard for Wildlife and Fish, page II-18, section 6.a.8 – Emphasis will be given to the management of special and unique wildlife habitats such as wallows, licks, talus, cliffs, caves, and riparian areas. The adaptive management alternative (Alternative 3) identified practices to move these habitats toward the desired future condition as would Alternative 1 that phases out livestock grazing in the allotments. Alternative 2 (Current Management) is not currently meeting these standards in some riparian segments, but this is due to the recent large flood and fire events and not grazing impacts.

Forest Plan Standard for Wildlife and Fish, page II-18, section 6.a.12 – Habitat that is essential for species identified in the Sensitive species list developed for the Northern Region will be managed to maintain these species. Sensitive species were addressed as part of the analysis for livestock grazing on the West Bridger and Carey Gulch Allotments. All of the species except the gray wolf were dismissed or eliminated from detailed analysis with all of the alternatives.

Forest Plan Standard for Threatened and Endangered Species, page II-18, section 6.b.all. Threatened and endangered species were addressed as part of the analysis for livestock grazing on the West Bridger and Carey Gulch Allotments. Livestock grazing effects on grizzly bear, lynx and lynx critical habitat were addressed per the programmatic biological assessment (USDA 2010 and USDI 2010b). There would be “no impact” to either of these species with any of the alternatives for the project.

### ***Management Area Direction***

The project area for livestock grazing is within eight Forest Plan Management Areas. The West Bridger and Carey Gulch Allotments lie in the following Forest Plan Management areas: MA6 (dispersed recreation), MA7 (riparian), MA8 (timber management), MA10 (range/timber), MA11 (timber/livestock), MA12 (wildlife/dispersed recreation), MA16 (livestock), and MA17 (livestock/wildlife). MAs applicable to the proposed grazing in regard to wildlife are MA7, MA16, and MA17. There is nothing in any of the alternatives that is incompatible with wildlife d

**Management Area 7 (MA7)-Riparian:** These are riparian management areas (FP, p. III-19). These standards would be met with the implementation of the Gallatin Forest Riparian Framework and other practices identified for riparian areas in the adaptive management strategy (Alternative 3). All of the alternatives maintain suitable habitats for those species of wildlife totally or partially dependent on riparian areas. For other management areas with an emphasis on big game, no potential conflicts were identified in the West Bridger and Carey Gulch Allotment project area. The noted discrepancy between desired and existing conditions on some riparian segments is more influenced by past flooding events and the Derby Fire of 2006 than current or proposed management of livestock. The adaptive management alternative (Alternative 3) includes management activities to construct water developments or fence (particularly exclusion fencing) based on monitoring and progress toward the desired future condition. For other management areas with an emphasis on big game, no potential conflicts were identified in the West Bridger and Carey Gulch Allotment project area with any alternative.

**Management Area 16 (MA16-Range/Open Grasslands):** - These areas have open grasslands interspersed with nonproductive timber lands on slopes generally less than 40 percent. They contain the most productive and heavily used portions of range allotments (FP, pp. III-50 through III-51). For this management area with an emphasis on big game, no potential conflicts were identified in the West Bridger and Carey Gulch Allotments with any alternative.

**Management Area 17 (MA17)-Range/Big Game:-** These areas consist of grasslands or nonproductive forestlands on slopes less than 40 percent that are suitable for livestock grazing and contain important big game habitat. They contain some of the most productive and heavily used portions of range allotments. For this management area with an emphasis on big game, no potential conflicts were identified in the West Bridger and Carey Gulch allotments with any alternative.

### **Gallatin Forest Travel Plan Direction**

There are no applicable Travel Plan standards for wildlife. There are no new roads, reconditioned roads, or changes in the road and/or trail system associated with this project. Open road densities would remain the same. From a wildlife perspective, all alternatives for the project would be consistent with our Travel Plan direction.

## **Issue 4-Soils**

The renewal of range allotment permits in the West Bridger and Carey Gulch Allotments could cause impairment of land productivity and reduced soil quality within grazing units. Of specific interest is the level of detrimental soil disturbance that may be created due to compaction, rutting, trampling, removal of vegetation, and/or increased soil erosion associated with livestock grazing.

### ***Affected Environment***

Soils throughout most of the West Bridger and Carey Gulch allotments have moderately coarse textures and contain abundant rock fragments. There are few poorly or very poorly drained soils, mainly limited to stream margins. As a result, soils throughout most of the area are not especially prone to soil compaction or rutting due to cattle grazing. Soils in the area are highly variable with regard to soil depth. Abundant shallow soils exist on steep to very steep slopes, as well as along ridge tops and bench areas. Shallow, coarse textured soils over impermeable bedrock have a high potential for soil erosion. Fortunately, the most sensitive, steep mountain slopes are not utilized by grazing cattle.

Low levels of prior, activity related, detrimental soil disturbance (DSD) are present in both allotments on national forest lands in both allotments. Disturbances from flooding in 2005 and again in 2011, and from the 2006 Derby Fire have had a substantial impact on the area, but these non-activity disturbances are not counted toward the Region One maximum allowable 15% DSD standard. Flooding and wildfire impacts need to be considered in management decisions, but they are not an issue relative to current grazing impacts on soils within the project area.

**General Soil Attributes:** The majority of soils in the West Bridger and Carey Gulch Allotments are characterized by having substantial amounts of rock fragments and variable soil depths. Soil textures, of the non-rock fraction, appear to be primarily sandy loams bordering on loams in upland areas based on the predominant geologic parent materials present, reconnaissance and field sampling in non-riparian areas, and at least a general agreement with the soil survey on surface soil textures. Nearly all soils in this area have abundant rock fragments throughout the soil profile.

Soils on extremely steep slopes (45-70%) are somewhat excessively well drained. Somewhat excessive soil drainage over shallow bedrock invariably means that a large percentage of precipitation that falls during heavy rainstorm events, will likely end up in runoff that rapidly enters drainage channels in the catchment rather than infiltrating into deep soil layers.

**Riparian Soils:** More extensive soil sampling of surface soil horizons in riparian areas was conducted in the fall of 2010 for Derby Gulch and along West Bridger Creek. Soil sampling of upper soil layers was completed as part of the soil monitoring protocol used in these areas. Soil textures in the upper twelve to sixteen (0-12; 0-16) inches of mineral soil sampled included loams, fine sandy loams, sandy loams, loamy sands, and sands. These were often stratified as is typical for high energy riparian areas that experience large seasonal or storm related variations in flow levels. The amount of rock fragments in the soil varied from near zero in some layers and/or sample locations, up to nearly 60% rock fragments. A high level of variability in both soil texture and rock fragment content existed among all sites sampled.

Stratified soil textures are common in riparian soils. For the most part, the near surface mineral soil layers were coarse textured in the riparian areas sampled. Over 70% of the samples tested were fine sandy loam or coarser. Subsoil layers are expected to have more

rock fragments than near-surface soil layers in riparian areas due to sorting in channel area which gradually results in fines being washed further downstream. Over time, the stream channel will have meandered back and forth across nearly all of the floodplain. Relatively coarse textured soils combined with abundant rock fragments make the riparian soils in this area quite resistant to soil compaction even under moist soil conditions.

The majority of riparian soils sampled were moderately well drained. They receive some excess run-off water as well as short-duration periods of high water table conditions associated with early snow melt or large storm events. Poorly and very poorly drained soils are of limited extent and were only found immediately adjacent to creek channels.

### *Scale of Analysis*

#### **Spatial Boundary**

The spatial boundary for assessing direct/indirect effects to soils from livestock grazing on the West Bridger and Carey Gulch Allotments is the outer allotment boundary, encompassing a contiguous area around both allotments. The spatial boundary for direct and indirect effects to soil productivity is defined by the unit boundary because productivity effects are spatially static and productivity in one location does not influence productivity in another location (USFS-R1 2009).

There are a couple potential exceptions to this rule with respect to cumulative effects. While it is true, in general, that soil productivity is spatially static and soil productivity at one location does not influence productivity at another location, this statement assumes that the soil stays in place. Processes of soil erosion and deposition can cut across boundaries to affect productivity outside the activity area, either by headcutting (upslope) or deposition (downslope). For that reason, steep mountain slopes that are spatially connected to a project area should be considered when assessing cumulative effects. The combined allotments of West Bridger and Carey Gulch are bounded on the west, south, and southeast by ridgelines that clearly define the extent of any cumulative effects. To the east, there is some spatial connection beyond the allotment boundary down slope to Bridger Creek and the confluence with Blind Bridger. There is a direct spatial connection between national forest lands in the uplands of Carey Gulch and private lands along the drainage bottom. There is also some spatial connection between private lands to the north of Packsaddle Butte in Section 27 and along the north portion of Section 25 with national forest lands in the West Bridger Allotment. The cumulative effects boundary for soils includes these spatially connected areas outside the allotment boundaries down to an appropriate topographic break.

#### **Temporal boundary:**

A reasonable temporal boundary for grazing impacts for both the West Bridger and Carey Gulch Allotments going forward is 20 years from the proposed renewal date for grazing leases. By that time, the system should have a sufficient period to adjust to any management improvements in the current decision. Follow-up adjustments due to adaptive management would likely have been implemented long enough to at least assess initial results. Benefits from any management changes, if they occur, should be quantitatively measurable by that time. Results after twenty years will define final conditions for the currently proposed management alternatives.

The temporal boundary for both allotments going backward would be extended to 50 years since residual impacts from past clearcutting, especially in the West Bridger Allotment, will

remain for at least that long. Initial clearcutting and seed tree harvests in this area, based on available Forest Service records, date back to 1968 and 1966, respectively.

### ***Methodology of Analysis***

Standards in the Gallatin Forest Plan, under Water and Soils, state that “The Forest Soil Survey will be incorporated into resource area analysis”. The Gallatin National Forest is currently working on selectively updating the Soil Survey in project areas. These updates will improve the quality of Soil Survey maps and supporting data in areas with the greatest need for accurate soil resource information associated with proposed management actions. Updates will be based on terrain analysis, representative field sampling of soil profiles, and accompanying laboratory data for the major soil-landscape associations within a project area. As time allows, several soil profile descriptions will be completed for the West Bridger/Carey Gulch area with accompanying lab analyses.

Soil and landscape observations were made by the Soil Scientist for the Gallatin National Forest during initial site visits, while conducting soil monitoring and analysis, and when traversing through the allotments. These observations and associated data help fill in some of the gaps in our knowledge base about soil resources as well as our understanding about the susceptibility of those soils to disturbance. Other supplemental information has been gleaned from geologic maps, topographic quads, and aerial photographs of the area used in conjunction with field assessments.

**Prior Soil Disturbance:** The R-1 Supplement (No. 2500-99-1) to FSM 2500 states that the assessment of prior disturbances relates to detrimental soil conditions “from prior activities”. Thus, disturbances due to natural occurrences, such as game trails or tree blow downs, natural floods, or wildfires, are not counted towards the 15 percent maximum DSD standard. Disturbances caused by human activities are counted. Pre-existing, human activity caused disturbances within the West Bridger and Carey Gulch Allotments need to be considered in calculating what the total level of activity related detrimental soil disturbance (DSD) that will be present at the end of the grazing permit period with respect to the Region 1 DSD standard in activity areas. Grazing domestic livestock is considered an “activity” in this regard. Other non-grazing related, human caused, disturbances present in the West Bridger and Carey Gulch Allotments include prior timber harvests, possible non-system roads, established off-road vehicle (ORV) trails, limited hiking and pack saddle trails, and some illegal recreational ORV use off established trails. The level of analysis required in these assessments depends on how likely it is that the project area exceed the 15% maximum DSD standard (USFS-R1 2009).

As a generality, cattle grazing alone will seldom exceed the 15% maximum detrimental soil disturbance standard when averaged across entire allotments on National Forest lands. This is partially because the activity area to be considered for assessing this standard in a range allotment is the entire allotment (personal communication – Meredith Webster, Regional Soil Scientist). Much of the area within allotments on National Forest lands, such as the West Bridger and Carey Gulch Allotments, is not used by cattle because of inaccessibility, steep terrain, and/or distance from available water. The majority of detrimental soil disturbances from livestock grazing occur in localized areas where animals congregate such as riparian areas, water tanks, salt blocks, shady areas, etc.

Primary sources of DSD in the West Bridger and Carey Gulch Allotments are listed in Table 21 below, along with the proportion of area impacted. Estimates of existing detrimental soil

disturbance in treatment units are generally split between concentrated disturbances which can be measured directly and dispersed soil disturbances that are assessed based on procedures described in the Region 1 Approach to Soils NEPA Analysis (USFS-R1 2009). Concentrated disturbances may be linear, such as established trails or non-system roads, or non-linear disturbances, such as an abandoned gravel pit. In either case, a high enough proportion of the area has been detrimentally disturbed and the boundaries of that disturbance are distinct enough so the area can be measured directly. Concentrated disturbances, such as these, are often spatially connected as opposed to independently distributed. They can be readily observable on aerial imagery of the project area provided map scale is large enough. Authorized Forest Service Roads (system roads) as defined in 36 CFR 212.1 are not considered part of the productive land based and are not included as concentrated disturbances in DSD determinations (USFS-R1 1999).

**Dispersed Soil Disturbance:** Dispersed soil disturbances include the majority of activity related disturbances within past timber harvest units, cattle grazing areas, or dispersed recreation areas, as well as most other dispersed activity related disturbances on the Forest. A combination of field observations, traverses, low intensity, and high intensity transects are used to assess the level of dispersed detrimental soil disturbance (DSD) present in treatment units. The specific approach to be used depends on the level or expected level of DSD present in a treatment unit relative to the Regional 15% maximum DSD standard (USFS-R1 2009). For the West Bridger and Carey Gulch Allotments, traversing through representative portions of these allotments is the level of analysis required. Several initial traverses through the allotments were made by the Soil Scientist during the fall of 2010, including traverses through past timber harvest areas that were severely burned in the 2006 Derby Fire.

Only a limited amount of DSD observed was observed during the initial traverses and site visits. These assessments combined with the limited extent of potential DSD sources for the allotments (Table 22) determined that for most areas, field observations and representative traverses were the most appropriate means to assess initial conditions. Table 22 provides the approximate area and relative percent of total area for primary sources of potential DSD in the West Bridger and Carey Gulch allotments. Assumptions used to calculate the approximate area of DSD associated with ATV trails and non-system roads are: ATV trails are 8 feet wide with 100% DSD, non-system roads are 12 feet wide with 100% DSD.

It appears reasonable that soil monitoring efforts should be focused on those areas most likely to be adversely impacted by cattle grazing. The Region 1 Approach to Soils Analysis Regarding Detrimental Soil Disturbance (USFS-R1 2009) was written specifically for the assessment of “detrimental soil disturbance in forested areas”. This approach was modified, however, for the West Bridger Allotment to provide semi-quantitative estimates of DSD (<15%) related to cattle grazing in riparian areas along West Bridger and Derby Creeks as well as on primary range in the area of Packsaddle Butte. Detrimental soil disturbance, in general, is not a scale dependent variable. Thus, the procedures for determining DSD levels can be adapted to various scales provided a suitable activity area for the analysis is defined.

**Table 22-Management Activities Potentially Causing DSD and Percent Area Affected.**

Category	West Bridger Allotment			Carey Gulch
	West Bridger	Tomato Can	Derby Gulch	
<b>Total Acres</b>	12,914 (62.7%)	3,337 (16.2%)	4,338 (21.1%)	4,043 (100%)
<b>Grazing on Suitable Range</b>	<b>Total for Allotment = 1,365 acres (6.6%)</b>			<b>465 ac. (11.5%)</b>
<b>Miles of USFS Road<sup>1</sup></b>	12.8	3.9	12.5	2.8
<b>Miles Non-system Road<sup>2</sup></b>	0	0	≈4.0 (0.13%)	0
<b>Miles of Established ORV Trails</b>	8.8 (0.07%)	13.4 (0.39%)	9.8 (0.22%)	0
<b>Past Timber Harvests<sup>3</sup></b>				
<b>Clearcut and Seed Tree</b>	936 acres (3.8%)			
<b>Partial Cutting</b>	856 acres (3.5%)			

- 1) All or nearly all miles of road within the allotments are administrative system roads. As such, they are not considered part of the productive land base and not counted towards the DSD standard.
- 2) Non-system roads are those portions of the total road system that are not excluded from the productive land base and therefore included in the assessment of DSD.
- 3) Past timber harvests not reported on an allotment or pasture basis have been split proportionately among the three West Bridger pastures and Carey Gulch Allotment based on a per acre basis for the sole purpose of showing the proportion of total allotment area to area of timber harvest.

**Riparian Soil Disturbance:** For riparian soil disturbance, the activity area was defined as the flood plain plus any peripheral areas along the stream corridor where riparian vegetation exists. Floodplain areas may or may not have predominantly riparian vegetation, depending on the depth to groundwater and frequency of flood events. They are defined by landscape position along a stream corridor and the presence of floodplain soils (soils formed from fluvial deposition of sediment). In this manner, activity areas along both Derby Creek and West Bridger Creek were identified for analysis.

A series of transect segments at right angles to floodplain direction were monitored for detrimental soil disturbance along a major portion of each drainage. Individual transect segments for both drainages were spaced approximately 500 feet apart; starting in upper reaches of the drainage and moving 500 feet downstream for each successive transect segment. Spacing between sample points within transect segments varied between the two drainages. Derby Creek has a wider floodplain/riparian corridor associated with it so the sample spacing within transect segments was set at 60 feet. For Derby Creek, only 30 foot spacing was used due to the narrower floodplain. These distances were set to ensure there would be at least sample location in each transect segment and most segments would contain several sample locations. Distance from the riparian edge to the first sample site in each transect segment was determined by a random role of the dice. For Derby Gulch, the potential starting distances could be 10, 20, 30, 40, 50, or 60 feet from the riparian edge. Boundaries of the riparian area were marked before the start of sampling. For West Bridger Creek, the starting distances could be 10, 20, or 30 feet from the riparian edge.

Determination of detrimental soil disturbance at each sample location followed the same procedure used on the Gallatin National Forest to monitor soil disturbance in forested areas. These procedures have their origin in the 1999 R-1 Supplement to the Forest Service Manual (FSM) which initially defined detrimental soil disturbance to include management caused soil compaction, rutting, topsoil displacement, severe burning, surface erosion, and soil mass wasting (USFS-R1 1999). More specific criteria, based on guidance from the 1999 R-1 Supplement, have since been developed to ensure that the assessment of DSD in soils of the

Gallatin National Forest can be consistently applied in the field and that identification of management caused DSD more closely aligns with observable reductions in soil/land productivity on Gallatin National Forest Lands (Keck 2010).

To help ensure the accuracy of soil monitoring results, rapid assessment procedures described in the Forest Soil Disturbance Protocol (Page-Dumroese, et.al 2009) have been augmented by digging a shallow, 12 to 16 inch, test pit at each stop along monitoring transects. Surface soil horizons in the shallow soils pits are examined for soil texture, amount of rock fragments, soil structure, moist or dry consistence, the abundance and distribution of roots, evidence of soil compaction, surface layer depth, and any other soil properties of interest or unique to a site. This approach takes more time but removes much of the guesswork associated with determining whether detrimental soil disturbance is present or not.

Using the above approach, low intensity transects (less than 30 sample points) were sampled in the riparian corridors of Derby Creek and West Bridger Creek. A total of 15 point locations were sampled in the Derby drainage and 14 sample points in the West Bridger drainage. Since soil conditions and grazing history are essentially the same and both drainages were subjected to the Derby Fire and the same flood events, the data from both drainages could be treated like a single transect. This was not needed, however, as limited detrimental soil disturbance in both drainages indicated that low intensity transects were sufficient for the analysis. The only sample site where DSD could be directly attributed to cattle grazing was located on a cattle trail crossing an escarpment. A single area of concentrated disturbance along an old 2-track was sampled separately in upper Derby Gulch. (See section on Direct and Indirect Effects for more details).

**Upland Soil Disturbance:** The same general approach was used for assessing DSD in primary upland range. After traversing through a number of upland range areas, a low intensity transect crossing through primary range southwest of Packsaddle Butte was monitored. For the purpose of this sampling, the boundary between grassland range areas and surrounding burned forest areas was used to delineate the activity area boundaries. The Region 1 soil monitoring approach was slightly modified as applied to monitor the level of DSD in grassland areas.

### *Soils Effects Analysis*

#### **Riparian Soil Monitoring Results:**

Soil monitoring was conducted within the riparian corridors of both Derby Gulch and West Bridger Creeks to assess the level of DSD in riparian areas. These are the areas most utilized by grazing cattle. In both instances short transects were used. Fifteen sample points were monitored in riparian areas along Derby Gulch and 14 sample points in riparian areas along West Bridger.

#### ***Derby Gulch***

No occurrence of dispersed, detrimental soil disturbance was found at the 15 locations sampled along riparian areas in Derby Gulch. Disturbance attributed to cattle use was noted at two locations, one related to cattle trampling and the other where cows trialing down to the water, contributing some to slumping along an escarpment. In neither instance was the level of soil disturbance commensurate to detrimental soil disturbance. No soil compaction was found at any of the sample locations. Soil textures in surface soil horizons down to 16 inches ranged from coarse very cobbly sand to more medium textured loams and fine sandy

loams (Table 18). Overall, soils along the drainage bottom would be mostly described as coarse textured. As expected in high energy riparian areas, soil texture were highly stratified and quite variable as a result of different deposition events.

A single area of concentrated soil disturbance was noted during soil monitoring of the riparian area along Derby Gulch. Although access to an old, dirt two-track road near the headwaters of the Creek had been blocked off, detrimental soil disturbance, mainly detrimental compaction, was readily apparent along the road tread. The road segment runs parallel to the creek for approximately 720 feet. Stations were set up on 100 foot intervals starting from a randomly selected starting point near the upper end of this disturbance. Total width of the road corridor and total width of detrimental soil disturbance were measured at each of 8 stations. Average width of the road corridor is calculated to be 12.25 feet and the average width of DSD from the dirt two-track is 56% for a total area. The area of DSD associated with the 2-track road equals 1.13 acres. This area represents only 0.002% of the total area in the Derby Gulch pasture. Although, it this disturbance represents a larger proportion when amortized over just the acreage of riparian area in Derby Gulch, it still represents a tiny contribution relative to the 15% standard.

***West Bridger Creek***

One sample location out of 14 sample sites monitored along the riparian corridor of West Bridger Creek was identified as having detrimental soil disturbance associated with trampling by cattle as shown on Table 23 below. Topsoil displacement and evidence of soil erosion were the reasons cited. Some trampling by cattle was notes at two other sample locations but the level of soil disturbance did not meet criteria for DSD. Mineral surface soil textures in the top 16 inches were highly variable and stratified the same as those found in Derby Gulch. Although the sample data indicates somewhat less very coarse soils were sampled in near surface, mineral soil layers, no valid inference can be drawn from these data between the two drainages. The range in soil textures found was the same for riparian areas along West Bridger Creek as that found in Derby Gulch.

**Table 23-Soil monitoring Results for Riparian Areas of Derby Gulch and West Bridger Creek.**

Drainage	Sample #	DSD#	Soil Texture Class			Data not Available
			Very Coarse <sup>1</sup>	Coarse <sup>2</sup>	Medium <sup>3</sup>	
<b>Derby Gulch</b>	15	0	4	6	4	0
<b>West Bridger</b>	14	1	2	5	4	3

<sup>1</sup> Very coarse indicates soil textures are primarily sand, loamy sand, and/or very gravelly sand.

<sup>2</sup> Course indicates soil textures are primarily loamy sands and sandy loams.

<sup>3</sup> Medium textured in this case indicates primarily loam and/or fine sandy loam textures are present.

Overall the soil monitoring data for riparian areas in Derby Gulch and West Bridger indicate very little prior detrimental soil disturbance is present in riparian areas where grazing cattle spend a large portion of their time. Relatively coarse soil textures and rock fragment in the soil help limit DSD in these areas as does deferred grazing and the scarcity poorly or very poorly drained soils in these areas. Some past DSD may well have been washed away or covered over during flooding that occurred in 2005.

**Upland Soil Monitoring Results:*****Packsaddle Butte***

A short transect with just 7 sample locations was monitored in a grassland area south of Packsaddle Butte. No DSD was found at any of the sample locations. This agrees with general results from traversing through similar areas. Of seven sites sampled, three were very shallow or shallow over hard, volcanic bedrock. Rough looking vegetation in this area was much more related to shallow soil depths than impacts from cattle grazing. This also agrees with general observations made elsewhere in the West Bridger allotment. It appears likely that many upland range areas along ridges or on convex slopes have a fair amount of shallow and very shallow soils over hard volcanic bedrock.

Soil texture of surface and near-surface mineral soil layers in the area sampled were primarily fine sandy loams and loamy sands with abundant rock fragments present in most sites sampled. Only one site had evidence of light burning in the soil from the Derby Fire four years earlier. Relatively coarse soil textures coupled abundant rock fragments in the soil limits the potential for detrimental soil compaction or rutting in these soils. The speed with which grass fires would have passed through the area limited any potential DSD due to burning during the Derby Fire. Soil erosion in along trails or two-tracks on moderately steep to steep grades would be the greatest threat for causing DSD in upland range areas similar to the one sampled.

**Summary of Soil Monitoring Results**

The level of treatment activity in comparison to the overall size of the West Bridger and Carey Gulch allotments makes the likelihood that DSD levels for either of the allotments would exceed the 15% maximum DSD standard, essentially nil. Soil monitoring in areas most likely to be impacted by cattle grazing indicated limited DSD also exists in concentrated use areas. It is unknown how much of the limited DSD found in riparian areas can be attributed to soil properties versus a masking effect from the combined 2005 flooding and 2006 Derby Fire.

Estimates of prior DSD given in Table 24 are based on conservative estimates designed to ensure that estimated prior DSD exceeds true DSD levels. This predicted DSD levels may not be entirely accurate but they certainly indicate that prior DSD levels are well below the 15% standard.

**Table 24- Estimates of Prior DSD by Pasture for the West Bridger and Carey Gulch Allotments**

Source of DSD	West Bridger Allotment			Carey Gulch
	West Bridger	Tomato Can	Derby Gulch	
Developed ORV Trails	0.1%	0.4%	0.2%	0.1%
Past Timber Harvests	1.1%	1.1%	1.1%	1.1%
Range	0.33	0.33	0.33	0.58
Total	1.5%	1.8%	1.6%	1.8%

### ***Direct/Indirect Effects***

Soils are not a critical issue with regard to differences among the three alternatives or between the two allotments. This determination is based on low overall levels of prior DSD in both allotments, the low susceptibility of soils in primary range areas to detrimental soil compaction or rutting, and low levels of existing DSD found during soil monitoring in critical primary range areas. Some of the current low levels of DSD are likely in response to reduced livestock numbers grazing the allotments since 2006, in response to the Derby Fire.

### **Alternative 1 – No Grazing**

#### ***West Bridger and Carey Gulch Allotments***

Alternative 1 would discontinue livestock grazing in both the West Bridger and Carey Gulch Allotments after a two year phase out period. Removal of cattle from these areas would have a limited positive effect on soil resources because most soils in areas utilized by grazing cattle appear to be quite resistant to detrimental disturbance. Soils in the allotments are relatively coarse textured and often contain abundant rock fragments. There are few very poorly drained soils. Low levels of activity related DSD currently exist on National Forest lands within the allotments, with estimates of total DSD below 2% for all pastures. If livestock grazing were eliminated, this figure would not change dramatically.

Impacts to soil resources would most likely recover sooner in floodplain areas without grazing. However, these areas currently have little existing DSD, so benefits would be minimal for the allotments as a whole. Existing impacts from past timber harvests, the Derby Fire, and recent major flood events would be less affected by the removal of livestock; however, past timber harvests in the allotments were primarily on steep slopes that are rarely utilized by grazing cattle.

The primary threat to soil resources in the West Bridger and Carey Gulch Allotments is soil erosion on steep and very steep slopes that are rarely used by livestock, where there are coarse textured soils over shallow (<20 inch deep) bedrock. Cheatgrass invasion, which dramatically increased in abundance after the 2006 Derby Fire, also increases the potential for soil erosion by limiting vegetative cover, especially in the fall and winter after the annual cheatgrass cures. Removing livestock from the allotments would do little to address this issue.

### **Alternative 2 – Current Management**

#### ***West Bridger and Carey Gulch Allotments***

Alternative 2 continues the current range management and stocking levels for the West Bridger and Carey Gulch Allotments. Although management directives would be unchanged, livestock numbers would increase relative to the reduced numbers that have grazed the allotments since the 2006 Derby Fire. Soils would not, however, be an issue due to relatively coarse soil textures, abundant rock fragments in soils, few poorly drained areas, and the fact that the most sensitive areas are largely not used by cattle. No significant changes from pre-Derby Fire levels of detrimental disturbance would be expected. Some continued degradation would occur in concentrated use areas, such as watering sites, salt licks, or bedding areas. The Forest Service's ability to react to any adverse impacts or to try new approaches in addressing resource issues would be limited under Alternative 2. Soil erosion and the spread of cheatgrass in steeply sloping areas would not likely be addressed.

### **Alternative 3 – Adaptive Management Alternative**

#### ***West Bridger and Carey Gulch Allotments***

Alternative 3, the Adaptive Management Alternative, potentially provides the most flexibility for the Forest Service to adjust land management actions in response to changing conditions on the ground. Associated with that flexibility comes a requirement for the Gallatin National Forest to follow through on continued soil and other resource monitoring needed to make informed land management decisions.

Alternative 3 would initially have few differences with respect to impacts on the soil resource because Phase 1 maintains range management and stocking levels very similar to Alternative 2. The Forest Service would be committed to conducting additional monitoring of vegetation, streams, soils, etc. before any substantive changes in management would take place. Alternative 3 does provide a mechanism for the Forest Service to make adjustments to management plans in the face of changing conditions on the ground or to implement new management ideas where warranted.

With respect to the cheatgrass issue, ideas that could be applied include using a rest-rotation system where feasible, or utilizing high intensity-short duration grazing early in the spring on selected areas as a way to put grazing pressure on the annual cheatgrass, early in the growing season. Although the current grazing plan relies heavily on deferred grazing to protect soil resources, soils in the area are resilient and are not likely to be severely affected by some amount of early season use from grazing livestock.

#### ***Cumulative Effects***

Effects common to all alternatives include impacts from the 2006 Derby Fire, and major flood events in 2005 and again in 2011, as well as the minor existing level of various activity related detrimental soil disturbance (DSD).

The Derby Fire burned across 207,115 acres in southern Sweetgrass and Stillwater counties. Many of those acres (55,163) were on the Gallatin National Forest (USDA, et.al. 2006). While detrimental soil disturbance from wildfire activity is not counted as activity DSD with respect to the Region 1 standard, it does impact the soil in the same manner as ground disturbing management activities by reducing both soil quality and land productivity. Because severely burned areas occur almost exclusively in timbered areas, disturbance from the 2006 Derby Fire has had limited effect on the land's capacity to support livestock grazing. Most of the primary range in both allotments exists in riparian or open grassland areas, where soils were not severely burned and vegetation has recovered. Detrimental disturbances from fire suppression activities would also be included in the assessment of activity related DSD. There is very little evidence, however, of fire suppression disturbances other than the presence of seeded perennial grasses along roads in burned areas. Much of the acreage burned in the Derby Fire was consumed during a major run made by the fire (personal communication Steve Schacht 2010) leaving little or no time for fire suppression.

Major flood events in the West Bridger area in 2005 and 2011 removed a lot of sediment from mountain slopes. Some of this sediment was deposited onto the floodplains of local creeks, while most of the sediment likely flowed out of the drainages with the flood water. At some level, the amount of sediment carried out the drainage is correlated to the rate of soil erosion within the drainage, but this is not a clean relationship. Much of the sediment created by soil erosion during normal years gets stored within local drainages. It is only during major floods

that the majority of sediment becomes entrained in the creek and flushed out of the system (Moody and Martin 2009). Thus, sediment delivery during floods is related to longer term sediment storage in the drainage. Regardless, impacts of the 2005 and 2011 floods were dramatic. Substantial sediment was both deposited along the floodplains and washed out of the drainages. These impacts are not included in the assessment of activity related detrimental soil disturbance. In some instances, the flooding has removed any evidence of prior DSD in riparian areas, by washing it away or burying it under a fresh layer of sediment. Management actions designed to repair flood damage could potentially be counted towards the maximum 15% DSD standard, but this amounts to very minor amounts of DSD with limited aerial extent.

### **Alternative 1-(No Grazing)**

#### ***West Bridger and Carey Gulch Allotments***

Implementation of Alternative 1 would phase out livestock grazing on the allotments over a period of two years. After this time, there would be no direct or indirect effects related to grazing, so there would not be any cumulative effects. Natural recovery from the Derby Fire and 2005 and 2011 flood events would likely occur in a shorter timeframe without grazing.

### **Alternatives 2 and 3**

#### ***West Bridger and Carey Gulch Allotments***

Potential for cumulative effects exist between livestock grazing and a number of other activities in the area with either Alternative 2 or 3. Management activities that potentially have limited cumulative effects with livestock grazing on soil resources in the West Bridger/Carey Gulch area include: effects from the Derby Fire, flood events in 2005 and 2011, post-fire timber salvage operations on adjacent private lands, ATV trail construction associated with implementing the Gallatin National Forest Travel Plan, and a few hunter-outfitter special use permits that are active in the West Bridger Allotment. The likelihood that these activities will create substantial activity related DSD on Forest Service lands with either alternative is limited, but creation of minor amounts of DSD is possible.

Natural recovery from the Derby Fire is occurring. Most of the primary range in both allotments exists in riparian or open grassland areas, where soils were not severely burned, and vegetation has responded favorably. There is very little evidence of detrimental disturbances from fire suppression activities, as explained above, so little reason to believe that there would be any major cumulative effects associated with either Alternative 2 or 3.

Erosion and deposition from flood events in 2005 and 2011 are not counted towards the Region DSD standard unless a clear link exists between management activities and the origin of soil erosion. These flood events have the potential for spreading cheatgrass seed downstream with the floodwaters. In at least one of the riparian sites sampled, a carpet of young cheatgrass seedlings was observed covering the ground. While impacts from the flooding itself are not activity related, soil erosion caused by the interaction of cattle grazing and an infestation of cheatgrass could be considered an indirect, activity related, cumulative effect in a few riparian stretches within the allotments.

Salvage harvesting of timber burned in the 2006 Derby Fire has occurred on private lands located down gradient, or on opposite hillsides from National Forest lands within the Carey Gulch Allotment. As such, these disturbances although potentially having some cumulative effects on allotment management, will likely have little or no impact on disturbance levels

on GNF lands within the allotment. Since the Forest Service does not have management authority over private landowner decisions regarding timber resources, potential DSD levels from timber harvesting on private lands are not counted with regard to the DSD standard on National Forest Lands, but they are considered from a cumulative effects perspective. The net cumulative effect would not be enough to preclude continued cattle grazing associated with either alternative in the Carey Gulch Allotment because only limited DSD impacts would be expected to occur on Forest Service lands.

Potential for cumulative effects exist between livestock grazing and past timber harvest on National Forest lands, however, cows do not generally graze on steep slopes where the majority of the past timber harvesting has occurred. The only recent harvest on National Forest lands occurred in 2007, and consisted only of the removal of roadside hazard trees burned in the Derby Fire. Thus, any potential cumulative DSD from these activities and livestock grazing would be considered to be very minor.

Another potential cumulative effect of some concern is soil disturbance associated with recreational ATV use, especially in areas of shallow, sandy soils. Even though cattle grazing and recreational ATV use, for the most part, occur on different areas of the landscape, they both contribute to the total level of DSD within the allotment boundaries. Construction of ATV trails associated with the 2006 Travel Management Plan and reconstruction of flood damaged portions of trails will undoubtedly create some detrimental soil disturbance, however, the overall area of disturbance will be small relative to allotment size, assuming Gallatin National Forest BMP's for trail construction are followed. The few hunter-outfitter special use permits within the allotments would be expected to create even less DSD. Although there may be individual sites of concern within the allotments associated with these activities, the combined level of DSD would be well within allowable levels relative to the Region 1 standard for either Alternative 2 or 3.

### ***Compliance with Applicable Laws, Regulations, and Guidelines***

#### **Historical and Legal Precedence:**

Legal directives to the U.S. Forest Service since 1960 have consistently stressed two themes: National Forests are intended to produce products and services for the American people and Forest Service lands are to be managed in such a way as to maintain the productivity of the land. National Forests are to be administered for outdoor recreation, range, timber, watershed, and fish and wildlife purposes according to the Multiple-Use, Sustained-Yield Act of 1960 (P.L. 86-517, 74 Stat. 215: 16 S.S.C. 528-531) and a high-level of annual or regular periodic output of renewable resources will be produced. Sustained yield as a management objective is upheld in the Forest and Rangeland Renewable Resources Planning Act (RPA) of 1974 (16 U.S.C. 1600-1614), the National Forest Management Act (NFMA) of 1976 (16 U.S.C. 472a), and in the Forest Service Manual Chapter 2550 on Soil Management (WO Amendment 2500-2009-1), as well as elsewhere. Clearly, National Forests are intended to be managed for the production of goods and services. All alternatives would be in compliance with the above-mentioned historical and legal precedence

#### **Land Productivity**

Sustained yield cannot exist without maintaining land productivity. Thus, the Sustained-Yield Act refers to "...coordinated management of resources without impairment of the productivity of the land". The National Environmental Policy Act (NEPA) of 1969 (16

U.S.C. 4321) states that man and nature should exist in “productive harmony”. The full definition of “productive harmony” may be open to debate but it irrefutably begins with maintaining land productivity. The Forest and Rangeland Renewable Resources Act directly refers to the maintenance of productivity of the land and “specifies that substantial and permanent impairment of productivity must be avoided”. Standards in Forest Plan for the Gallatin National Forest indicate that “All management practices will be designed or modified as necessary to maintain land productivity and protect beneficial uses”. All alternatives would maintain land productivity within the allotments.

### **Soil Quality**

The Forest and Rangeland Renewable Resources Act (1974) appears to be the first legal reference made to protecting the “quality of soil” in Forest Service directives. Since that time, references to “soil quality” in Forest Service directives have often been used interchangeably with references to “land productivity”. This is unfortunate because the two terms are not synonymous. Many references to “soil quality” are made in the 2009 Washington Office Amendment 2500-2009-1 to the FSM 2500 – Watershed and Air Management Chapter 2500 – Soil Management. Thus under objectives Amendment 2500-2009-1 states (2550.2): “Maintain or improve soil quality on National Forest System lands...”

The Forest Service has used soil quality as a surrogate measure for predicting potential reductions in land productivity on Forest Service lands. While it is easy to tell when land productivity has been reduced due to degradation of the soil resource, it is extremely difficult if not impossible to say, that for every instance and every land use, productivity will be significantly reduced or improved when specific soil quality thresholds are passed. This disconnect becomes increasingly important when surrogate measures are used as indicators of soil quality.

The relationship between soil quality and productivity appears to be a general one at best. For example, soil compaction is one measure used to indicate reduced soil quality. If compaction is severe enough, detrimental soil disturbance is believed to occur indicating a reduction in land productivity. Long-term effects on vegetative growth from “detrimental” compaction are not always consistent however (Han, et al. 2006) and depend on a number of factors including the soil’s inherent ability to recover. A good review of this topic can be found in the National Council for Air and Stream Improvement, Technical Bulletin No. 887 (NCASI 2004). The above concerns with regard to the application of soil quality standards apply equally as well to grasslands as they do forests. All of the alternatives would maintain soil quality.

### **Chapter 2550 – Soil Management: R-1 Supplement**

The R-1 Supplement 2500-99-1 to FSM 2500 – Watershed and Air Management (Effective 11/12/1999) has provided guidance in Region 1 on how National Forest System Lands should be managed “without permanent impairment of land productivity and to maintain or improve soil quality”. Soil quality is defined in the R-1 Supplement on the basis on management induced changes to soil properties that have been identified as affecting soil quality. In addition, the R-1 Supplement established the Region wide standard for not creating “detrimental soil conditions” on more than 15 percent of an activity area. General guidelines for determining detrimental soil disturbance were also provided in the R-1 supplement. These guidelines have recently been defined more precisely for the Gallatin

National Forest (Keck 2010) so they can be applied consistently in the field and so identification of detrimental soil disturbance on Gallatin National Forest lands is more closely aligned to observable reductions in soil and land productivity. None of the alternatives would create detrimental soil conditions on greater than 15% of the area used for grazing.

### **Gallatin National Forest Plan**

Guidance relative to soils in the Forest Plan (USFS-GNF 1987) that is germane to the West Bridger and Carey Gulch Allotments includes the following: 1) “best management practices” will be used to mitigate impacts occurring to the watershed from land use activities (p. II-5), 2) the Forest Soil Survey will be used as a part of the “resource area analysis” (p. II-23) and 3) “all management practices will be designed or modified as necessary to maintain land productivity...” (p. II-24). These provisions are consistent with guidance provided at both regional and national levels within the Forest Service. All alternative would comply with soil guidance outlined in the Gallatin Forest Plan.

## ***Affected Environment, Direct, Indirect, & Cumulative Effects for Other Issues***

### **Issue A-Recreation/Special Uses**

#### ***Affected Environment***

The West Bridger and Carey Gulch Allotments are located south of Big Timber, MT in the foothills of the Beartooth Mountain Range. The topography is rolling and was impacted extensively by the 2006 Derby Fire. The area has several public access points via roads and trails. The road networks provide dispersed camping, firewood gathering and hunting opportunities. The trails in the area are predominately motorized trails and are popular during fall hunting season. Two Forest Service rental cabins provide the opportunity to experience the lifestyle of early forest rangers.

### **West Bridger Allotment**

#### ***Recreation***

Recreation facilities in the West Bridger Allotment include numerous roads, trails and two rental cabins. Table 25 lists National Forest System Roads, their seasons of use, and the predominate types of uses on the road. These roads are most heavily used during fall hunting by both day use and overnight camping hunters.

**Table 25-Recreational Access Roads in West Bridger Allotment**

Road	Season of Use	Recreational Uses
<b>West Bridger Road #488</b>	Yearlong	Hunting, dispersed camping, access to W. Bridger Cabin and Jim's Gulch Trailhead
<b>Derby Gulch Road #6674</b>	Yearlong	Hunting, dispersed camping, firewood gathering
<b>Packsaddle Butte Road #6675</b>	Yearlong	Hunting
<b>Carey Gulch Road #6671</b>	May 16 <sup>th</sup> to December 1st	Hunting
<b>Upper Blind Bridger Road #6677</b>	Yearlong	Hunting
<b>Lower Deer Creek Road #2550</b>	May 16 <sup>th</sup> to October 14th	Hunting
<b>Wepler Road #2551</b>	May 16 <sup>th</sup> to October 14th	Hunting
<b>Iron Mountain Road #482</b>	Yearlong	Hunting, dispersed camping, firewood gathering, access to Placer Gulch Trailhead

Several National Forest System Trails exist within the boundaries of the West Bridger Allotment. Table 26 below lists these trails, their season of use, and predominate type of use.

**Table 26-National Forest System Trails within West Bridger Allotment**

Trail	Season of use	Predominate Users
<b>Derby Ridge Trail #126</b>	Yearlong	Open to non-motorized users. Used mostly by hikers and stock during fall hunting season.
<b>Jim's Gulch Trail #129</b>	Yearlong	Open to non-motorized users. Used mostly by hikers and stock to access Deer Creek Cabin and during fall hunting season.
<b>Lower Deer Creek Trail #5</b>	Yearlong – non-motorized ATVs and Motorcycles – May 16 <sup>th</sup> to March 31 <sup>st</sup>	Open to motorized and non-motorized users. Used mostly by Deer Creek Cabin renters and during fall hunting season.
<b>Placer Gulch Trail #256</b>	Yearlong – non-motorized ATVs and Motorcycles – May 16 <sup>th</sup> to March 31 <sup>st</sup>	Open to motorized and non-motorized users. Used by Deer Creek Cabin renters, gold panners and fall hunters.

Trail	Season of use	Predominate Users
<b>Tomato Can Trail #156</b>	Yearlong – non-motorized Motorcycles – May 16 <sup>th</sup> to March 31 <sup>st</sup>	Open to motorized and non-motorized users. A very low use trail which is difficult to find.

The Placer Gulch Trail #256, Tomato Can Trail #156 and Derby Ridge Trail #126 have gates associated with pasture fences. Occasionally problems have occurred due to recreationalists leaving gates open.

In 2012 a new ATV trail system will be added in the Derby Gulch/Lower Deer Creek area. Trail design and layout was completed during the summer of 2010. New ATV cattle guards are proposed for sites where trails cross between the Derby Gulch Pasture and the West Bridger Pasture.

In May of 2011 large rain events caused extensive flood damage to roads and trails in the Main Bridger, West Bridger, and Lower Deer Creek drainages. Roads especially damaged from the high creek flows include: West Bridger Road #488, Derby Gulch Road #6674, Lower Deer Creek Road #2550, and Wepler Road #2551. Emergency repairs were made to each road to allow the public to use the roads during the summer of 2011. Further repairs are necessary and will be conducted in 2012. Trails damaged by the flooding include: Jim's Gulch Trail #129, Lower Deer Creek Trail #5, Placer Gulch Trail #256 and Tomato Can Trail #156. Placer Gulch Trail was particularly hard hit by flooding and has been closed to all motorized use. Horse use is also discouraged due to very high cut banks (4–5 ft in some locations) and no tread in many areas. Repairs to these trails may be conducted in 2012 or 2013.

Dispersed recreational day use occurs within the West Bridger Allotment during fall hunting seasons. Hunting use is comprised of hunters on foot or horseback. No dispersed motorized use occurs within the allotment boundaries.

The West Bridger Cabin and Deer Creek Cabins are within or adjacent to the West Bridger Allotment. The Deer Creek Cabin is utilized approximately 80–100 days per year; mostly during the summer season. The West Bridger Cabin is utilized approximately 150–175 days per year. The West Bridger Cabin is located along West Bridger Road and thus more accessible yearlong.

### ***Special Uses***

The West Bridger Allotment has two day use hunting outfitters whose hunting areas overlap with National Forest System (NFS) lands in the allotment. The operating period is during fall archery season (September 4–October 17) and general hunting season (October 23–Nov 28).

The West Bridger Allotment also has one overnight hunting outfitter whose hunting area overlaps with NFS lands in the allotment. His camp is located outside of the allotment in Dry Creek. The operating period is the same as day use.

## **Carey Gulch Allotment**

### ***Recreation***

There are no recreational facilities (trails, roads, cabins) within the Carey Gulch Allotment thus no concentrated recreational use occurs in the area. Dispersed recreational day use occurs within the Carey Gulch Allotment during fall hunting seasons. Hunting use is comprised of hunters on foot or horseback. No motorized use occurs within the allotment boundaries.

### ***Special Uses***

The Cary Gulch Allotment has no outfitters operating in the area.

### ***Analysis Area Boundaries and Methodology***

Because effects to recreation relate specifically to recreational facilities and opportunities on the ground, the spatial extent of this analysis was bound by the West Bridger and Carey Gulch Allotment boundaries.

The timeframe considered for the recreation cumulative effects analysis was 1980 to 2013. The 1980's began the majority of timber harvest projects which dominate the landscapes in the West Bridger allotment and neighboring the Carey Gulch Allotment as well as neighboring private lands. The timbers harvests helped form the recreational access that developed along roads built during this period. It is difficult to predict future changes beyond the next five years, thus the year 2016 was selected as the future temporal boundary of this analysis.

The recreational resource was analyzed by reviewing the recreational use and facilities located within the allotments and comparing the differences in effects that the various Alternatives would likely have on the recreating public.

### ***Direct/Indirect Effects***

Management actions common to both action alternatives (Alternatives 2 & 3) on West Bridger and Carey Gulch Allotments include:

- Annual utilization measurements within each active pasture would be taken to ensure that upland utilization standards are not exceeded.
- Implement an upland utilization standard of 55% as required by the R1 Range Analysis Handbook (FSH 2209.21).
- Under a deferred rotation grazing system, Forest Plan Standards (Page III-20) allow good condition riparian range to be grazed at a 50% utilization standard.
- Once utilization standards are met (Tables 4 & 5), then the livestock would be moved to another pasture, another area of the pasture, or off the allotment for the grazing season.
- Manage invasive weed sites by mapping and treating them according to the Final Noxious and Invasive Weed Treatment Project, Environmental Impact Statement (EIS) and Record of Decision (ROD) released in June 2005.
- Distribute cattle by riding and use of mineral supplements to promote desired forage utilization. Utilize appropriate upland and riparian utilization guidelines.

- Encourage livestock distribution to better utilize the increased forage in other portions of the allotments resulting from the Derby Fire.
- Encourage the permittees to move cattle off stream banks by increased riding, placing salt well away from riparian areas, and training permittees on how to monitor grazing utilization of key riparian areas.

The above actions would, in general, have a beneficial effect on recreational facilities and the recreating public's enjoyment of these areas. Closely monitoring utilization standards and moving cattle when standards are met would help prevent cattle from lingering in certain areas potentially impacting trails, roads, or recreation facilities.

Locations for the mineral supplements should be carefully selected to avoid placement close to trails, roads or camp sites such that cattle do not congregate at these recreation sites and negatively impact road or trail conditions or affect the experience of the recreating public. The management of weed sites would improve the naturalness of recreation sites. The recreating public would likely experience a more natural appearing setting for their activities.

### **West Bridger Allotment**

**Alternative 1—No Action/No Grazing:** The removal of grazing from this allotment would have no direct/indirect negative effects on the recreational uses and facilities in this allotment. Positive effects would include the removal of cattle from the Deer Creek Cabin area, which has been an issue of contention with cabin renters.

**Alternative 2 – Current Management:** The current grazing on the West Bridger Allotment has few direct/indirect negative effects on recreational uses and facilities. However, cattle grazing near the Deer Creek Cabin have created negative impacts to the cabin renter's experience. The presence of cattle in the cabin area has led to trampling of the yard area, manure in walkways around the cabin, and higher concentrations of flies. Proposed mitigation includes building a fence around the Deer Creek cabin to create a buffer between cabin users and cattle, which would alleviate this concern.

No concerns have been raised relative to recreational users impacting livestock grazing such as moving or disturbing cattle.

**Alternative 3 – Adaptive Management:** Phase 1 of the adaptive management alternative also includes the following actions:

- Continue to use a three-pasture rotation grazing system. Balance grazing between the pastures to achieve better overall distribution on the allotment.
- Implement a riparian utilization standard
- Design and implement a permanent riparian livestock enclosure in the impacted portion of North Derby Gulch. Develop an alternative water source in this area before Phase 2 if needed.
- Motorized trail implementation will require evaluation of the existing fences for livestock and may necessitate additional fences and /or trail cattle-guards to insure cattle stay in their assigned pasture.

The riparian livestock enclosure will be located near a proposed new trailhead for ATV trails to be built in 2012. The trailhead would include parking for trucks and trailers. The parking

areas would be outside of the riparian zone and should not conflict with the building of the enclosure.

The proposed ATV trails would cross pasture fences in two locations. The contract to build the trails would include cattle guards and gates at both sites to allow ATVs, motorcycles, stock and hikers to easily pass without allowing cattle to stray from their pasture.

Due to flooding in 2011 the Placer Gulch Trail #256 may need to be re-routed. Design and construction of a new trail may need to incorporate new cattle guards and gates to confine cattle to the currently used pastures. Existing fences in Placer Gulch may need to be rebuilt to ensure cattle do not use the old Placer Gulch Trail to travel outside their appointed pasture.

Phase 2 of this alternative includes the following actions if needed:

- Increase riding, move livestock to the next pasture, or if necessary, reduce the number of permitted livestock on the allotment.
- Install additional water developments or create off-site water developments to improve livestock distribution.

Water developments should be located at least 300 feet from roads and trails and ¼ mile from rental cabins or campgrounds so that the site does not draw cattle into areas used by the public.

The above actions, with mitigation, should have no negative effects on recreational opportunities in the West Bridger Allotment area.

### **Carey Gulch Allotment**

#### ***Effects Common to all Alternatives***

Because the Carey Gulch Allotment has no recreation facilities (roads, trails, cabins, etc.) only bow or early season hunters hiking or riding through the area encounter cattle, and there would only be minor, if any, direct or indirect effects associated with any alternative. Cattle will have been removed from the allotment prior to the beginning of the general hunting season.

#### ***Effects Associated with Alternative 3***

Phase 1 of the adaptive management alternative includes the following actions:

- Review and monitor allotment “boundaries” to assure that cattle remain in allotment.
- Monitor to be sure grazing use is meeting goals and FP standards.

Phase 2, if necessary would include the following action:

- Construction of additional fences or water developments to keep cattle on the allotment or to improve cattle grazing distribution.

The above actions should have no negative effects on hunters using the area.

#### ***Cumulative Effects for West Bridger and Carey Gulch Allotments***

Past, present and reasonably foreseeable actions include recent wildfires, past road construction and re-construction, proposed fisheries projects, past timber harvest, recreation access and

facilities, travel plan implementation, mining activities, past flood events, activities on private lands in the area, noxious weed treatments, future prescribed burning, and other foreseeable activities on national forest lands.

Because none of the proposed alternatives, with mitigation, would have any measurable negative direct or indirect effects on recreation within either of the allotments, there would be no cumulative effects expected from any of the alternatives.

### ***Compliance with Applicable Laws, Regulations, and Guidance***

The Gallatin National Forest Plan directs the Forest to provide for a broad spectrum of recreation opportunities in a variety of Forest settings (FP, pg. II-1). The Forest Plan recognizes objectives for recreation settings by incorporating the Recreation Opportunity Spectrum (ROS), which provides a framework for stratifying and defining classes of outdoor recreation environments, activities, and experience opportunities (FP, pg. II-2). Furthermore, the Plan specifically identifies as objectives activities that will be managed 1) to provide for users' safety, 2) that existing recreational hunting opportunities will be maintained, 3) that recreation trails will provide safe public access, and 4) to continue the cabin rental program (FP, pg. II-2-3). All alternative would comply with Gallatin Forest Plan direction for recreational uses.

The Gallatin National Forest Travel Plan (December 2006) contains language updating and further defining the forest-wide goals, objectives and standards for recreation. The Travel Plan recognizes the goal of "providing for a variety of recreation opportunities on the road and trail system that allows for the enjoyment of the Forest's backcountry, wilderness, rivers, lakes, topography, wildlife, snow and historical assets" (TP, Detailed Description of the Decision, I-1). Goals, objectives and standards are further defined in the Travel Plan by Travel Planning Area. The Deer Creeks Travel Planning Area includes the West Bridger Allotment and the Carey Gulch Allotment. The goals include for summer recreation use:

*"Provide opportunities for both motorized and non-motorized summer recreation use with emphasis on motorcycle, ATV, horse and pack stock use. In addition, provide moderate levels of opportunity for mountain biking, pleasure driving and 4x4 use on backcountry roads."*

Objectives for this travel planning area include achieving the goals stated above through the route-by-route-decisions made through the travel Plan. Future proposed changes to the uses specified in the Travel Plan will be done in consideration of the targeted recreation setting to be provided (TP, Detailed Description of the Decision, II-164). The targeted recreation setting for summer recreation in these allotments is a combination of Roded Natural, Semi-Primitive Motorized and Semi-Primitive Non-Motorized.

**Roded Natural** settings are generally characterized as mostly natural-appearing environments with moderate evidence of the sights and sounds of man. Resource modification and utilization practices are evident but harmonize with the natural environment.

**Motorized Semi-Primitive** settings are predominately natural-appearing environments where there is often evidence of other users and moderate probability of solitude. Vegetation alterations are very small in size and number and are widely dispersed and visually subordinate.

**Non-Motorized Semi-Primitive** settings are similar settings to motorized semi-primitive area with the absence of motorized vehicles. In non-motorized settings, the presence of roads is tolerated, provided they are closed to public use.

All of the alternatives would comply with the objectives for the Deer Creek Travel Planning Area. Alternative 1 would remove livestock from the allotments, so would have no conflicts with the Travel Management Plan. Alternative 3, adaptive management, would provide the most flexibility in livestock management of the two action alternatives were conflicts to arise in the future, due to the addition of planned ATV trails in the area.

## **Issue B-Inventoried Roadless Areas**

Inventoried roadless areas contain important environmental values that warrant protection. Roadless areas shall, as a general rule, be managed to preserve their roadless characteristics, and proposed projects within roadless areas need to be analyzed for potential impacts to the roadless resource. Grazing activities and associated improvements could cause direct or indirect effects in portions of the North Absaroka Roadless Area, #1-371, that could potentially affect eligibility for future inclusion into the wilderness system.

### ***Affected Environment***

The North Absaroka Roadless Area # 1-371 (approximately 89,000 acres) as identified in the Gallatin NF Plan (FP, pg. V-9-10 and Appendix C-5) extends from the East Boulder drainage on the western extent to the Derby Gulch area on the eastern extent.

The West Bridger and Carey Gulch Allotments consist of approximately 24,400 acres; with approximately 16,170 acres (or 66% of the total allotment acres) located within the North Absaroka IRA. The portion of the IRA in the vicinity of the allotments is effectively bounded on the west by Iron Mountain Road and on the north and east by the West Bridger Road and North Derby Road, respectively. Within this portion of the roadless area, there are existing motorized and non-motorized trail systems, multiple trailheads, two recreational rental cabins, roadside and dispersed camping opportunities, active mining claims, hunting, fishing, and winter snowmobile riding opportunities.

The West Bridger and Carey Gulch Allotments have likely been grazed since Eurasian settlement, before the Forest Service was created. Sheep were grazed in the allotment areas beginning in the early 1900s. The first Forest Service permit records for the West Bridger Allotment began in 1941 for cattle grazing, which has continued to be an established and permitted use. The first permit records for the Carey Gulch Allotment began in 1943 for sheep grazing; in 1947 the permit was converted to cattle grazing, which has continued to be an established and permitted use.

### ***Scale of Analysis***

#### **Spatial Bounds**

The analysis area for direct, indirect, and cumulative effects on inventoried roadless areas is the North Absaroka IRA, selected because the expected direct, indirect, and cumulative effects are localized and no other IRA is in proximity.

### **Temporal Bounds**

The temporal scope for the analysis is 1987-2020. This time period is chosen because it is the timeframe since the last Forest Plan decision for recommendation was needed, until the next FP decision is anticipated to be completed.

### ***Methodology for Analysis***

The following five "wilderness" attributes are the basis for evaluation of the effects of the alternatives. These characteristics are those used to define wilderness attributes of an area and are the basis for evaluating actions or proposals that could affect future wilderness designation. See the Forest Service Manual FSH 1909.12 (72.1) for definitions of wilderness characteristics.

- Natural - the extent to which long-term ecological processes are intact and operating.
- Undeveloped - means the environment appears natural to most people.
- Outstanding opportunities for solitude or primitive unconfined recreation - a personal, subjective value defined as the isolation from the sights, sounds, and presence of others and development of man. Primitive recreation is characterized by meeting nature on its own terms, without modern comfort or conveniences.
- Manageability and Boundaries - ability to manage a roadless area to meet the minimum size criteria, which is 5,000 acres, for wilderness.
- Special Features or Values - refers to attributes of the area that are special or valuable to stakeholders, and are often less tangible than the previous 6 attributes. Special features can include such factors as unique ecological, scientific or geologic features; significant cultural or historic resources; or outstanding scenic resources. Special values are often intangible and not clearly articulated by inventories or data relating to the natural environment.

Many roadless characteristic features pertain to resource specific issues that were analyzed by other resource specialists for this project (i.e. water quality, wildlife, vegetation, scenery, and soils). Please refer to those sections for a more complete effects analysis for each resource.

### ***Direct and Indirect Effects***

Direct effects are those activities that would occur within the IRA that would alter the roadless characteristics to prevent them from future consideration for wilderness designation. Indirect effects would cause changes to roadless character that would impact Remoteness, Solitude, Natural Integrity, Apparent Naturalness, Special Features, or Manageability and Boundaries, as well as the effects of any proposed activity that would substantially alter these characteristics as to render the area unsuitable for future wilderness designation.

### **Alternative 1 (No Action)**

Alternative 1 would discontinue livestock grazing on both of the allotments after two years. Current permittees would be given advanced written notice of permit cancellation as provided under 36 CFR 222.4(a) (1). Discontinuing grazing on the allotments would have no effects to existing roadless characteristics within the North Absaroka IRA. The no action alternative would allow for the roadless lands within the North Absaroka IRA that currently retain roadless character to be considered for wilderness designation in the future. There would be no irretrievable or irreversible commitment of resources that would eliminate this possibility.

### **Alternatives 2-Current Management**

Under Alternative 2, livestock would continue to be permitted under current management, which includes all applicable standards and guidelines from the current Gallatin Forest Plan. Under this alternative, existing permits for livestock grazing on the West Bridger and Carey Gulch Allotments would be re-authorized. Future permits would adhere to the same terms and conditions that apply to the current permits. The number of permitted water facilities and miles of fence would remain relatively stable.

Grazing activity and associated developments have been permitted on the National Forest since the 1940s, prior to the area's designation as "roadless". This alternative does not propose any roads, boundary adjustments, permanent structures, or area modification. No changes (direct or indirect) to existing roadless characteristics are expected in either of the allotments as a result of Alternative 2.

### **Alternative 3-Adaptive Management**

Alternative 3 would have effects that are similar to those associated with Alternative 2. However, Alternative 3 may have slightly more beneficial effects than Alternative 2 because "Adaptive Management" allows for flexibility in administering grazing permits based upon active monitoring techniques that indicate the need for adaptation. Potential adaptations could include changes in numbers of AUMs, modification of the season of use, additional water developments, and/or stream bank protections to improve resource conditions. Alternative 3 does not propose any roads, boundary adjustments, or area modification.

Grazing activity and associated developments have been permitted on the National Forest since the 1940s, prior to the areas designation as "roadless". No changes (direct or indirect) to the areas existing roadless characteristics are expected as a result of Alternative 3.

## ***Cumulative Effects***

### **Alternative 1 (No Action)**

Alternative 1 would have no long-term or cumulative effects to roadless characteristics within the North Absaroka IRA. The no action alternative would allow the roadless lands within the North AB IRA that currently retain roadless character to be considered for wilderness designation in the future. Likewise, there would be no irretrievable or irreversible commitment of resources, which would eliminate possibility of the Northern Absaroka IRA to be designated as wilderness at some future date.

### **Alternatives 2 and 3 (Action Alternatives)**

Alternatives 2 and 3 would have no long-term or cumulative effects to the roadless characteristics of the North Absaroka IRA, and there would be no effects to any other IRA. Likewise, there would be no irretrievable or irreversible commitment of resources, which would eliminate possibility of the Northern Absaroka IRA to be designated as wilderness at some future date.

## ***Consistency with Laws, Regulations and Forest Plan Direction***

The National Forest Management Act, and associated agency policy directs the agency to evaluate all roadless lands for their suitability for designation as wilderness within the Wilderness Preservation system. The Final Environmental Impact Statement for the Gallatin National Forest Plan approved in 1987 evaluated roadless characteristics for all inventoried

roadless lands on the forest (at that time), and made recommendations for future inclusion in the wilderness preservation system. 36 CFR Part 294, Roadless Area Conservation Rule (2001 Roadless Rule) establishes prohibitions on road construction, road reconstruction, and timber harvesting in inventoried roadless areas on National Forest System lands. The intent of this final rule is to provide lasting protection for inventoried roadless areas within the National Forest System in the context of multiple-use management. The Secretary's Memorandum 1042-154 (5/28/09) is intended to assure the careful evaluation of actions in inventoried roadless areas while long term roadless policy is developed. The Gallatin Forest Plan allows for livestock grazing in inventoried roadless areas under the management direction spelled out on pp. II-4 and II-20, and in the Absaroka-Beartooth Wilderness Area as described on p. F-10.

There would be no direct, indirect, cumulative, or long-term effects to the North Absaroka IRA within the project analysis area associated with any of the alternatives. There would be no irretrievable or irreversible commitment of resources, which would eliminate possibility of the Northern Absaroka IRA to be designated as wilderness at some future date. All alternatives are in compliance with the Gallatin Forest Plan and all laws, regulations, and direction regarding roadless concerns.

### **Issue C-Socio-Economics**

Given the level of social and economic change in the region over the past decade, the residents of South-central Montana have become increasingly aware of the effect National Forest resource management has on local and regional economies. Ranching operations and livestock grazing have historically played an important role in these communities and may impact local and regional economies, government receipts and expenses, and permittee income.

#### ***Affected Environment***

The analysis area covers two range allotments located in Sweetgrass County, Montana on the northeast corner of the Deer Creek Mountains, southeast of Big Timber, MT. The allotments have historically been grazed by cattle since the 1800's. Grazing has been authorized since the formation of the Gallatin Forest in the early 1900's and it continues to be an important part of the management of forest resources today. Grazing permittees are often issued one permit for both private land and National Forest System (NFS) lands when a logical grazing area exists to promote efficient use of intermingled ownership. For the West Bridger and Carey Gulch Allotments, Alternatives 2 & 3 propose to continue to allow livestock grazing on NFS lands within these allotments in order to utilize the forage resource and provide opportunities for business ventures in livestock production.

#### ***Analysis Area Boundaries and Methodology***

This section presents concepts used to delineate the affected area and methods used to analyze the economic effects of grazing on the West Bridger & Carey Gulch Allotments, including the financial efficiency and economic effects. Unless otherwise stated, the affected area is the allotment boundaries and the temporal boundary for analysis is ten years into the future, which is the length of an average grazing permit.

Analysis of effects on counties is limited to Sweetgrass County which maintains a population of about 3,000 people covering approximately 2,627 square miles. There is one incorporated city, Big Timber and several communities. Big Timber is the county seat of government. The diverse economy includes everything from agriculture, logging, mining, and recreation to new technical businesses. Local residents pursue a wide variety of life-styles, but many share a common

theme; an orientation to the outdoors and natural resources. These communities, closely tied to the National Forests in work, subsistence, and recreation, are directly affected by what happens on the Forests. The importance of the ranching sector in this county is highlighted as both an economic benefit and a social benefit. It is a rich and important part of the history of the area. Ranching operations in the area often operate at a loss or close to the margin and their profitability can be notably affected by a variation of market conditions. If access to federal lands for grazing is altered significantly, this change would affect ranching profits and possibly overall business viability. The inventory of all cattle in Sweetgrass County 2007 was 36,196 with a total value of approximately 16.8 million (National Agricultural Statistics Service).

A comprehensive socio-economic analysis was completed during the development of the Gallatin Forest Plan in 1987. The analysis estimated the relationship of Forest activities to communities. Short-term impacts were given primary emphasis with lesser consideration given to long-term effects. Many projects over a large area were consolidated so that socio-economic effects could be shown effectively (Gallatin Forest Plan FEIS, pp. II-100). Although activities within the project area influence local socio-economic conditions, many of these influences and effects cannot be effectively analyzed at the project level. The comprehensive analysis conducted at the Forest Plan level can more readily project social effects to the local and regional communities.

Ranch operations in the West Bridger and Carey Gulch Allotment project area have built their operations with reliance upon Forest Service grazing permits. Private grazing is generally not available for replacement of federal permits, due in part to the high land values throughout Sweetgrass County. Grazing fees are generally lower than market value. Although the Forest Service does not receive full market value, the permittees and local economy are benefited by the value of grazing on NFS lands. This economic value is the basis for Present Net Value calculations in the economic analysis. Grazing fees are set based on a formula established by Congress and Presidential Executive Order and are outside the scope of this analysis.

In 2010, the Forest Service collected a \$1.35 per head month (HM) grazing fee from permittees for grazing cattle and horses. Of the grazing fees collected from permittees, 50% goes to the Federal Treasury. Funds appropriated by Congress are normally used to finance planning activities related to allotment management plans. All costs for normal maintenance of allotment improvements are paid by the permittees.

The other 50% is typically split between “Range Betterment Funds” to the Forest collecting the fees and the “25% Fund Payment to States”. Range Betterment Funds finance material and some labor for range improvement projects. Permittees contribute the labor for most projects. Each National Forest allocates Range Betterment Funds to individual ranger districts based on the priority rating for their range improvement projects. Twenty-five percent of the grazing revenues are returned to the states as payments to the counties with National Forest System lands within their boundaries for school and road funding. It is possible that 25% fund payments may effect “payments in lieu of taxes” to the counties.

### ***Effects Analysis***

The estimation of economic efficiency was based on the costs and revenues associated with all management, maintenance and administration of the allotments. Costs included in the analysis include such items as construction and maintenance of fences, administration of the allotment by the Forest Service, the cost of materials for range improvements, noxious weed management, monitoring, etc. Benefits for permittees are based on the estimated value of red meat production

attributable to the forage and associate improvements provided on the allotments. Benefits for the Forest Service are based on total revenues from grazing fees. Other costs and benefits, such as watershed and riparian health or scenic quality, have not been assigned dollar values; therefore, they are expressed using other quantitative and qualitative terms in the EA and project record.

The present net value (PNV) is an indicator for comparing the financial efficiency between alternatives. PNV is the difference between the present value of the revenues and present value of the costs. PNV converts costs and revenues over the entire time frame of the project into a single figure for a selected year. A positive PNV means that the project would generate more revenues than costs. The NEPA planning costs are sunk costs at the time of decision and are not included in the PNV analysis. The present net value is based on benefits that will be produced during the life of the allotment management plan and costs including capital investments. The PNV as shown in Table 27 was calculated using Quicksilver, a program for economic analysis of long-term, on-the-ground resource management projects. A four percent real discount rate (exclusive of inflation) was used over the ten-year grazing permit lifespan (2012-2022). Details of the analysis are on file in the Project File.

**Table 27-Efficiency Analysis (Present Net Value in 2009 dollars) by Alternative**

	Alternative 1 (No-Action)		Alternative 2		Alternative 3	
	Forest Service	Permittee	Forest Service	Permittee	Forest Service	Permittee
<b>Benefits</b>	\$0.0	\$0.0	\$27,952	\$238,620	\$27,952	\$238,602
<b>Costs</b>	\$34,158	\$0.0	\$14,759	\$11,297	\$14,759	\$12,208
<b>Total PNV</b>	<b>\$34,158</b>	<b>\$</b>	<b>\$14,103</b>	<b>\$227,322</b>	<b>\$13,192</b>	<b>\$226,411</b>
<b>Possible 25% Fund</b>	\$0.00		\$2,822.00		\$2,822.00	
<b>AUM*</b>	1,445		1,445		1,445	
<b>HM**</b>	1,094		1,094		1,094	

\* AUM = Animal Unit Month. The AUM is the approximate amount of forage a 1000 lb cow will eat in one month. The AUM is 780 lbs of forage on a dry weight basis. An example is a cow/calf pair eats about 32% more of the forage one cow will eat in one month (1.32). This allows managers to match the number of animals with the amount of forage.

\*\* HM = Head Months. The number of animals times the average number of days of authorized use.

## *Direct and Indirect Effects*

### **Alternative 1 – No Action/No Grazing**

The No Action/No Grazing Alternative would reduce the amount of public land available for grazing by 3,592 acres. The PNV for the No Action Alternative (Table 19) includes costs and revenues from the phase out of cattle grazing on the allotment. Because no grazing would be occurring after this period, no monetary benefits would be gained by either the Forest Service or the permittees. Permittees may elect to continue to graze on adjacent private land. The average cost of private pasture in the state of Montana was approximately \$20.20 per AUM in 2009 (USDA Agriculture Survey Statistics). This would be a cost of approximately \$29,189.00/year for the cattle currently permitted on the West Bridger & Carey Gulch grazing allotments. With the termination of grazing permits, the Forest Service would no longer have any management input over any of the private lands within the allotments. Additional costs may occur for removal of improvements for both the permittee and the Forest Service. Over the long term, declining range conditions would likely result in reductions of future forage availability.

On a region-wide basis, it is unlikely that any economic effects would be noticeable given the minor percentage of livestock feed resources derived from these allotments. From a social perspective, elimination of livestock grazing on NFS lands could be seen as a threat to the ranching culture Sweet Grass County. In addition, the accumulation of fine fuels over time on this landscape may result in an increased threat to wildfire ignition. However, given the fact that the Derby Fire burned through 90% of these allotments in 2006, any likely increased wildfire threat would be well into the future.

### **Alternative 2: Current Management**

With Alternative 2, permits for livestock grazing on the West Bridger & Carey Gulch Allotments would be re-issued for the same numbers and season of use that are currently allowed. Alternative 2 would provide \$27,952.00 in revenue value over the ten-year period. It would cost the Forest Service approximately \$13,848.00 to administer and monitor the grazing permits. The present net value would be positive \$14,103.00. Permittee costs and benefits are also shown in Table 19 to disclose the possible economic implications of the alternatives on permittees. Alternative 2 would result in a positive net benefit to the permittee of \$227,322.00 (See Table 19). These figures are the present value of all accumulated costs and revenues over the ten-year planning period (present value of average annual costs are one tenth of these values). Forest Service costs include all Forest overhead, planning, monitoring, and administration costs incurred for the project area.

Alternative 2 has the highest total value for both the Forest Service and permittees. The difference between the Alternatives 2 & 3 is the associated cost of improvements on the allotments. Alternative 3 would maintain the level of administration and maintenance on the allotments, but would require additional fencing and water source development.

Actual Forest Service revenues are based on congressionally established prices. These prices may be adjusted during the term of the permit. Historically, 25 percent of all grazing fees have been distributed to counties for school and road funding. It is possible that 25% fund payments may effect “payments in lieu of taxes” to the counties. Current Management would generate approximately \$1,950.00 yearly in Forest Service revenues and \$264.00 in 25% fund contributions yearly from the West Bridger & Carey Gulch Range Allotment

grazing receipts. Over the ten-year period of the permits, the present net value of the Forest Service revenues for the 25% county fund would be \$2,822.00.

### **Alternative 3-Adaptive Management**

Alternative 3 would re-authorize grazing permits and continue “permitted livestock grazing”, utilizing management techniques designed to meet desired future conditions and ensure consistency with Forest Plan standards. This alternative focuses on Adaptive Management Strategies to improve resource conditions within these allotments.

Alternative 3 would provide \$27,952.00 in revenue value. It would cost the Forest Service \$14,759.00 to administer and monitor the grazing permits. The present net value would be positive \$13,192.00. A positive benefit of \$226,411.00 is also reflected for the Permittees in Alternative 3 (Table 19).

Alternative 3 would generate the same revenues as Alternative 2, \$1,950.00 yearly in Forest Service revenues and \$264.00 in 25% fund contributions yearly from the West Bridger & Carey Gulch Range Allotments grazing receipts. Over the ten-year period of the permits, the present net value of the Forest Service revenues for the 25% county fund would be \$2,822.00.

### ***Cumulative Effects***

This section considers the effects on the environment resulting from the incremental impact of the alternatives analyzed in detail, when added to other past, present, and reasonably foreseeable actions and trends. These effects are discussed by resource and collectively. Where no cumulative effects have been identified, such is noted.

Past and present actions include both human and natural disturbances that have had an effect on vegetative composition and structure. Human activities that have had the most influence on understory vegetation composition and structure in the analysis include the introduction of non-native species and livestock grazing. Other human activities including fire suppression and recreational uses have also impacted vegetation composition and structure. Natural disturbances include, but are not limited to, insect and disease outbreaks, wind events, fire, landslides, floods, and ice and “freeze-thaw” damage. Below are the main past and present actions considered in the cumulative effects analysis for socio-economics. The timeframe for cumulative effects analysis is the length of a typical grazing permit (ten years):

- Livestock Grazing
- Activities on Private lands in the area
- Recreational Access/facilities
- Travel Plan Implementation Changes
- Noxious Weed Treatments
- Prescribed Burning

Over the next ten years, the FS anticipates the following occurring in the analysis area:

- Continued livestock grazing;
- Continued development on private land;
- Increased recreational use;
- Continued monitoring of the Travel Plan changes;

- Known noxious weed infestation area will continue to be treated and monitored;
- Prescribed fire application and/or hand thinning will be applied;

Implementation of any of the alternatives considered in this Environmental Assessment would not be expected to contribute negatively or positively to these effects. The permittees for the West Bridger & Carey Gulch Allotments do not have Forest permits in other areas with recent NEPA decisions. Therefore, there are no known cumulative economic effects on individual permittees.

The livestock industry is expected to continue to play an important role in the local economy of Sweetgrass County. There are no foreseeable changes in the Federal grazing fee structure in the near future. Current trends in Yellowstone County (east of Sweetgrass County) include a shift from agricultural to other industries as more diverse businesses become established. This may have an adverse affect on the future of the livestock industry in Sweetgrass County.

### ***Compliance with Applicable Laws, Regulations, and Forest Plan Guidance***

The socio-economic analysis prepared for this analysis complies with all of the following laws and guidance:

Economic and social analyses are described in **Forest Service Manual (FSM) 1970**. This guidance considers costs, benefits, and effects of proposed actions on the public. It also considers economic efficiency, along with other factors, in making decisions and in implementing and reviewing projects, programs and budgets. The economic analysis was prepared using the guidance provided in this manual.

**Forest Service Handbook (FSH) 1909.17** – Economic and Social Analysis, Chapter 10, measures costs and outputs to consider for economic efficiency, ranking for alternatives. The direction set forth in this handbook was used to complete the economic analysis for this project.

**Federal Land Policy and Management Act (FLPMA) of 1976 (Sec 103)**. FLPMA authorizes the Secretary of Agriculture to issue permits for various uses on National Forest System lands. FLPMA (1) prescribes the manner in and extent to which livestock operations are to be conducted to meet multiple uses, sustained yield, economic, and other objectives. Alternatives 2 & 3 were designed to comply with FLPMA. Alternative 1 would discontinue grazing on the allotments.

**Forest Service Manual (FSM) 2203 (1), (2), and (3)**, - Cost-effectiveness in range vegetation management and direction for operating the permit system to best serve the public's long-term economic and social needs. The economic analysis was prepared using the guidance provided in this manual.

### **Issue D-Heritage Resources**

Heritage resources (also known as cultural resources) include buildings, structures, sites, areas, and objects of scientific, historic, prehistoric, or social value. They are irreplaceable, nonrenewable resources documenting the legacy of past human use of the Forest.

### ***Affected Environment***

In 2010, all moderate-to-high probability terrain within the analysis area received cultural resource inventory by a qualified archaeologist. No known prehistoric cultural sites exist within the project boundaries. The existing condition is the desired condition for heritage resources within the project boundary. All moderate-to-high probability terrain has received intensive survey (2006) as a result of the Derby Fire and the results have been documented. The resulting negative inventory report will be included in the Forest's 2011 annual compliance report to the Montana State Historic Preservation Office, as required under the terms of the Programmatic Agreement among the Forest Service Northern Region (Montana), the Montana State Historic Preservation Office and the Advisory Council on Historic Preservation.

### ***Analysis Area Boundaries and Methodology***

For heritage resource purposes, the area of analysis for the West Bridger/Carey Gulch Range Allotment Project comprises all national forest lands within and immediately contiguous to the project boundaries. Two known heritage sites are located inside the boundaries of the West Bridger Range Allotment Project area:

- West Bridger Cabin (24SW0301)
- Deer Creek Cabin (non-recorded site)

West Bridger Cabin and Deer Creek Cabin, were at one point administrative sites, but now are cabin rentals for the Gallatin National Forest. West Bridger cabin site is currently fenced off from disturbance due to livestock and Deer Creek Cabin will be fenced off as a part of project related mitigation. Neither cabin has enough integrity to be considered eligible for listing on the National Register of Historic Places.

Project-related mitigation includes that any ground disturbing activities within the area of potential effect, should have a qualified archaeologist present. This will help increase the project efficiency if any new heritage resources are located.

When a project is proposed on the Gallatin National Forest, heritage program specialists participate in planning and in the analysis of potential project effects. This participation consists of: 1) reviewing historical materials, archival documents, and overviews relevant to the project area; 2) analyzing the nature of the project and its potential to affect cultural resources; 3) reviewing public concerns regarding the project and its potential effect; and 4) consulting with interested Tribes, heritage interest groups, and the Montana State Historic Preservation Office. In the process, the heritage specialist determines the project's "area of potential effect" (APE) based on the geographic area in which a project may alter the character or use of any existing historic properties.

Based on this information, heritage specialists determine whether existing cultural resource data is adequate to complete the environmental analysis and disclose potential effects on cultural resources. If the information is insufficient, additional research and/or inventory will be undertaken. Where additional inventory is needed, heritage personnel design a survey strategy to locate all prehistoric/historic properties within the APE. This strategy is designed in accordance with the criteria defined in the "Site Identification Strategy" (SIS), for the Gallatin, Helena, Custer, and Lewis and Clark National Forests. If a survey discovers previously unknown cultural resources, those resources are recorded and National Register eligibility status determined in consultation with the Montana State Historic Preservation Office (MTSHPO). Both background research and fieldwork are documented in a report submitted to the MTSHPO. The heritage

program manager consults with MTSHPPO to determine the nature of the project's effects on significant properties. If needed, the heritage program manager and MTSHPPO work together to determine appropriate project redesign, restrictions, designation of sensitive areas, or mitigation measures. The heritage program manager coordinates recommendations, actions, and monitoring with the project leader, MTSHPPO, and interested Tribal preservation officials.

A project is determined to affect a prehistoric/historic property when project activities alter the characteristics that qualify the property for inclusion in the National Register of Historic Places (NRHP). In determining the effect, alteration to features of the property's location, setting, or use may be relevant, depending on the property's significant characteristics. An "adverse effect" results when the project may diminish the integrity of a prehistoric/historic property's location, design, setting, materials, workmanship, feeling, or association. Adverse effects include (but are not limited to): physical destruction, damage, or alteration of all or part of the property; isolation of the property from its setting; alteration of the setting's character when that character contributes to the property's National Register eligibility; introduction of visual, audible, or atmospheric elements out of character with the property or its setting; and neglect of a property resulting in its deterioration or destruction (National Register Bulletin #15; How to Apply the National Register Criteria for Evaluation, US Dept. of Interior, National Park Service, rev. ed., 1995).

The Forest Service Heritage Resource Program is responsible for managing cultural resources to prevent loss or damage before they can be evaluated for scientific study, interpretive efforts, or other appropriate uses. This requires projects to be implemented in a manner that avoids adverse effects on historic properties. Project design should ensure that the essential form and integrity of historic properties is not impaired. If the potential for adverse effects cannot be avoided, appropriate mitigation treatments are determined in accordance with 36 CFR 800.5. As an example, mitigation of impacts for timber harvest may include establishment of buffer zones, directional falling, alteration of harvest unit boundaries, changes in road locations, location of skid trails away from historic properties, limiting the harvest methods in certain areas, seasonal limitations, and restrictions on slash disposal or tree planting activities. Where a project has the potential to impact a property of Tribal concern, the Forest Service will consult with Tribal representatives to develop appropriate mitigation measures.

### ***Direct/Indirect Effects***

Within the West Bridger and Derby Gulch Range Allotments, all areas that are considered to be "moderate-to-high probability for heritage resource occurrence" were surveyed on the 29<sup>th</sup> and 30<sup>th</sup> of September 2010. The area surveyed in 1976, 1984 and 2006 included all lands previously surveyed. As listed above, two historic sites have been recorded within the project area during the earlier surveys. No new sites were discovered during the 2010 inventory.

Because no new heritage resources have been revealed within the project area by literature search, tribal and state preservation office consultation, or field surveys, and the area has been grazed with similar numbers of cattle for numerous decades, it is believed the proposed activities associated with all of the alternatives would not have any direct or indirect effects on cultural resources that were not previously stated. Mitigation is in place to protect any future cultural resources that may be discovered.

### ***Cumulative Effects***

Because there are no anticipated direct or indirect effects associated with any of the alternatives regarding heritage resources, there would be no cumulative effects associated with the project.

### *Consistency with Applicable Laws, Regulations, and Forest Plan Guidance*

The primary legislation governing modern heritage resource management is the **National Historic Preservation Act (NHPA) of 1966 (amended in 1976, 1980, and 1992)**. All other heritage resource management laws and regulations support, clarify, or expand on the National Historic Preservation Act. **Federal Regulations 36 CFR 800 (Protection of Historic Properties), 36CFR 63 (Determination of Eligibility to the National Register of Historic Places), 36 CFR 296 (Protection of Archaeological Resources) and Forest Service Manual 2360 (FSM2360)** provide the basis of specific Forest Service heritage resource management practices. These laws and regulations guide the Forest Service in identifying, evaluating, and protecting heritage resources on national forest system lands. The Forest Service is required to consider the effects of agency actions on heritage resources that are determined eligible for the National Register of Historic Places (NRHP) or on heritage resources not yet evaluated for eligibility. Eligible Heritage Guidelines for Archaeology and Historic Preservation are also an important element of federal agencies' management of cultural resources on public lands.

Several other laws address various aspects of heritage resource management on national forests, including the **National Environmental Policy Act of 1969 (NEPA), the National Forest Management Act of 1976 (NFMA), the Antiquities Act of 1906, the Historic Sites Act of 1935, and the Archaeological Resource Protection Act of 1979, as amended in 1988 (ARPA)**. ARPA and two other regulatory acts describe the role of Tribes in the federal decision-making process, including heritage management. ARPA requires Tribal notification and consultation regarding permitted removal of artifacts from federal lands. **The Native American Graves Protection and Repatriation Act of 1990 (NAGPRA)** recognizes Tribal control of human remains and certain cultural objects on public lands and requires consultation prior to their removal. **The American Indian Religious Freedom Act of 1978 (AIRFA)** requires federal agencies to consider the impact of their actions on traditional Tribal cultural sites. **The National Historic Preservation Act (NHPA)** also specifically calls for Tribal participation in the NHPA Section 106 consultation process.

The Crow Tribal Nation located on the Crow Reservation, regards the Gallatin National Forest as an area of concern, and is consulted on all projects occurring on the Forest.

Heritage and Tribal interests are regulated by federal laws that direct and guide the Forest Service in identifying, evaluating, and protecting heritage resources. All of the alternatives in this analysis would comply with all of these Federal laws. The Gallatin Forest Plan tiers to these laws, therefore all of the alternatives would meet Forest Plan standards.



## Chapter 4-Consultation and Coordination

### *List of Preparers*

The following Forest Service employees comprised the interdisciplinary team (IDT) that prepared the Environmental Analysis and assessment for this proposal:

- Alex Sienkiewicz – Yellowstone District Ranger, Responsible Official
- Lauren Oswald – Acting District Ranger, Roadless Analysis
- Chauntelle Rock - Rangeland Management Specialist, East Zone Gallatin NF
- Kim Reid –Lead Range Specialist, Gallatin-Custer National Forests
- Barbara Ping – IDT Leader and Writer/Editor, East Zone NEPA, Gallatin NF
- Rachel Feigley –Wildlife Biologist, East Zone, Gallatin NF
- Clint Sestrich–Fisheries Biologist, East Zone Gallatin NF
- Mark Story – Forest Hydrologist, Gallatin National Forest
- Wendi Urie – Recreation Specialist, Yellowstone Ranger District
- Tom Keck – Forest Soil Scientist, Gallatin National Forest
- Justin Mochelle – Archaeologist, Gallatin National Forest
- Steve Schacht – Vegetation Management (Socio-Economics), East Zone Gallatin NF

### *Public Notice and Distribution of the EA*

The West Bridger and Carey Gulch Allotments analysis was announced in the winter of 2009/2010 and appeared in the winter 2009 through winter 2011/2012 Gallatin Forest Quarterly proposed project listings (SOPA). Over eighty scoping letters were sent out on December 10, 2009 to agencies, organizations, permittees, local residents, and others who have expressed interest in similar projects. Six comment letters were received in response to this scoping. The EA was prepared and a legal notice was published in the Bozeman Daily Chronicle (the paper of record) stating that this EA is available for public review and comment. Copies of the February 2012 EA are being mailed to persons, groups, and agencies that have expressed an interest in the project or asked to be included. The mailing list was compiled using names and addresses from the following sources:

- Individuals or groups who have requested to have their names placed on the mailing list.
- Individuals or groups who submitted comments to date in the process.
- Current Permittees
- Co-operating, consulting, or interested agencies
- Tribal Leaders

## **Individuals**

The following individuals provided comment or requested information via telephone, letter, or personal visit during the scoping comment period:

1. James Vesbach-Hardin, MT
2. Rusty Terland-Permittee-Reed Point, MT
3. Terry Terland-Permittee-Reed Point, MT
4. Cindy Green/Ray Hertzler-Permittees-Absarokee, MT

## **Organizations**

Two organizations provided written or oral comments regarding this proposal during the scoping comment period:

1. Western Watersheds Project-Missoula, MT
2. Eagle Vision Ministries-Reed Point. MT

## **Agencies and Government**

Project information was mailed to the following agencies that were either consulted or have shown interest in similar projects.

Bureau of Land Management-Billings, MT  
US Fish & Wildlife Service (concurred with the Programmatic BA used for this project)-  
Helena, MT.  
Montana Department of Fish and Wildlife-Livingston & Big Timber, MT  
Sweet Grass Co. Commissioners-Big Timber, MT  
Farm Bureau-Big Timber, MT  
Montana Department of Natural Resources & Conservation-Billings, MT  
Sweet Grass Conservation District-Big Timber, MT  
Sweet Grass County Extension Agent-Big Timber, MT

## **Indian Tribes**

Information regarding this project was mailed to the following tribal agencies:

Crow Tribe-Crow Agency, MT.  
Eastern Shoshone Tribe-Fort Washakie, WY  
Shoshone-Bannock Tribes-Ft. Hall, ID  
Confederated Salish and Kootenai Tribes of the Flathead Nation-Pablo, MT.

Copies of the EA can be obtained or viewed at the following locations:

Yellowstone Ranger District- Big Timber Office

Copies of the document are also available by contacting Barbara Ping at the following address:

USDA Forest Service  
c/o Barbara Ping  
Bozeman Ranger District  
3710 Fallon St. Suite C  
Bozeman, Montana 59718  
Phone - (406)-522-2558  
email – [bping@fs.fed.us](mailto:bping@fs.fed.us)

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## ***Glossary and Acronyms***

**303 (d) LISTING** – The Clean Water Act Section 303 (d) requires each state to identify water bodies that are water quality limited (WQLS). A stream listed in a report by the Montana Department of Environmental Quality/Water Quality Division 303(d) report (MDEQ, 2004) is one that is in need of Total Maximum Daily Load (TMDL) development. When the TMDL is developed and approved by the EPA, the 303(d) list becomes part of the annual Montana 305(b) Report.

**AFFECTED ENVIRONMENT** – The biological and physical environment that will or may be changed by actions proposed and the relationship of people to that environment.

**ALLOTMENT (also Grazing Allotment)** – A designated area of land available for livestock grazing upon which a specified number and kind of livestock may be grazed under an allotment management plan. It is the basic land unit used to facilitate management of the range resource on National Forest System and associated lands administered by the Forest Service.

**ALTERNATIVE** – A combination of management prescriptions applied in specific amounts and locations to achieve a desired management emphasis as expressed in goals and objectives. One of the several policies, plans, or projects proposed for decision making. An alternative need not substitute for another in all respects.

**ANIMAL MONTH** – A month of use by one animal. The kind and class of animal must be specified. Not synonymous with “animal unit month.”

**ANIMAL UNIT MONTH (AUM)** – The quantity of dry forage required by one mature cow or equivalent animal of 1,000 pounds for one month based on a forage allowance of 26 pounds per day.

**BEDLOAD** – Those particles, transported by moving water, that are generally rolled, dragged or skipped along the stream bed without being lifted upward and suspended by the action of the water.

**BIOLOGICAL ASSESSMENT (BA)** – The legal record of findings for USDI Fish and Wildlife Service proposed, threatened, or endangered species (FSM 2670.5.2).

**BIOLOGICAL EVALUATION (BE)** – The legal record of finding for USFS Region 1 sensitive species (FSM 2670.5.3).

**BROWSE** – Twigs, leaves, and young shoots of trees and shrubs on which animals feed; in particular, those shrubs which are utilized by big game ungulates or livestock for food.

**CHANNEL STABILITY** – The ability of the stream banks and bottom to resist the erosive powers of moving water.

**CFR** – Code of Federal Regulations.

**CULTURAL RESOURCES** – The physical remains of human activity (artifacts, ruins, burial mounds, petroglyphs, etc.) and conceptual content or context (as a setting for legendary, historic, or prehistoric events, as a sacred area of native peoples, etc.) of an area of prehistoric or historic occupation.

**CUMULATIVE EFFECT** – The effect on the environment which results from an incremental impact of the action when added to other past, present and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time.

**DEFERRED GRAZING STRATEGY** – A grazing system where all pastures within an allotment are grazed during a given year but some are deferred (not grazed) during all or part of a season to allow for plant growth, nutrient storage, or seed production.

**DISPLACEMENT** – Lack of security, forage or other resources that cause elk or other wildlife to move away from their normal use area.

**DIVERSITY** – (1) The relative abundance of wildlife species, plant species, communities, habitats, or habitat features per unit of area. (2) The distribution and abundance of different plant and animal communities and species within the area covered by a Land and Resource Management Plan (36 CFR Part 219.3(g)).

**ECOSYSTEM** – A complete, interacting system of organisms considered together with their environment.

**EFFECTS** – Physical, biological, social, and economic results (expected or experienced) from natural events or management activities. Activities that cause effects may be direct, indirect, and/or cumulative.

**ENDANGERED SPECIES** – Any plant or animal that is in danger of extinction throughout all or a significant portion of its range other than a species of the Class Insecta determined by the Secretary of the Interior to constitute a pest whose protection under the Endangered Species Act would present an overwhelming and overriding risk to man. Endangered species are identified by the Secretary of the Interior in accordance with the 1973 Endangered Species Act.

**ENVIRONMENTAL ASSESSMENT (EA)** – a concise public document for which a Federal agency is responsible that serves to:

- (1) Briefly provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement (EIS) or a finding of no significant impact.
- (2) Aid an agency's compliance with the National Environmental Policy Act when no EIS is necessary.
- (3) Facilitate preparation of an EIS when one is necessary.

**EROSION** – The group of processes whereby earthly or rocky material is worn away by natural sources such as wind, water, or ice and removed from any part of the earth's surface.

**FORAGE** – All browse and non-woody plants available to livestock or wildlife for food.

**FOREST PLAN** – Gallatin National Forest Land and Resource Management Plan, September, 1987.

**GRAZING ALLOTMENT** – See Allotment.

**GRIZZLY BEAR RECOVERY ZONE** – The area comprised of Management Situations 1 and 2 for grizzly bear as decided by an interagency team. The Cache Creek Allotment falls part way between zones 1 and 2.

**HABITAT TYPE** – An aggregation of all land areas potentially capable of producing similar plant communities at climax.

**INDIRECT EFFECTS** – Effects separated in time or space from the causative actions.

**INHERENT STABILITY** – The amount of stream channel that would be stable under natural conditions. Inherent stability takes into account the natural migration of streams across a landscape, native ungulate use, the natural distribution of peak flow events, and the interaction of soil and rooting characteristics of vegetative communities. Each of these factors may contribute to reduced stream channel stability.

**INTERDISCIPLINARY TEAM (IDT)** – a group of individuals with different training specialties assembled to solve a problem or perform a task. The team is assembled out of recognition that no one scientific field is sufficiently broad to adequately solve a multi-disciplinary problem.

**INTERMITTENT STREAMS** – Streams that naturally stop flowing during part of most years.

**LANDTYPE** – An inventory map unit with relatively uniform potential for a defined set of land uses. Properties of soils, landform, natural vegetation, and bedrock are common components of landtype delineation used to evaluate potentials and limitations of land use.

**MANAGEMENT INDICATOR SPECIES** – Species identified in a planning process that are used to monitor the effects of planned management activities on viable populations of wildlife and fish including those that are socially or economically important.

**MANAGEMENT SITUATION 1 (MS1)**– Contains grizzly population centers and habitat components needed for the survival and recovery of the species or a segment of its population (Forest Plan pg. G-3).

**MANAGEMENT SITUATION 2 (MS2)**– Areas that lack distinct grizzly bear population centers, highly suitable habitat does not generally occur, although some grizzly bear habitat components exist and grizzlies may be present occasionally. Habitat resources in MS2 are either unnecessary for survival and recovery of the species, or the need has not been determined, but habitat resources may be necessary (Forest Plan pg. G-3).

**MEMORANDUM OF UNDERSTANDING** –Official record documenting an agreement between two or more parties.

**MITIGATION** – Avoiding or minimizing impacts by limiting the degree or magnitude of the action and its implementation; rectifying the impact by repairing, rehabilitating, or restoring the affected environment; reducing or eliminating the impact by preservation and maintenance operations during the life of the action.

**NATIONAL ENVIRONMENTAL POLICY ACT of 1969 (NEPA)** – An act which encourages productive and enjoyable harmony between man and his environment; promotes efforts to prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; enriches the understanding of the ecological systems and natural resources important to the Nation; and establishes a Council on Environmental Quality.

**NATIONAL FOREST MANAGEMENT ACT of 1976 (NFMA)** – A law passed as amendments to the Forest and Rangeland Renewable Resources Planning Act that requires the preparation of Regional and Forest plans and the preparation of regulations to guide that development.

**NATIONAL FOREST SYSTEM (NFS)**– All National Forest lands reserved or withdrawn from the public domain of the United States; all National Forest lands acquired through purchase, exchange, donation or other means; the National Grasslands and land utilization projects administered under the Title III of the Bankhead-Jones Farm Tenant Act (50 Stat. 535, 7 U.S.C. 1010-1012); and other lands, waters, or interests therein which are administered by the U.S. Forest Service or are designated for administration through the U.S. Forest Service as part of the system.

**PEAK FLOW or PEAK DISCHARGE** – The greatest amount of flow attained in a stream or river during a large precipitation or snowmelt event.

**PERENNIAL STREAMS** – Streams that flow continuously through most years.

**PROJECT FILE** – Detailed documentation of an environmental analysis, usually located in files in the Forest Service District Office or the Forest Supervisor’s Office.

**PUBLIC INVOLVEMENT** – A Forest Service process designed to broaden the information base upon which agency decisions are made by (1) informing the public about Forest Service activities, plans, and decisions, and (2) encouraging public understanding about and participation in the planning processes which lead to final decision making.

**RANGE ALLOTMENT** – A designated area of land available for livestock grazing upon which a specified number and kind of livestock may be grazed under a range allotment management plan. It is the basic land unit used to facilitate management of the range resource on National Forest System and associated lands administered by the Forest Service.

**RANGELAND** – Land on which the climax vegetation (potential natural plant community) is predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing and browsing.

**REACH** – A section of the stream that is being referred to or analyzed.

**RIPARIAN / RIPARIAN AREA / RIPARIAN ZONE** – A transition area between the aquatic ecosystem and the adjacent upland terrestrial ecosystem identified by soil characteristics and by distinctive vegetative communities that require free or unbounded water. Included are the banks and adjacent areas of water bodies and water courses, seeps, and springs whose waters provide soil moisture sufficiently in excess of that otherwise available locally, providing a more moist habitat than that of contiguous flood plains and uplands.

**RIPARIAN VEGETATION** – Plant communities associated with riparian zones that are dependent upon the presence of water near the ground surface (high water table).

**SCOPING** – An early and open process designed to identify the environmental issues and significant factors to be addressed in the analysis process.

**SEDIMENT** – Solid material, both mineral and organic, that is in suspension, being transported, or has been moved from its site of origin by air, water, gravity, or ice.

**SENSITIVE SPECIES** – Those plant or animal species that merit concern due to declining populations or a reduction in habitat and as recognized by the Regional Forester.

**SERAL** – A biotic community that is developmental; a transitory stage in an ecologic succession.

**SERAL STAGE** – The developmental stages of an ecological succession.

**SINUOSITY** – The amount of meandering by a stream. The measure of sinuosity has implications for the amount of energy applied to stream banks and the vulnerability for streambank alteration.

**SOIL PRODUCTIVITY** – The capacity of a soil to produce a specific crop such as fiber or forage, under defined levels of management. It is generally dependent on soil moisture, soil nutrients, and the length of the growing season.

**STOCKING RATE** – The number of specific kinds and classes of livestock grazing or utilizing a unit of land for a specified time period.

**STREAMBANK ALTERATION** – Physical change of the streambank from natural causes such as runoff events or hoof shear by wild ungulates or human causes such as road building or hoof shear by livestock.

**STREAM TYPE** – A classification of a stream that is based in its dimensions, patterns and profile characteristics. This system is based on Rosgen's stream classification system.

**SUSPENDED LOAD** or **SUSPENDED SOLIDS** – Those particles, transported by moving water, that are lifted up and suspended by the action of the water, and moved long distances before settling again to the stream bed.

**THREATENED SPECIES** – Any species of plant or animal that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. Threatened species are identified by the Secretary of the Interior in accordance with the 1973 Endangered Species Act.

**TIERING** – Refers to the elimination of repetitive discussions of the same issue by incorporating by reference the general discussion in an environmental impact statement or other document of broader scope. For example, an environmental assessment for a project might be tiered to the Forest Plan EIS.

**TOTAL MAXIMUM DAILY LOAD (TMDL)** – Refers to a quantitative measure of a specific pollutant that is responsible for creating a water quality limited stream (WQLS). Once a TMDL is established, a strategy is implemented maintain that pollutant at or below that TMDL thereby moving the stream toward the attainment of that water quality standard. The development of a TMDL is the responsibility of the State of Montana.

**TRANSITORY RANGE** – Land that is suitable for grazing for a period of years, but may not be suitable afterward. For example, after a fire, grasses may establish and provide transitory range until replaced by trees or shrubs not suitable for forage.

**UTILIZATION** – The proportion of the current year's forage production that is consumed or destroyed by grazing animals. May refer either to a single species or type of forage or to the vegetation as a whole.

**VEGETATIVE COMMUNITY** – A group of one or more populations of plants in common spatial arrangement with common nutritive and growth functions.

**WATER DEVELOPMENT** – A water source developed by public land managers and permittees meant to provide water to livestock, but which could also be used by wildlife.

**WATER QUALITY LIMITED STREAM (WQLS)** – A stream that has been affected by a pollutant such that it does not meet the water quality standards as designated by the Environmental Protection Agency and the Montana Department of Environmental Quality. The EPA's and MDEQ's strategy for dealing with water quality streams is to develop a TMDL and then maintain the pollutant in question at or below that TMDL, thereby moving the stream toward the attainment of the water quality standard.

**WIDTH TO DEPTH RATIO** – An index value that indicates the shape of a stream channel cross-section. The ratio of the width of the channel at bankfull compared to the average depth of the channel at bankfull.

**WINTER RANGE** – The area available to and used by big game during the winter season. Winter range areas tend to have a relatively low amount of snow cover which enables the animals to reach forage.