2013 MONTANA FEDERAL LANDS ACCESS PROGRAM PROPOSAL

# MAIN BOULDER RIVER ROAD RECONSTRUCTION

SWEET GRASS COUNTY

## APPENDIX B

Main Boulder Corridor Study Report

December 2012

# Main Boulder Corridor Study Report

Prepared for Sweet Grass and Park Counties, Montana

Beck Consulting

Montana Department of Transportation

U.S. Department of Transportation
Federal Highway Administration

## Table of Contents

**Executive Summary** ..... **1**

**Chapter 1. Introduction** ..... **3**

Purpose of the Corridor Study ..... 3

Background ..... 5

Study Area ..... 5

Planning Horizon ..... 8

Goals of the Study ..... 8

How this report is organized ..... 8

How this plan relates to the National Environmental Policy Act (NEPA) ..... 9

**Chapter 2. Public Process, Agency and Tribal Coordination** ..... **11**

Public Involvement Activities ..... 11

Agency Coordination ..... 12

Tribal Coordination ..... 14

**Chapter 3. Existing Social, Economic, and Environmental Conditions** ..... **15**

Social Conditions ..... 15

Environmental, Recreation, Cultural, and Aesthetic Resources ..... 19

Environmental Resources ..... 19

Biological Resources ..... 23

Projected Social, Economic, and Environmental Conditions ..... 38

**Chapter 4. Improvement Options** ..... **47**

Option A: Three Gravel Sections ..... 47

Option B: Four Sections, One Asphalt, Three Gravel ..... 50

Analysis of Improvement Options ..... 53

Discussion and Recommendations ..... 54

**Appendix A: Other studies and plans** ..... **57**

Sweet Grass County ..... 57

Park County ..... 58

Gallatin National Forest ..... 60

## Table of Figures

Figure 1. Main Boulder Corridor Vicinity Map ..... 4
Figure 2. Topographic Map of Corridor Study Area ..... 7
Figure 3. Linking NEPA and Transportation Planning ..... 9
Figure 4. 2010 Census Age of Population ..... 16
Figure 5. Park and Sweet Grass Counties, and Montana Incomes (Source: 2010 U.S. Census) ..... 17
Figure 6. Park County Traffic Counts ..... 43
Figure 7. Roadway Cross Sections ..... 48

## Table of Tables

Table 1. Employment, Park and Sweet Grass Counties ..... 18
Table 2. Largest Industries by Employment ..... 18
Table 3. Substrate sediment and sediment delivery by Forest stream category ..... 30
Table 4. National Forest Person at One Time Estimates ..... 34
Table 5. Wild and Scenic River Classifications ..... 35
Table 6. Gallatin Forest Plan Visual Quality Objectives for the Study Area ..... 37
Table 7. Bridge Inspections ..... 45
Table 8. Option A ..... 47
Table 9. Option B ..... 50
Table 10. Option C ..... 51
Table 11. Options analyzed against screening criteria ..... 53
Table 12. Park County Growth Policy Guidance ..... 59
Table 13. Gallatin National Forest Plan Guidance ..... 62

# Main Boulder River Road Reconstruction Corridor Study

## Executive Summary

The Main Boulder River Road is a special and unique roadway located in Park and Sweet Grass Counties, Montana. The road's present condition ranges from rough to primitive. The road provides access for seasonal and year-round residents, church camps, year-round recreation, forest management, and emergency response. This road provides the only ingress and egress to the upper half of the Main Boulder drainage. The current condition of the road does not allow for a timely evacuation in the event of an emergency (wildland fire is the largest concern) nor is the road in a condition that the two counties can afford to maintain it. The purpose for this corridor study is to identify road improvement options that will 1) improve the ability of the counties to evacuate the drainage during an emergency (while also allowing ingress for emergency response) and 2) to reconstruct the road to a standard that better enables the counties to maintain the road.

A variety of types of vehicles travel the road from bicycles, motorcycles, and four-wheelers to passenger cars and trucks to school buses to fire apparatus and to logging trucks. There is also some pedestrian, off-highway vehicle (OHV), and stock use along the road. The road provides access to the Gallatin National Forest and the Absaroka Beartooth Wilderness Area.

The commissioners in the two counties along with the Gallatin National Forest successfully applied for funds from the Federal Highway Administration to prepare a corridor study. Following the corridor study, the project will be eligible to compete for federal funds for design and construction.

A series of public meetings was held to gather input on the project. Seasonal and year-round residents as well as emergency responders identified their concerns and offered suggestions at the various meetings held from December 2011 through October 2012. Public input guided the work of the planning team so that the proposed recommendations meet local expectations and are supported by the benefitting population and elected officials.

The project goals were as follows:

1. Increase the safety of residents and visitors using the Main Boulder River Road.
2. Improve roadway conditions and features such as bridges, alignment, drainage, bottlenecks, and sight distances where practicable.
3. Reconstruct the roadway to reduce long-term maintenance costs to the counties.
4. Maintain the aesthetic character of the corridor to the extent possible while addressing safety and maintenance issues.

Three options were considered. Option A divides the roadway into three linear sections. The improvements are designed to align the development with the fact that the amount of traffic decreases with distance traveled on the road proceeding from north to south. Option A proposes two 12-foot travel lanes from Natural Bridge to Two Mile Bridge, two 10-foot travel lanes from Two Mile Bridge to Fleming Bridge, and one 16-foot lane with inter-visible turnouts from Fleming Bridge to Box Canyon. All of the sections are scheduled for non-native gravel surfacing. Three of the five bridges are proposed for replacement. Drainage and grade challenges will be addressed.

Option B divides the roadway into four linear sections. The improvements are also designed to align development with the fact that traffic decreases with travel up the drainage. Option B provides for the first section (Natural Bridge to Two-Mile Bridge) to have an asphalt surface. The remaining sections would be gravel. As with Option A, three of the five bridges are proposed for replacement. Drainage and grade challenges will be addressed.

Option C divides the roadway into three linear sections. As with Option B, the northern most section is proposed for paving. The first section (northern-most) under Option C is longer than in the other two options—making the paved section longer than that in Option B. The first section would extend from Natural Bridge to Aspen Campground. Option C also has the greatest variation in road standard of the three options. Option C begins with the highest standard on the north and ending with a lower standard at Box Canyon to the south, the terminus of the project. As with Options A and B, three of the five bridges are proposed for replacement. Drainage and grade challenges will be addressed.

The recommended improvement option is Option A. This option was developed largely in response to local residents that participated in the public comment and public meeting opportunities. The majority of local residents engaged in the process continued to advocate for minimal reconstruction.

In the next couple of months, the Counties and the Forest Service will be meeting to discuss the application for project funding. The next step toward a road improvement project would include the completion of the appropriate environmental analysis.

If the next phase of this project is funded, the National Environmental Policy Act (NEPA) process would begin and would examine a range of alternatives including Option A. The intent of the process would be to look at environmental effects and explore significant and non-significant issues that may not have been considered to date. The NEPA process--by law--requires thorough consideration of environmental effects and also includes a rigorous formal public input process.

# Chapter 1. Introduction

This corridor study is being prepared for the Main Boulder River Road (MT#298) using the Montana Department of Transportation's corridor planning process as a guide. The process emphasizes public involvement and early consideration of environmental issues associated with transportation projects. The planning process can save time and money by providing a context for later planning documents and by helping to analyze the desirability of various improvement options.

The corridor study considers the needs identified by the Sweet Grass County Commissioners and the Gallatin National Forest contained in the two project proposals submitted to the Federal Highway Administration in April 2011.

The county stated the need for the reconstruction project as follows: "The condition of the roadway is such that frequent users of the roadway recommend that it not be used by low clearance, two-wheel drive vehicles. The Sweet Grass County Commissioners believe that the condition of the road represents a serious safety risk to the people that live, work, and vacation in the Boulder River Valley."

The proposals go on to identify the conditions requiring relief as: "The project will address the following problematic conditions: 1) failed road surface strewn with boulders, 2) bottlenecks caused by narrow road width, 3) replace bridges that do not meet current standards for width, 4) deterioration of the road going through wetlands, and 5) limited sight distance that has contributed to at least two automobile accidents."

Seasonal and permanent residents; recreationists using campground and other developed facilities in the drainage; anglers, hunters, hikers and other day users; children and staff at the church camps; and emergency response personnel are all at risk due to the current situation, and will continue to be at risk until improvements are made.

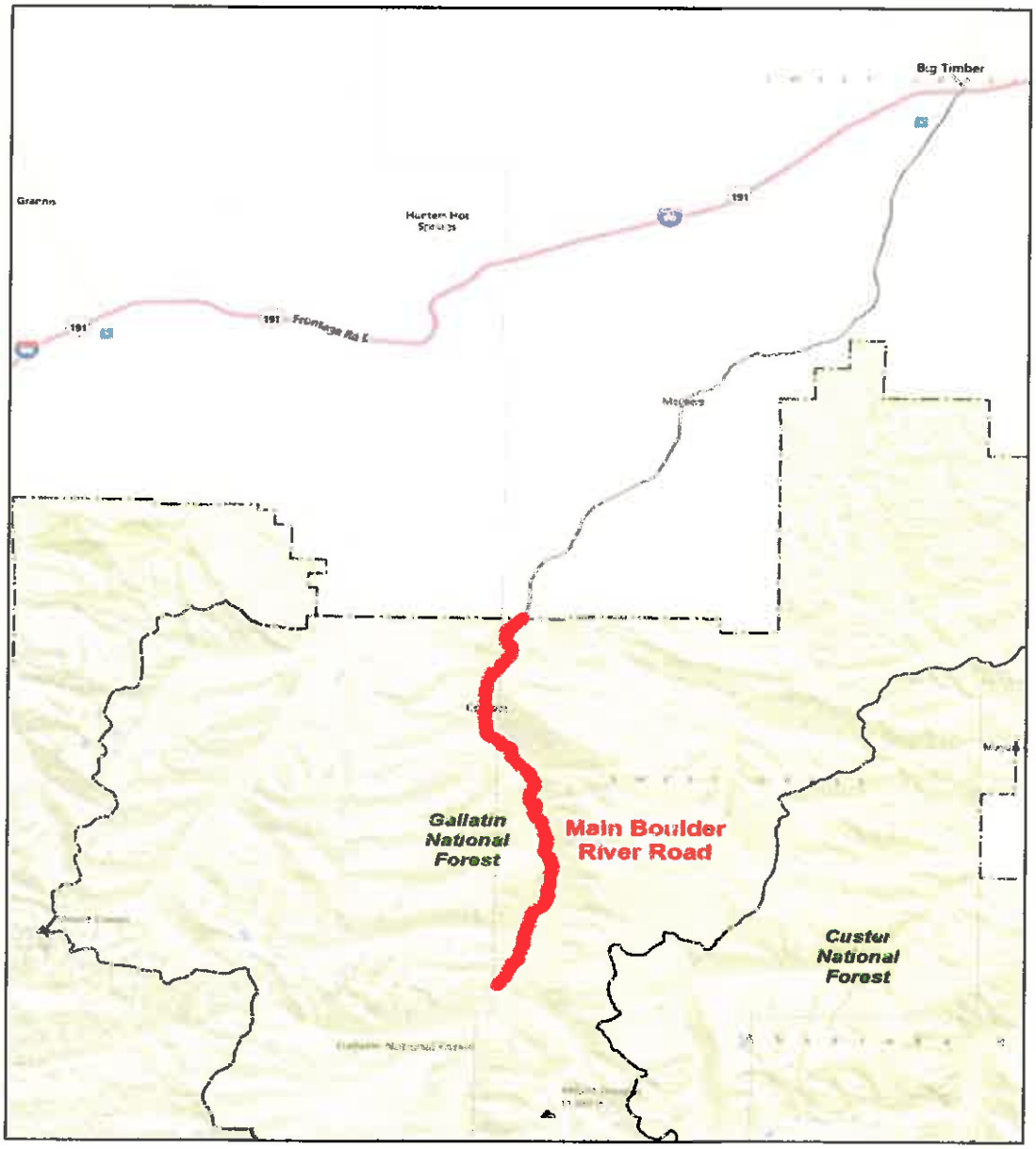
## Purpose of the Corridor Study

The purpose of the corridor study is to:

- compile information on the existing and projected conditions of the Main Boulder River Road,
- identify needs, issues, goals and screening criteria,
- develop and evaluate improvement options, and
- provide recommendations for reconstruction of the road.

Following the study process, the counties can apply for project funds. The Montana Department of Transportation, Montana Association of Counties, and the Federal Highway Administration will then make a decision on whether to proceed with an implementation project that may include reconstruction. If the decision is made to reconstruct the road, the information in this study report can be used to help inform the environmental analysis and decision documents.

*Figure 1. Main Boulder Corridor Vicinity Map*



## Background

Sweet Grass County, Montana, and the Gallatin National Forest submitted two Forest Highway Project Proposals to reconstruct the Main Boulder River Road. The applications were submitted in April 2011. Phase I as originally submitted begins at Natural Bridge and ends 7.5 miles south of Natural Bridge. Phase II begins 7.5 miles south of Natural Bridge and ends 16.7 miles south of Natural Bridge.

The applications were reviewed by the Montana Tri-Agency. The Tri-Agency had representation from the Montana Department of Transportation, the USDA Forest Service, and Western Federal Lands (a division of the Federal Highway Administration within the U.S. Department of Transportation.) The Tri-Agency combined the two project phases into one project and selected it for a corridor study. Sweet Grass County was notified of the decision by Western Federal Lands in the fall of 2011. The project was chartered on October 25, 2011 in Big Timber at a meeting between the Sweet Grass and Park County Commissioners, the Forest Service, and Western Federal Lands.

The corridor planning process is intended to comprehensively study the transportation needs and potential solutions that exist within a particular area and serve as the foundation for future project prioritization and implementation. The study was based on the corridor planning process developed by the Montana Department of Transportation (MDT), which emphasizes early public involvement and consideration of environmental issues during the transportation planning process. This approach is intended to save time and money later on by developing specific products and information that can be used during the project development and environmental review process.

## Study Area

The Main Boulder River Road is situated south of Big Timber, Montana. The road crosses back and forth between two counties, Sweet Grass and Park Counties, Montana. The road provides access to year-round and seasonal residences, camps, National Forest campgrounds and trails, and the Absaroka Beartooth Wilderness Area. While the number of year-round residents is limited due to access and distance considerations, summer populations in the drainage--including seasonal residents, attendees at the four camps, and recreationists accessing National Forest campgrounds and back country--regularly exceed 3,000 people. The road dead-ends in the National Forest and serves as the only ingress and egress for the drainage.

The original corridor study began at Natural Bridge on the Main Boulder River Road (County Road 298, Forest Road 6639) and followed the road south for 16.7 miles. At the December 7, 2011 open house, participants asked that an additional six miles of roadway south to Box Canyon be studied. Federal Highways agreed to extend the corridor study area to Box Canyon.

According to research on the history of the road conducted by Jerry Brekke in 2008, the entire Boulder River region was a part of the Crow Indian Reservation between 1868 and 1882. Lands west of the Boulder River (and a portion of the Stillwater drainage) were ceded to the United States by an 1880 treaty which was ratified by Congress in 1882. These lands were returned to public domain, while lands east of the Boulder River remained reserved by the Crow until they were ceded in 1891 and a portion reserved as Yellowstone Forest Reserve. The Upper Boulder area remained in public domain, unreserved for public use, until the establishment of the Absaroka National Forest (predecessor to Gallatin National Forest) on September 4, 1902.

Brekke continues, "The catalyst for settlement and development of the Boulder River lands was principally mining. Prospecting near the headwaters of the Boulder River had taken place throughout the Crow Reservation period and Joe Keeney is credited with naming Independence and working claims in the area, albeit while trespassing on Crow lands, as early as 1877. Discoveries on Contact Mountain were developed by the mid-1880s and significant mining investments were being made in the Independence area. By the late 1880s, communities were established in both mining districts.

Development of the Boulder area coincided with the creation of Park County from eastern Gallatin County in 1887. While Gallatin County road records indicate establishment of roads on the lower Boulder River in 1884, petitions for roads on the Upper Boulder River were presented to the Park County Commission subsequent to county establishment. Boulder Road District #15 was created by commissioners' action on September 5, 1887." (Commissioner Proceedings, Book 1, Pg. 13)

The road corridor--in large part because of the natural setting of the river and the adjacent steep slopes--is narrow. The corridor is surrounded by National Forest and for most of the project's length, the designated Absaroka Beartooth Wilderness Area. Private lands are intermingled with the National Forest in the drainage bottom primarily as a result of mineral patents. The corridor between the designated wilderness boundaries is in most places no more than a half-mile wide, and in no place along the road corridor does it exceed three-quarters of a mile in width.

The corridor study is narrow, generally not extending farther than 150 feet either side of centerline. Exceptions that could require extension of the study corridor would be in areas where realignment is considered or where a particular resource requires a larger study area.

The corridor study area starts approximately 15 miles south of Big Timber and approximately 25 road miles east of Livingston. There are no incorporated communities within the corridor study boundaries. The study area does include the unincorporated community of McLeod.

*Figure 2. Topographic Map of Corridor Study Area*

## Planning Horizon

The planning horizon for this project is 20 years.

## Goals of the Study

The following project issue statements were developed based upon the Sweet Grass County 2011 Montana Forest Highway Proposals dated April 26, 2011; a public meeting that was held by the Sweet Grass county commissioners on June 22, 2011; a meeting held by Western Federal Lands (Federal Highway Administration) and the Park and Sweet Grass County commissioners and the Forest Service on October 25, 2011; and a public meeting held in Big Timber on December 7, 2011.

- What should be done to improve the road for emergency response access and/or evacuation?
- How should the road be designed so that both counties can afford to maintain it to an acceptable standard?
- What is needed and where to address road safety and function concerns such as alignment, bridges, drainage, and bottlenecks, etc.
- How can the project support appropriate existing and future economic uses of the Main Boulder River drainage, for example, recreation, grazing, fuels and timber management, and mineral development?
- What considerations such as roadway width and surface type are needed to retain the character of the road and protect resources like fisheries and wetlands?

Consistent with the issues identified above and the needs of the county and Forest Service, the goals for the reconstruction project are as follows:

1. Increase the safety of residents and visitors using the Main Boulder River Road.
2. Improve roadway conditions and features such as bridges, alignment, drainage, bottlenecks, and sight distances where practicable.
3. Reconstruct the roadway to reduce long-term maintenance costs to the counties.
4. Maintain the aesthetic character of the corridor to the extent possible while addressing safety and maintenance issues.

## How this report is organized

The corridor study report is organized to first provide the background information about the project and the study area. The report then lists the major issues developed with input from the public, local elected officials, and planning team technical staff, and the project goals. The public involvement process and results are documented. Next the report describes existing social and economic, biological, and physical conditions. The report explains the improvement options—what was considered and recommended, and what was considered and not recommended. Finally the options are analyzed against the screening criteria to present the final recommendation. A summary of other local studies and plans is provided as Appendix A.

## How this plan relates to the National Environmental Policy Act (NEPA)

Traditional transportation planning has not typically incorporated environmental factors and environmental agencies often have little understanding of transportation planning processes. Because federally funded or approved activities—such as road construction—require environmental review, previous transportation planning decisions may be revisited and decisions changed. Viewing transportation planning and environmental review as two separate processes is inefficient and frustrating.

The Council on Environmental Quality issued guidance in 40CFR 1501.2 to address this situation, "…..agencies shall integrate the NEPA process with other planning at the earliest possible time to ensure that planning and decisions reflect environmental values, to avoid delays later in the process…."

The Montana Department of Transportation has developed a process to guide corridor studies that maximizes integration of information and planning considerations to improve efficiency and final products. The guidance is found in "Montana Business Process to Link Planning Studies and NEPA/MEPA Reviews." The integrated approach to transportation and environmental planning considers the land use system, transportation system, water resources system, and other natural and cultural systems in order to support multiple goals. Existing resource inventories and plans are reviewed and considered in the integrated approach.

The Main Boulder Road Corridor Study will incorporate and document environmental, social and economic considerations at the earliest point in the transportation planning process. The study document is organized and prepared to fully support the subsequent environmental analysis process. Transportation options that have obviously unacceptable environmental consequences (consequences that cannot be adequately mitigated) will not be advanced.

Once the corridor study has been completed, the appropriate authority under federal transportation legislation will make a decision on whether to proceed with the road reconstruction project. If the decision is to proceed, the environmental analysis or "NEPA process" will be completed.

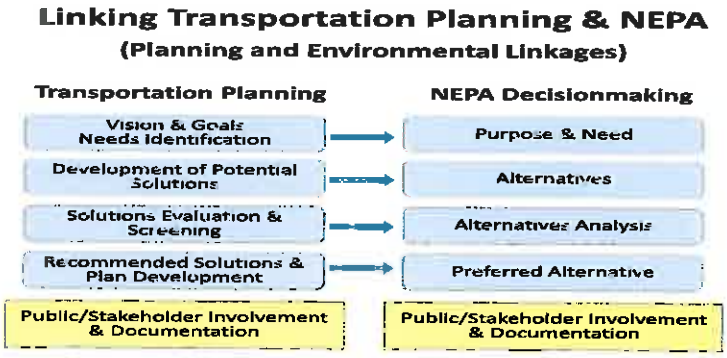



*Figure 3. Linking NEPA and Transportation Planning*

# Chapter 2. Public Process, Agency and Tribal Coordination

## Public Involvement Activities

The project initiation meeting was held in Big Timber, Montana, on October 25, 2011. One of the agenda items at this initial meeting was how best to involve the public in the study process. The participants at this meeting (the planning team) discussed the number of public meetings that would be needed and who would have an interest in the study and should be invited to attend. Planning team members concurred that it would be appropriate to hold up to four public meetings over the course of the coming 12 months while the corridor study was being developed.

These meetings would consist of a project kick-off meeting in Big Timber in December of 2011, another meeting in Big Timber to report progress in late spring of 2012, a meeting held at a location on the Main Boulder in the summer of 2012 to attract seasonal residents, and a final meeting in Big Timber in the fall of 2012 to present the draft corridor study report.

The first public meeting was held in Big Timber on December7, 2011. A press release with information about the meeting was provided to the Big Timber News and was printed by them. Invitations to the meeting were mailed out using the Forest Service's contact list of all property owners in the drainage. Posters were placed around Big Timber and provided electronically to a Main Boulder resident who maintains an extensive e-mail list of landowners. This individual graciously agreed to forward the invitation. A one-page Fact Sheet about the corridor study was prepared and made available at the meeting and on Sweet Grass County's website.

The first public meeting was structured as an open house. The purposes of the meeting were to explain the corridor study project and to validate the preliminary issue statements. Attendees were greeted, asked to sign in, and provided with a copy of the Fact Sheet. Maps with aerial photos of the project area and flip charts with issue statements were posted on the walls around the room. Open house participants were encouraged to write comments in their own words under the issue statements and to make notations indicating safety and other concerns along the road on the maps.

Participants at the open house did validate the preliminary list of issues identified by the planning team and did not identify any additional issues. Thirty individuals attended the December 7, 2011 public meeting.

The second public meeting was held in Big Timber on May 23, 2012. The primary purpose of this meeting was to update the public on progress with the corridor study to date and ask for input. The May public meeting was advertised in the Sweet Grass County

News. E-mail invitations were sent by a Main Boulder resident who informally maintains a mailing list of property owners in the drainage.

A third public meeting was held at the Boulder River Ranch in the Main Boulder drainage. This meeting took place on August 23. The location and date were selected so that it would be convenient for the maximum number of seasonal residents to attend. More than 60 individuals attended this meeting. Participants new to the process were updated on the corridor study. Western Federal Lands presented design concepts based on public input to date. There was robust discussion and some agreement on what the final design should look like. While supporting modest changes to improve safety, most residents favored only minimal improvements to the road. Participants expressed concern over long-term maintenance and costs once the project is completed.

The final public meeting was held in Big Timber on October 2, 2012. The planning team presented the draft report. Members of the public expressed appreciation at having their input considered and incorporated. The public review period was initiated. The plan was posted on the website.

All meeting notes were available on the project website, www.mainboulderroad.com.

## Agency Coordination

The project planning team identified the agencies that would potentially have an interest in the project or knowledge of the project area to contribute to the study. The following agencies were listed; Montana Department of Environmental Quality; Fish, Wildlife and Parks; Department of Natural Resources and Conservation; Montana State Historic Preservation Office; and Montana Department of Transportation; U.S. Fish and Wildlife Service; U.S. Army Corp of Engineers, and specialists from the Gallatin National Forest in addition to those Forest Service employees that were serving on the planning team.

**February 2012 Agency Meeting, Big Timber** (photo credit: Big Timber Pioneer)

The planning team scheduled and held an agency meeting on February 23, 2012. County commissioners from both Park and Sweet Grass attended the agency meeting. The first half of the meeting was dedicated to explaining the corridor study, the relationship between the study, and the process to date.

The following list of resources was reviewed to discuss potential issues, opportunities, and information sources:

- aquatic organisms and amphibians,
- wildlife
- wetlands and floodplains,
- air quality and visual resources,
- soils,
- water quality,
- heritage (cultural resources), and
- recreation and wilderness.

Participants agreed to provide identified reference materials and the planning team agreed to communicate with the agency contacts periodically throughout the project to ensure they are current and included in invitations to any future public or other meetings.

Agency specialists were invited on a field review of the road. The field review took place on July 26 and consisted primarily of the planning team and Forest Service specialists. Meeting notes from this field review can be found on the project website.

The resource agencies participated in the corridor study process in the following ways:

- The Gallatin National Forest has been the primary stakeholder agency in this process. Gallatin Forest line and staff served on the planning team, participated in several field reviews, participated in all public meetings, provided language for the draft report, reviewed and provided comments on the draft, and developed an additional option for consideration. Forest Service comments on the draft included evaluating how the improvement options were consistent with the forest plan and potential design considerations and mitigation measures.
- The Montana Department of Transportation (MDT) served as a member of the planning team, attended both planning team and public meetings, and provided information for the report. The MDT liaison for the project also assisted in helping to explain the scope of a corridor study and ensuring that the preparation of this study report was consistent with the MDT corridor planning process.
- Fishery and wildlife biologists from the Montana Department of Fish, Wildlife and Parks were invited to, but unable to attend the agency meeting. Both aquatic and terrestrial biologists provided input for the description of existing conditions working with other planning team members from the Forest Service and Western Federal Lands.
- The U.S. Fish and Wildlife (FWS) was consulted informally by the Western Federal Lands (WFL) environmental specialist. FWS commented on the project, but not specific options. FWS typically participates in formal consultation during the NEPA process and in cooperation with the appropriate agency land owners.

- The U.S. Army Corp of Engineers (USACE) participated in the agency meeting explaining how they evaluated impacts to wetlands. USACE provided a list of previous 404 (wetland) permits for the area and requested to be re-engaged once the NEPA process was initiated.
- The local District Conservationist of the USDA Natural Resources and Conservation Service was invited to participate in the agency meeting and elected not to attend. Land ownership of the project is largely National Forest and with the exception of some limited grazing, not in agricultural production.
- The Montana Department of Environmental Quality (DEQ) was invited to participate in the agency meeting and declined to do so. The DEQ typically becomes involved in projects during the NEPA process.
- The Montana State Historic Preservation Officer was invited to participate in the process and invited to the agency meeting. SHPO, Mark Baumler responded by letter explaining that the office was unable to attend the agency meeting. Baumler explained that the SHPO would look forward to consultation with Federal Highways and the Gallatin National Forest as directed by Section 106 of the National Historic Preservation Act and 36CFR800 as appropriate.

The entire corridor study process was open and transparent. All meetings were posted electronically, e-mail invitations were sent out, a project website was maintained, and newspaper articles were published. Some agencies--based upon their assessment of the study process--simply decided to engage more fully during the subsequent NEPA process. An agency e-mail list was maintained and utilized during the project to keep agency personnel up to date.

## Tribal Coordination

Forest Service archeologist, Marcia Pablo, provided a list of all tribes that the Gallatin National Forest consults with on project activities. Based upon the location of the study area in relation to past interest expressed by various tribes, Ms. Pablo recommended communicating with four tribal entities from the Forest's list for this project. These tribes are the Confederated Salish and Kootenai Tribes, the Crow Tribe, the Northern Cheyenne Tribe, and the Shoshone-Bannock Tribes.

The FHWA sent letters to the Confederated Salish and Kootenai Tribes, the Crow Tribe - Apsáalooke Nation, the Northern Cheyenne Tribe, and Shoshone-Bannock Tribes of the Fort Hall Reservation regarding the corridor study. Federal Highways requested government-to-government consultation regarding any concerns the tribes may have about a potential transportation project in the Main Boulder corridor. FHWA did not receive any responses. Additional coordination will be needed if an improvement project moves forward.

# Chapter 3. Existing Social, Economic, and Environmental Conditions

This chapter identifies existing social, economic, and environmental conditions along the Main Boulder River Road corridor. The information in this report is intended as a planning-level overview and was primarily obtained from federal and state agency sources, coordination with agency staff, previously-published documents, and windshield surveys. The social and economic information provided here is consistent with other MDT corridor study efforts. County level data is provided because there is little to no existing data specifically for the project area below the county level.

If a recommendation from this corridor study is approved for funding, a full environmental review, in compliance with NEPA and other applicable environmental laws and regulations, will be completed as part of the project development process. Information such as project needs and objectives, preliminary identification and screening of alternatives, preliminary identification of environmental resource concerns, potential impacts, and mitigation options documented in this study may be adopted in the NEPA process for a future project.

## Social Conditions

### Population

According to the 2010 census the population of Sweet Grass County was 3,651 and the population of Park County was 15,636. The population in Sweet Grass County increased by 1.2% from the 2000 census to the 2010 census while the population in Park County declined 0.4% for the same period. (http://quickfacts.census.gov) Based on this information, the populations of both counties have been relatively stable over the past decade.

Big Timber is the county seat for Sweet Grass County and is the only incorporated community in the county. The population of Big Timber is 1,641. Livingston is the county seat for Park County and has a population of 7,044. 45% of the population in both counties lives in the county seat.

### Demographic Composition

While the total population in each county differs, the composition of the two populations is similar in terms of race, gender, and age.

The populations in the two counties are homogeneous with respect to race at 96.6% white in Sweet Grass County and 96.5% white in Park County. Persons reporting themselves as Black, American Indian and Alaska Natives, Asian, Hispanic and Latino, and persons reporting two or more races makeup the remaining less-than-4% of the populations in the two counties. Only 2.9% of the residents in Sweet Grass County reported speaking a language other than English at home while 4.5% of the Park County residents speak a language other than English at home. Between 2006 and 2010, 2.2% of the persons in Sweet Grass County were foreign born and 3.0% of the persons in Park County were foreign born. Park County had 50.2% Sweet Grass 49.4% female persons in 2010.

Park County had 1,666 veterans and Sweet Grass County had 492 veterans for the period 2006-2010.

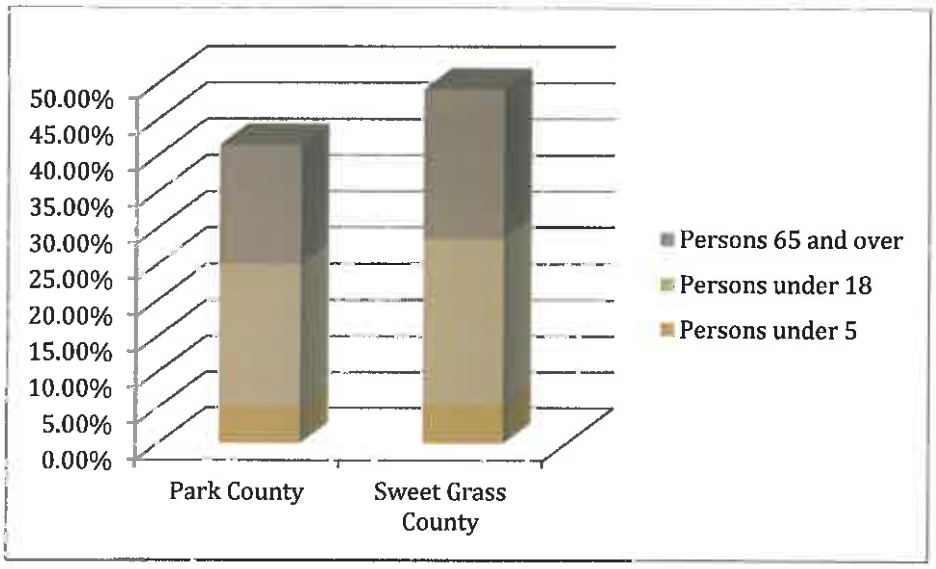



*Figure 4. 2010 Census Age of Population*

**Education**

In the state of Montana, 91% of the population (as a percent of persons age 25+) were high school graduates in 2010. In Park County, 89.4% of this same age group were high school graduates slightly less than the Montana average, and in Sweet Grass County, 92.8% were high school graduates, slightly higher than the Montana average. Park County has 31.4% of persons 25 years + with bachelor's degrees or higher and Sweet Grass has 28.8% with bachelor's degrees.

**Housing**

Park County had 9,375 housing units in 2010 with 2.19 persons per household for the period 2006-2010. The median value of owner-occupied housing units from 2006-2010 was $207,300. The home ownership rate in Park County was 70.4%. Housing units in multi-unit structures made up only 11.1% of the total number of housing units.

Sweet Grass County had 2,148 housing units in 2010 with 2.42 persons per household for the period 2006-2010. The median value of owner-occupied housing units from 2006-2010 was $184,100. The home ownership rate in Sweet Grass County was 81.3%. Housing units in multi-unit structures made up only 5.3% of the total number of housing units. Family households made up 61.7% of the households. Nonfamily households (persons living alone) made up the remaining 34.8% of the households in the county. 93.5% have lived in the same house one year or over for the period 2006-2010. According to the 2006-2010 American Community Survey 5-year estimates, 749 housing units or approximately one third of the housing units in the county were vacant.

## Economic Conditions

Despite being adjacent to each other, Park and Sweet Grass Counties have some differences in their economic base. While both have a substantial agricultural component, Sweet Grass County derives jobs and income from the Stillwater Mine while Park County includes a portion of Yellowstone National Park and benefits from tourists drawn to the National Park.

"Natural resource industries are important to Sweet Grass County, with significant mining and agricultural activity. The Stillwater Mining Company provides substantial employment in the county and has the distinction of being the only significant producer of palladium in the United States. Agriculture is prevalent through the eastern and northern sections of the county, where the primary livestock are cattle and sheep. Some crops are also raised, particularly those which require little moisture, such as hay, wheat, barley, and oats." (Demographic and Economic Information for Sweet Grass County, Census and Economic Information Center, Montana Department of Commerce, September 2010)

"Yellowstone, being a major tourist draw, makes tourism and recreation an important part of Park County's economy. Other important industries include agriculture, logging, mining, and health care. Park County has one hospital, two clinics, and four airports." (Demographic and Economic Information for Park County, Census and Economic Information Center, Montana Department of Commerce, March 2012)

### Income

The 2010 census reports per capita money income in Park County in the past 12 months in 2010 dollars of $24,717 in Park County. This is slightly higher than the state of Montana average. Sweet Grass County had per capita money income in 2010 of $22,785, slightly lower than the Montana average.

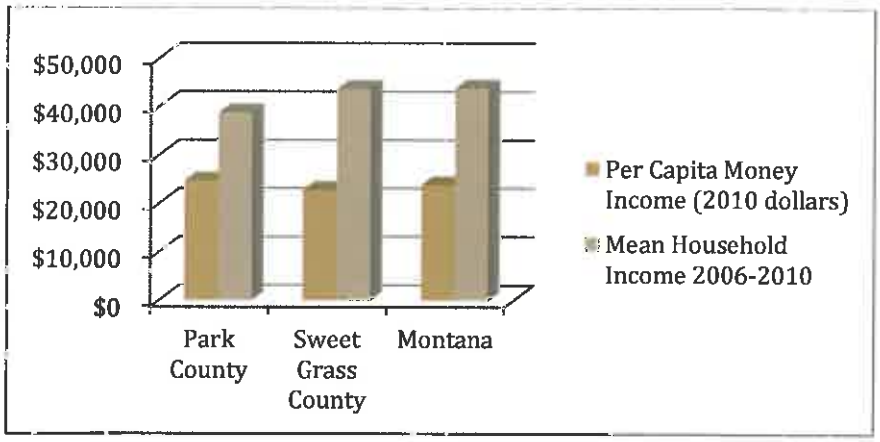



*Figure 5. Park and Sweet Grass Counties, and Montana Incomes (Source: 2010 U.S. Census)*

**Industry and Employment**

In March 2012, Park County had 854 business establishments with average annual employment of 5,172 persons. (Montana Department of Labor and Industry) The number of jobs in the private sector was 4,433. There were also 739 government jobs in the county.

As of September 2012, Sweet Grass County had 207 business establishments with average annual employment of 1,404 persons. (Montana Department of Labor and Industry) The number of jobs in the private sector was 1,034. There were also 370 government jobs in the county.

***Table 1. Employment, Park and Sweet Grass Counties***

| Year | Park County Civilian Labor Force | Park County Unemployment Rate | Sweet Grass Civilian Labor Force | Sweet Grass Unemployment Rate |
|---|---|---|---|---|
| 2010 | 8,357 | 8.1% | | |
| 2009 | 8,507 | 7.4% | 2,435 | 4.2% |
| 2008 | 9,014 | 4.7% | 2,890 | 2.4% |
| 2007 | 9,073 | 3.3% | 3,014 | 1.6% |
| 2006 | 9,213 | 3.1% | 2,825 | 1.6% |

The top ten private employers in Park County in alphabetical order include; Albertson's, Best Western Mammoth Hot Springs, Chico Hot Springs, Church Universal and Triumphant, Livingston Health and Rehabilitation, Livingston Healthcare, Montana' Rib and Chop House, Mountain Sky Guest Ranch, PrintingForLess, and Town and Country Foods.

The top ten private employers in Sweet Grass County in alphabetical order include: Big Timber IGA, Citizens Bank and Trust, Fort Liquor Store, Frosty Freez, The Grand Hotel and Restaurant, Pamida, Pioneer Meats, Sharps Rifles-Shiloh Rifle Manufacturing Company, Stillwater Mining, and Town Pump/Super 8 Motel.

The largest industries in the two counties in terms of employment were as follows:

***Table 2. Largest Industries by Employment***

| Industry | # employed in Park County | Annual wage in Park County (2012) | # employed in Sweet Grass County | Annual wage in Sweet Grass County (2010) |
|---|---|---|---|---|
| Accommodations and food service | 1182 | $15,499 | 141 | $13,815 |
| Construction | 296 | $32,040 | 91 | $31,030 |
| Health Care and Social Assistance | 626 | $36,706 | 19 | $16,714 |
| Manufacturing | 248 | $38,931 | 60 | $31,848 |
| Retail Trade | 646 | $22,383 | 150 | $23,547 |
| Local, state, and federal govt | 739 | $34,811 | 370 | $25,799 |

Source: Demographic and Economic Information for Park and Sweet Grass Counties, Montana Department of Labor and Industry

According to the latest census of agriculture statistics (2007), Park County had 535 farms. The average size of farm was 1,426 acres and the median size of farms was 205 acres. In 2007 there were 34,849 cattle and calves, 3,488 horses and ponies, 2,242 sheep and lambs, 200 bison, and a small number of hogs and pigs in Park County. In descending order by acres of production, the county produced hay, winter wheat, barley, spring wheat, and oats for grain. The agricultural census listed 258 individuals whose primary occupation was farming in Park County. Most of these individuals reside on the farm and have done so for 10 years or more. (Source: National Agricultural Statistics Service, 2007)

According to the latest census of agriculture statistics (2007), Sweet Grass County had 355 farms. The average size of farm was 2,289 acres and the median size of farms was 400 acres. In 2007 there were 36,196 cattle and calves, 6,615 sheep and lambs, 1,809 horses and ponies, 715 chickens, and a small number of hogs and pigs. In descending order by acres of production, the county produced hay, wheat, oats, and barley for grain. The agricultural census listed 177 individuals whose primary occupation was farming in Sweet Grass County. Most of these individuals reside on the farm and have done so for 10 years or more. (Source: National Agricultural Statistics Service, 2007)

## Environmental, Recreation, Cultural, and Aesthetic Resources

The Main Boulder River corridor is defined by the landscape, the community and the cultural and natural resources in the area. These issues are important, not just from a legal or regulatory standpoint, but in addressing transportation needs in a way that reflects the values of the community and the unique character of the corridor.

## Environmental Resources

### Physical Environment

#### Surface Waters & Water Quality

Surface waters within the corridor study area include the main stem of the Boulder River and its tributary drainages. The larger, named tributaries within the study area include Froze-to-Death Creek, Falls Creek, West and East Chippy Creeks, Miller Creek, Speculator Creek, Bramble Creek, Hawley Creek, Fourmile Creek, Ruby Creek, Clear Creek, Snowslide Creek, Bridge Creek, Upsidedown Creek, and the East Fork of the Boulder River. The Boulder River Watershed is located within the Upper Yellowstone sub-basin (Hydrologic Unit Code [HUC] 10070002). The Boulder River originates in the Absaroka and Beartooth mountain ranges in south central Montana and flows north-northeast approximately 60 miles before joining the Yellowstone River in the town of Big Timber. The watershed area upstream of the Gallatin National Forest Boundary is approximately 224.5 square miles. Two major tributaries—the West Boulder River and the East Boulder River—join the Boulder River downstream of the study area.

Section 303(d) of the Federal Clean Water Act (CWA) requires states to identify water bodies within its boundaries that do not meet state water quality standards. Section 303(d) also requires states to develop a list of impaired water bodies, referred to as the 303(d) list. Based on an assessment of water quality in the Boulder River watershed, the Montana Department of Environmental Quality (MDEQ) included the Boulder River from the headwaters to the confluence of the East Fork Boulder River on the 303(d) list as impaired due to metals including copper, iron, and lead. The MDEQ identified abandoned mining sites located in the headwaters as the primary source of metals impairment. As such, the Main Boulder River Road and any future roadway improvements would not significantly contribute to the causes of water quality impairment in the watershed. Although the Boulder River is not listed as impaired for sediment, communication with the USFS Fisheries Biologist identified concerns related to existing sediment delivery from the Main Boulder Road into the Boulder River and potential impacts to fisheries habitat.

The Main Boulder River Road runs roughly parallel to the Boulder River through the study area. Existing surface water crossings include four bridges across the Boulder River and numerous small bridges or culverts at the tributary drainages. As discussed in this report, bridges within the study area need to be upgraded or replaced due to size and functional deficiencies. From a water quality standpoint, the Boulder River bridges have dirt buildup from vehicular traffic and storm events as well as drain holes on the bridges that allow sediment to deposit directly into the river. Gravel bridge approaches also contribute to erosion and sediment deposition into the river. Many of the culverts on tributary channels are undersized, damaged, or clogged with debris and sediment from the road crossings drains directly into the stream. The lack of adequate roadway drainage contributes to erosion and sediment delivery to the river. In several areas, the road is located very close to the river with minimal vegetative buffer and road runoff and sediment drains directly into the river. The corridor study did not identify any areas of bank instability where the river is adjacent to the roadway.

This corridor study did not identify the need for any additional river or stream crossings, but the replacement of existing bridges and culverts is recommended. Replacement bridges should be designed to meet Forest Service stream simulation guidelines to avoid or minimize impacts to channel morphology by spanning the bankfull river channel and constructing bridge abutments out of the active channel. Smaller channel crossings should be appropriately sized and installed per Forest Service aquatic organism passage (AOP) guidelines to allow natural streambed material to deposit in the bottom of the culverts and facilitate passage of aquatic organisms (see fisheries and aquatics section for additional information.) Project features such as improved roadway and bridge drainage and paved bridge approaches would reduce sediment inputs to the river. In areas where the road is located immediately adjacent to the river, roadway improvements should be designed to shift the road away from the river where possible. Existing vegetative buffers between the roadway and the river should be maintained. If possible, vegetation should be established where there are no buffers between the roadway and the river to help reduce sediment inputs. These project features would be an improvement over the existing conditions. More detailed evaluation would be required prior to initiation of an improvement project to determine the potential impacts to surface waters as well as appropriate design and mitigation strategies.

**Wetlands & Waters of the U.S.**

The Clean Water Act (CWA) is the primary federal law regulating waters of the United States (U.S.), which essentially includes all surface waters such as all navigable waters and their tributaries, all interstate waters and their tributaries, all wetlands adjacent to these waters, and all impoundments of these waters. Section 404 of the CWA regulates the discharge of dredged or fill material into waters of the U.S. The Section 404 permit program is run by the U.S. Army Corps of Engineers (USACE) with oversight by the U.S. Environmental Protection Agency (EPA). The Executive Order for the Protection of Wetlands (EO 11990) also regulates the activities of federal agencies with regard to wetlands. Essentially, this EO states that a federal agency, such as the FHWA, cannot undertake or provide assistance for new construction located in wetlands unless the head of the agency finds: 1) that there is no practicable alternative to the construction and 2) the proposed project includes all practicable measures to minimize harm.

This study used National Wetland Inventory (NWI) data and windshield surveys to evaluate existing conditions within the corridor study area and identify areas where potential impacts may occur. A formal wetland and waters of the U.S. delineation that meets USACE standards would be needed to fully evaluate potential impacts if a roadway improvement project is proposed in the corridor.

Based on the roadway improvement recommendations in this corridor study, impacts to waters of the U.S. would most likely occur at the four bridge replacement locations on the Boulder River, at culvert replacement locations on tributary channels, and at the Beaver Pond area where the roadway is very narrow and constrained by steep talus slope to the east and wetlands adjacent to the roadway to the west. Some impacts could also occur in areas where the road is located immediately adjacent to the river. To address potential impacts, all project features should be designed to avoid or minimize impacts to waters of the U.S. the greatest extent practicable.

As discussed above, bridges should be designed to span the active channel and bridge abutments should be located above the ordinary high water mark (OHWM) of the river to avoid impacts to waters of the U.S. Culverts at smaller channel crossings should be appropriately sized and installed to allow natural streambed material to deposit in the bottom of the culverts and facilitate passage of aquatic organisms. Temporary disturbances should be minimized by working "in the dry" as much as possible. Designs for the Beaver Pond area should consider raising the roadway to gain any needed width and minimize impacts to the adjacent wetland area. In areas where the road is located immediately adjacent to the river, roadway improvements should be designed to shift the road away from the river, if possible, to avoid or minimize potential impacts.

Because a future improvement project in the corridor would potentially involve the replacement of multiple bridges and culverts as well as other possible impacts to waters of the U.S., a Section 404 permit would most likely be required. The USACE issues different types of permits under the Section 404 permit program depending on the type of activity and the level of impacts. If the total impacts to waters of the U.S. exceeds 0.5 acre, then an Individual Permit would probably be required. An Individual Permit requires additional documentation and agency coordination during the project development process to demonstrate there is no practicable alternative that would have

less adverse effects. Any unavoidable impacts to waters of the U.S. will need to be mitigated as required by the USACE and other applicable regulations. Coordination with the USACE should occur early in the project development process to identify potential mitigation sites.

### Floodplains

Executive Order (EO) 11988 (Floodplain Management) directs all federal agencies to evaluate the potential effects of any actions it may take in a floodplain and ensure that its actions reflect consideration of flood hazards and floodplain management. Federal agencies are required to avoid direct or indirect support of development in floodplains whenever a practicable alternative exists. FHWA regulations require an evaluation of project alternatives to determine the extent of any encroachment into the base floodplain.

There are no Federal Emergency Management Agency (FEMA) Flood Hazard Zones mapped within the corridor study area. Additional coordination with Sweetgrass and Park Counties should be conducted during the project development process to determine if any floodplain permits are required.

### Air Quality

The Clean Air Act (CAA), as amended in 1990, is the federal law that governs air quality. This law set National Ambient Air Quality Standards (NAAQS) for the quantity of pollutants that can be in the air in order to protect human health and welfare. NAAQS have been established for six transportation-related criteria pollutants that have been linked to human health concerns. These criteria pollutants are: carbon monoxide (CO), nitrogen dioxide ($NO_2$), ozone ($O_3$), particulate matter (PM), lead (Pb), and sulfur dioxide ($SO_2$). Under the CAA, USDOT agencies (including FWHA), are prohibited from funding, authorizing, or approving transportation plans, programs, or projects that do not to conform to the State Implementation Plan (SIP) for meeting the Clean Air Act requirements. Transportation conformity requirements apply only in areas that are designated as nonattainment and "maintenance" (former nonattainment) areas for the NAAQS, and only for the specific NAAQS that are or were violated.

According to the MDEQ Air Quality Nonattainment Information website, there are 14 designated nonattainment areas in Montana. The corridor study area is not located within a designated air quality nonattainment or maintenance area; therefore, transportation conformity requirements are not applicable.

Certain areas of special natural, scenic, recreational, or historic value are provided special protection under the CAA. These areas are designated as Class I Airsheds. The corridor study area is not located within a designated Class I Airshed.

## Biological Resources

### Threatened, Endangered, Candidate, and Proposed Species

The Endangered Species Act (ESA) is the primary federal law protecting threatened and endangered species. Under Section 7 of the ESA, federal agencies are required to consult with the U.S. Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NOAA Fisheries Service) to ensure that they are not undertaking, funding, permitting, or authorizing actions likely to jeopardize the continued existence of listed species or destroy or adversely modify designated critical habitat.

The FHWA contacted the USFWS to determine the federally threatened, endangered, proposed, and candidate species that have the potential to occur in the project area and to request preliminary comments on the proposal to improve the Main Boulder River Road. Based on USFWS's response, the federally-listed species and designated critical habitat that occur in Sweet Grass and Park Counties include the threatened Canada lynx (*Lynx canadensis*), Canada lynx critical habitat, and the threatened grizzly bear (*Ursus arctos horribilis*). Federal candidate species wolverine (*Gulo gulo luscus*) and whitebark pine (*Pinus albicaulis*), also may occur in Sweet Grass and Park Counties.

The corridor study area is located within occupied grizzly bear habitat. The area south of Hillary Bridge is within a grizzly bear Recovery Zone. Grizzly bears are increasing in the area as they continue to populate the ecosystem; black bears are also common residents. Management direction for grizzly bear is provided in Appendix G and H of the *Gallatin Forest Plan* (1987). Also amended to the Gallatin Forest plan and considered best science for management of grizzly bear is the *Forest Plan Amendment for Grizzly Bear Habitat Conservation for the Greater Yellowstone Area National Forests* (2006.)

The entire National Forest portion of the corridor study area is located within designated lynx critical habitat. Management direction for lynx and lynx critical habitat is provided in the *Northern Rockies Lynx Management Direction* (2007), which is also amended to the *Gallatin Forest Plan* and the *USDI Federal Register 2009 Final Rule* identifying lynx critical habitat.

Issues related to grizzly bears include high potential for bear/human encounters to increase with increased use by Forest users and for increased vehicle collisions resulting in bear mortality. Because the Main Boulder River Road corridor is located in the designated recovery zone or occupied grizzly bear habitat, the USFWS recommended the following measures be incorporated into any future proposed project:

- No construction related activities occur within a half mile of any stream from April 1 through June 30.
- Store all food, toiletries, and other potential bear attractants in bear-proof containers.
- Remove all trash from the project site each day and dispose of trash in a way that is unavailable to bears.
- Do not feed bears.

- Report grizzly bear sightings or incidents to the Montana Fish, Wildlife & Parks and Forest Service personnel as soon as possible.
- Modify construction activities any time the potential of compromising the safety of a grizzly bear is identified.

For federally-listed species such as the lynx, actions that would increase traffic volume, speed, and extend use periods on roads that divide critical habitat could reduce connectivity within the landscape for lynx, and could result in increased mortality. Habitat connectivity is an issue of even greater concern within designated critical habitat areas, which includes the entire National Forest portion of the Main Boulder Corridor study area. As such, the USFWS recommended the project be examined for the effects of resulting increases in speed, traffic volume, and potential barriers (e.g., jersey rails) that would be an impediment to lynx movement.

Based on the preliminary recommendations from this corridor study, roadway improvements resulting in substantial increases in speed, traffic volume, and installation of barriers would not be anticipated; however, this cannot be evaluated during this early planning stage. Potential affects to lynx and other threatened, endangered, proposed, and candidate species would need to be fully evaluated in a biological assessment (BA) and through consultation with the USFWS if a roadway improvement project is proposed in the corridor.

The USFWS and the Forest Service also provided comments regarding aquatic species and peregrine falcon, which are addressed below.

**U.S. Forest Service Sensitive Species**

USFS sensitive species are those animal species identified by a Regional Forester 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 a species' existing distribution. Protection of sensitive species and their habitats is a response to the mandate of the National Forest management Act (NFMA) to maintain viable populations of all native and desired non-native vertebrate species. The sensitive species program is intended to be pro-active by identifying potentially vulnerable species and taking positive action to prevent declines that will result in listing under the ESA.

Sensitive terrestrial species for the Gallatin National Forest include bald eagle (*Haliaeetus leucocephalus*), gray wolf (*Canis lupus*), peregrine falcon (*Falco peregrinus*), flammulated owl (*Otus flammeolus*), trumpeter swan (*Cygnus buccinators*), harlequin duck (*Histrionicus histrionicus*), wolverine (*Gulo gulo*), Townsend's big-eared bat (*Corynorhinus townsendii*), black-backed woodpecker (*Picoides arcticus*), and bighorn sheep (*Ovis canadensis*). In addition, nineteen plant species are designated as sensitive.

Harlequin duck
Source: USFWS National Digital Library

Planning-level coordination with USFS staff identified concerns related to harlequin duck. The area above Hillary Bridge is a location where the fast-moving water and resting substrates yield harlequin duck activity. Roadway improvements in this area could potentially affect nesting and brooding activities. There may be some timing restrictions during construction. A roadway design that encourages people to pass through this area, rather than stop or park, would be desirable for this sensitive species.

The USFWS commented that a peregrine falcon eyrie is known to occur near the project area. The Forest Service routinely monitors eyries in cooperation with the Montana Peregrine Fund for annual activity levels. Active peregrine falcon nest sites may be affected by the proposed project and may require associated timing restrictions.

No additional concerns related to these USFS Sensitive Species were raised during the corridor planning process. Additional coordination with USFS Wildlife Biologists would be required to ensure potential impacts to sensitive species are addressed if an improvement project is initiated in the corridor. Potential affects to sensitive animal and plant species would need to be fully evaluated in a biological evaluation (BE) if a roadway improvement project is proposed in the corridor.

**U.S. Forest Service Management Indicator Species**

USFS Management indicator species (MIS) are wildlife species whose habitat is most likely to be affected by forest management practices, thereby serving as indicators of habitat change. The Gallatin Forest Plan directs that habitat is provided for identified MIS and those native indigenous species that use special or unique habitats. The six terrestrial MIS species for the Gallatin are grizzly bear, elk, bald eagle, pine marten, and goshawk.

Elk serve as the indicator for big game species, pine marten for moist spruce old growth, and goshawk for dry Douglas fir old growth.) In the Main Boulder corridor study area, most of Montana's big game species are present and could be affected by a road improvement project

including elk, moose, mule deer, and bighorn sheep. Pine marten and goshawk are also present. Improvements to the road could increase trapping access for pine marten.

The Montana Department of Fish, Wildlife and Parks (MFWP) was also contacted for information regarding any species of concern in the corridor study area. MFWP responded that the Main Boulder Corridor is grizzly bear habitat and is an important winter range for elk, moose, and mule deer.

Both the USFS and MFWP expressed concerns about potential impacts to wildlife from a roadway improvement project in the corridor. Roads can affect wildlife in many different ways such as causing habitat loss and fragmentation, creating barriers to animal movement, or increasing wildlife mortality due to collisions with vehicles.

A future improvement project on the Main Boulder River Road would be located, for the most part, within the existing alignment. Therefore, the main issues of concern for wildlife would be related to potential increases in vehicle speeds, traffic levels, use periods, and changes in roadside vegetation or cover. These factors have the potential to increase wildlife/vehicle collisions, which is a concern for both people and wildlife. Based on the preliminary recommendations for roadway improvements in the corridor, substantial increases in speed, traffic volume, changes in periods of use, or installation of barriers would not be anticipated; however, this cannot be fully evaluated during this early planning stage.

Project designs that avoid or minimize potential impacts to the maximum extent possible and also incorporate opportunities to benefit wildlife would need to be considered during the project development process. One design consideration to address potential increases in vehicle speed is to retain the existing horizontal alignment and avoid the creation of any additional long, straight stretches of roadway.

Bull Elk
Source: USFWS National Digital Library

Vegetation treatments adjacent to the roadway can also have different implications for wildlife/vehicle collisions. Clearing trees and brush can increase visibility in forested areas, but may encourage faster driving speeds, so areas of vegetation clearing should be carefully selected. In addition, areas adjacent to the road may have different objectives for wildlife depending on whether they are more open and wildlife linger and forage there (in which case screening is desirable) or whether the areas serve as crossing points (in which case more visibility would be needed.) Fencing along rights-of-way can be significant barriers to wildlife movement. Much of the existing fencing along the roadway is in disrepair. Any replacement fencing should be a wildlife-friendly design and should be carefully located and to prevent wildlife from being trapped or lingering adjacent to the roadway. Additional coordination with USFS and MFWP Wildlife Biologists would be needed to address these issues if and when an improvement project is implemented in the corridor.

The amount of wildlife mortality along the existing roadway is unknown, but some specific areas of concern were identified by MFWP during the study. These areas are summarized below and are not intended to be inclusive of all points of concern.

- The area where Contact Mountain drops off into the Main Boulder is a pinch point for wildlife movement. Reduced vehicle speeds and increased visibility would be recommended in this area.

- The meadows on both sides of the road between Falls Creek and Graham Creek are important winter and spring foraging areas for elk. Reduced vehicle speed and wildlife crossing signs would be recommended in this area.

- The "beaver pond" area and associated willow bottoms south of Great Falls Creek are key areas used yearlong by moose and black bears. Reduced vehicle speed and wildlife crossing signs would be recommended in this area.

- The "Elk Wintering Area" near Aspen Campground is an important area for elk. Removing the old fence in this area would be recommended to help wildlife move through the area and not linger near the road.

- The meadows north of Speculator Creek are an important foraging area used yearlong by elk. Maintaining and enhancing the existing vegetation (screening) between the road and meadow would be recommended to reduce disturbance to wildlife.

- The Hawley Mountain area is an important area for elk. Maintaining and enhancing the existing vegetation (screening) between the road and meadow would be recommended to reduce disturbance to wildlife. Reduced vehicle speed and wildlife crossing signs would also be recommended in this area.

The recommendations presented above are preliminary and based on limited project information. Additional coordination would be required to ensure potential impacts to wildlife resources are addressed if an improvement project is initiated in the corridor. A proposed improvement project in the corridor would need to be consistent with the Gallatin Forest Plan Standards and Guidelines, Forest Plan amendments, Gallatin Travel Plan, and other applicable USFS management direction.

**Fisheries and Aquatic Resources**

According to the *Draft Yellowstone Cutthroat Trout Conservation Strategy for Montana,* the Boulder River supports nine species of fish, including nonnative brook trout (*Salvelinus fontinalis*), rainbow trout (*Oncorhynchus mykiss)*, and brown trout (*Salmo trutta*.) The lower Boulder River supports spawning runs of fluvial brown trout and rainbow trout from the Yellowstone River, and resident populations of these species. Brook trout have relatively restricted distribution in the main stem, and are present in about 10 river miles beginning about 37 miles from the mouth. Yellowstone cutthroat trout (*Oncorhynchus clarkii bouvieri*) are limited to the upper reaches of the Boulder River.

In addition to Brook trout, other native species include longnose sucker (*Catostomus catostomus),* mountain sucker (*C. platyrhhynchus)*, longnose dace (*Rhinichthys cataractae*), mountain whitefish (*Prosopium williamsoni*), and mottled sculpin (*Cottus bairdi*). Based on coordination with USFS and MFWP, the Boulder River contains a population of rainbow trout, brook trout, Yellowstone cutthroat trout, and rainbow x cutthroat hybrids within the corridor study area. Four known fish-bearing tributaries within the study area include Froze-to-Death Creek, East Chippy Creek, Speculator Creek, and Bramble Creek. These tributaries also contain populations of rainbow trout, brook trout, Yellowstone cutthroat trout, and rainbow x cutthroat hybrids.

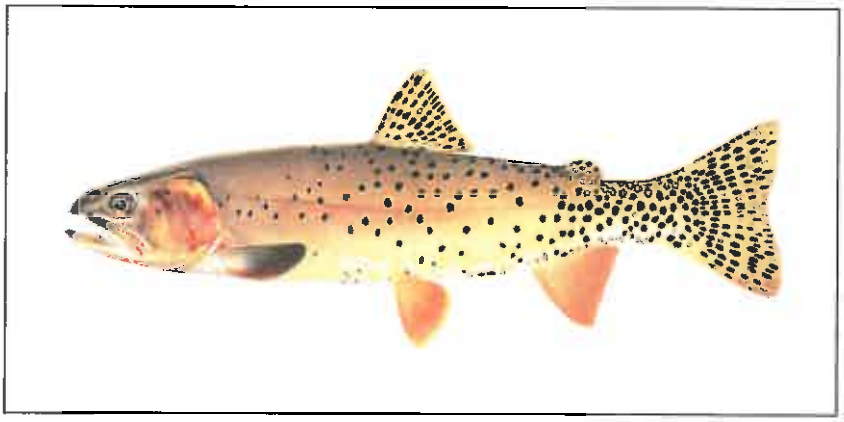
Within the corridor study area, the Boulder River contains a population of rainbow trout, brook trout, Yellowstone cutthroat trout, and rainbow x cutthroat hybrids (GNF Fisheries Data; Main Boulder Fuels Project Fisheries Specialist Report.) There are 25 tributary streams to the Boulder River within the study area. Of the 17 streams surveyed for fish presence within this area, 14 (82%) support populations of brook, rainbow, Yellowstone cutthroat, and rainbow x cutthroat hybrids. Additional surveys are required to confirm presence or absence of fish in the eight unsurveyed streams within the study area.

**U.S. Forest Service Aquatic Sensitive Species**

USFS sensitive aquatic species present or potentially present within the study area include Yellowstone cutthroat trout, northern leopard frog (*Rana pipiens*), and boreal (Western) toad (*Bufo boreas*).

In addition to being considered a sensitive species, the Yellowstone cutthroat trout is a Montana species of special concern, and multi-agency efforts have been initiated for securing, restoring, and maintaining Yellowstone cutthroat trout in Montana. Competition and hybridization with nonnative salmonids poses one of the greatest threats to Yellowstone cutthroat trout populations. The historic and current distribution of fish in the Boulder River watershed relates largely to the presence of two waterfalls, and introductions of native and nonnative salmonids. Brown trout do not occur above Natural Bridge Falls while brook trout distribution extends upstream to a 12-foot high waterfall located above Hells Canyon (between the confluences of Hawley Creek and Fourmile Creek.) Because brown trout and brook trout are not present above this barrier, the upper watershed likely presents the best area for Yellowstone cutthroat trout conservation efforts in Boulder River drainage. Here, hybridization with rainbow trout, which were historically stocked in Rainbow, Mirror, Silver and Prospect Lakes, poses the greatest risk to the Yellowstone Cutthroat trout population in the upper drainage. Interagency conservation efforts are ongoing to complete

removal of rainbow trout from these lakes and downstream tributaries including Fourmile Creek and Rainbow Creek.



Yellowstone cutthroat trout
Source: MFWP

Single historic observations of western toad and northern leopard frog have occurred in the West Boulder River drainage and the lower Boulder River, respectively. Although no observations of either species have been documented within the study area, additional surveys are necessary to confirm absence. Suitable habitat exists along the Boulder River corridor throughout the study area. Both species breed in slow, shallow water habitats of marshes, wetlands, lakes, ponds, and slow streams (Maxell 2000.) Amphibians are especially sensitive to habitat alteration because they typically have complex life histories requiring breeding, foraging, and wintering habitats that may be up to several miles apart (Maxell 2000.) Loss of or degradation to any one of these habitats or disruption of migratory corridors between them may result in population impacts. Therefore, actions such as road-widening that could decrease availability of wetland habitat could negatively impact these and other amphibian species. In addition, actions that could increase traffic volume or speed on roads that bisect migratory corridors could reduce connectivity and increase mortality.

**U.S. Forest Service Aquatic Management Indicator Species (MIS)**

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.

To reduce impacts to aquatic MIS, roadway improvements should incorporate best management practices (BMPs) in order to decrease sediment delivery to stream channels. Aquatic MIS present within the planning area include Yellowstone cutthroat trout, rainbow trout, and brook trout.

**Additional Gallatin National Forest Plan Direction**

In watersheds with streams currently at or above fish habitat management objectives, GNF Forest Plan Standard M-1: Water, Fisheries, and Aquatic Life, requires that proposals for road and trail construction, reconstruction and maintenance will be designed to not exceed annual sediment delivery levels in excess of those in Table 1 of the Plan Standard, (Table 3 in this study document.) Sixth-code Hydrologic Unit Codes (HUCs) are the analysis unit for sediment delivery (and other habitat parameters). Within the analysis unit, sediment delivery values in Table 1 (Table 3 in this study document) will serve as guidelines; however, sediment delivery values denoted in individual 7th code HUCs may temporarily exceed sediment delivery rates denoted in Table 4 of the Plan Standard, in the following circumstances:

1. The HUC does not contain a fragmented sensitive or MIS fish population;
2. The majority of HUC's in the analysis unit remain within sediment delivery values listed in Table 1;
3. Other core stream habitat (e.g. pool frequency, pool quality) or biotic (e.g. macro-invertebrates, fish populations) parameters within the HUC do not indicate impairment as defined by Montana Department of Environmental Quality (MDEQ); and
4. Sediment delivery levels will return to values listed in Table 1 within 5 years of project completion.

***Table 3. Substrate sediment and sediment delivery by Forest stream category***

| Category (Grazing Sensitivity Level) | Management Objective (% of reference)* | % Fine Substrate Sediment (<6.3mm) | Annual % > Reference** Sediment Delivery |
|---|---|---|---|
| **Class A** Sensitive Species and/or Blue Ribbon fisheries | 90% | 0 – 26 % | 30% |
| **Class B** Regionally or locally important fisheries and all other streams (formerly Classes B,C,D) | 75% | 0 – 30 % | 50% |

*% of reference = % similarity to mean reference condition**Reference = observed relationship between substrate % fines and modeled sediment delivery in reference (fully functioning) GNF watersheds.

Issue Description

Aquatics concerns raised during this corridor study process are primarily related to river and stream crossings and sediment inputs to the river. Issues related to sediment inputs are addressed under the Surface Waters and Water Quality Section of this report. USFS and MFWP recommendations related to bridge and culvert replacements are summarized below.

**Bridge Construction**

Bridge construction activities and completed bridges themselves may have negative effects on fish habitat (Alberta Transportation 2001.) These include increased sediment loading, changes in stream channel morphology, and alteration and removal of streambank and riparian vegetation.

Elevated levels of suspended sediment may be caused directly by instream construction activities including equipment crossings, excavation, blasting, and installation of erosion control features such as rip-rap (Alberta Transportation 2001.) Sediment levels may also be increased by changes in downstream flow patterns imposed by a bridge, headcutting upstream of a bridge, or exposed areas on the right-of-way. Regardless of the delivery mechanism, the effects of fine sediment on aquatic organisms are the same. Deposition of fine sediment over stream substrates reduces availability of salmonid spawning habitat and increases mortality of fish eggs and fry (Chapman 1988, Young et al. 1991, Weaver and Fraley 1993, Magee et al. 1996.) Fine sediment also suppresses growth of periphyton (algae), decreases abundance of benthic macroinvertebrates which fish feed upon, and may cause shifts in invertebrate community structure (Bowlby et al. 1987.)

Changes to channel morphology may result from debris blockage on bridge pilings, introduction of large quantities of sediment, or changes to upstream or downstream flow patterns imposed by a bridge (Alberta Transportation 2001.) These changes can effect stream substrate size, increase scouring of the streambed, and increase streambank erosion. Extreme changes in flow patterns can completely alter stream channels and associated fish habitat. Alteration of streambank or riparian vegetation in the vicinity of a stream crossing or right-of-way clearing can also have a negative effect on fish habitat. For example, removing riparian vegetation reduces stream shading, which increases water temperatures. Streambank stability may also be compromised with the removal of riparian vegetation.

- The Guidance for Aquatic Species Passage Design, Forest Service Northern Region and Intermountain Region, requires designs to provide stream simulation by spanning the bankfull stream channel to conform to local channel morphology and allow for overall channel stability. In addition, bridge alignment should be compatible with stream channel morphology.
- Instream disturbance should be minimized at bridge locations on the Boulder River. Major spawning areas have not been identified in the vicinity of these bridges, but they may be present. Timing restrictions would likely be required for cutthroat spawning, which takes place in the summer, but these restrictions are anticipated to be relatively minor.

**Aquatic Organism Passage / Culvert Replacement / Amphibian Crossings**

Culverts or crossings which block or impair fish passage negatively affect fish populations by restricting gene flow and blocking connectivity to critical habitats such as spawning areas. Populations isolated upstream from impassable culverts have a high potential of becoming extinct if they lack sufficient quantity or quality of habitat. Moreover, undersized culverts typically cause upstream or downstream channel instability and erosion that degrade fish habitat. The Main Boulder Road crosses 14 named streams, 13 of which have been surveyed for fish species presence (GNF Fisheries Data; Main Boulder Fuels Project Fisheries Specialist Report.) Only three of those streams surveyed did not support fish. GNF fish passage data indicate that many culverts on the

Main Boulder Road either block or impair fish passage and may be negatively impacting channel morphology and fish habitat as well as upstream fish populations on National Forest System Lands.

- The USDA Forest Service Interim Directive for Aquatic Organism Passage Design as well as Guidance for Aquatic Species Passage Design, Forest Service Northern Region & Intermountain Region (2003) both set expectations for aquatic organism passage (AOP) for new and replacement stream crossing structures. These guidelines simultaneously provide for aquatic organism passage under most flow conditions, prevent undesirable effects to upstream and downstream channel morphology and habitat, minimize the potential for and consequences of plugging and overtopping, and minimize life cycle cost. For the reasons described above, all designs should provide passage for all aquatic species and life stages present at that location, unless there is a biological reason to separate or exclude populations (i.e. to prevent non-native species competition or introgression).

- MFWP indicated that culverts on Froze to Death, East Chippy, Speculator, and Bramble Creeks are (all fish-bearing tributaries) are located near the mouth of each creek, where there is a lot of fish movement back and forth from the Boulder River. Culverts on these channels should be designed to accommodate aquatic organism passage. Construction timing restrictions at these crossings are also anticipated to be minor.

- MFWP commented that smaller perennial tributaries may contain fish. In these smaller perennial streams, culverts should be embedded to a depth of 12-inches or 20% of the culvert rise to facilitate aquatic organism passage.

- Roadside ponds and wetlands should be inventoried during the spring breeding season for sensitive amphibian species. If breeding sites for western toad are found adjacent to the Main Boulder Road, passage structures could be installed to reduce mortality of adults and metamorphs migrating to and from upland foraging and overwintering sites. Woltz et al. (2008) recommends the use of tunnels > 0.5 m in diameter lined with soil or gravel and accompanied by 0.6-0.9 m high guide fencing. For efficiency, ditch relief culverts could be modified to suit this purpose.

The recommendations presented above are preliminary and based on limited project information. Additional coordination with USFS and MFWP Fisheries Biologists would be required to ensure potential impacts to fisheries resources are addressed if an improvement project is initiated in the corridor.

**Sensitive Plant Species**

Based on coordination with USFS staff, there are currently 19 plant species designated as sensitive on the Gallatin National Forest. Most sensitive plant species on the Gallatin National Forest are associated with relatively undisturbed, and often fragile, environments such as alpine areas and riparian habitat.

The Main Boulder River Road corridor is located in an area where disturbance from various sources has occurred since settlers came to Montana. There are no alpine habitats located in the project

area and roadway improvements in or near riparian areas would most likely occur at previously disturbed road crossing sites. If/when an improvement project proceeds, further coordination with the USFS Botanist is recommended to ensure no sensitive plant species are likely to occur in the project area.

**Noxious Weeds**

**Invasive Species (Executive Order 13112)**

E.O. 13112 was issued to prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts that invasive species cause. Noxious weeds have a long-term biological impact on the ecosystem by: displacing native plant species and reducing species diversity, reducing the quality and quantity of wildlife forage and habitat, decreasing soil stability and water quality and by altering plant succession dynamics. Noxious weeds known to occur in the Boulder River drainage include spotted knapweed, sulfur cinquefoil, oxeye daisy, Canada thistle, and hounds tongue. Canada thistle and hounds tongue are often associated with disturbed soil such as roadsides and construction sites.

If a project is implemented in the corridor, FHWA standard practices to prevent the spread of noxious weeds would be implemented. This typically includes requiring all material sources and materials incorporated into the project to be certified free from noxious weeds, invasive plants, and other deleterious materials; requiring equipment to be cleaned prior to entering the construction area; and the use of native species for any areas to be revegetated. Further coordination with the USFS would be needed to determine if there would be any additional requirements to meet Gallatin National Forest Plan Standards.

**Recreation Resources**

The Main Boulder River drainage provides for a multitude of both developed and dispersed recreation activities. According to the Main Boulder Fuel Reduction FEIS, there are 25 recreation residences, four church camps, six developed Forest Service campgrounds, 11 day use sites, 50 designated dispersed sites, and seven developed trailheads. The drainage contains an approximate 250 private structures. Some of these are year-round residences, some are recreation cabins, and the rest are other types of structures.

Recreation activities in the drainage include but are not limited to:

- Hiking
- Horseback riding
- Wildlife viewing
- Camping
- Hunting and fishing
- Swimming and floating
- Snowmobile riding
- Recreation residences

***Table 4. National Forest Person at One Time Estimates***

| Name | Total PAOTs | Estimated average PAOTs |
|---|---|---|
| Developed campgrounds (6) | 280 | 53 |
| Designated dispersed campgrounds (50) | 200 | 46 |
| Day Use sites (11) | 307 | 77 |
| Permitted private recreation cabins (24) | 144 | 36 |
| Camp Miminagish (1) | 100 | 45 |
| TOTAL National Forest PAOTs | **1031** | **257** |

Note: The estimated average number of PAOTs was developed based upon collections at the fee sites over the approximately 100-day summer collection season.

In addition to the numbers from the Forest Service, there are three church camps located on private lands—not permitted nor tracked by the Forest Service—Christikon, Clydehurst, and Camp on the Boulder. According to Bob Quam, Director of Christikon, the maximum number of people at one time is 200 including campers and staff. The estimated average number at Christikon is 185. According to the Camp on the Boulder website, the camp has sleeping accommodations for 280 people. Based upon their website, Clydehurst is estimated to have capacity for 200.

The Gallatin Forest plan uses a framework for defining classes of outdoor recreation environments called the Recreation Opportunity Spectrum or ROS. There are both summer and winter ROS classifications in the corridor study area. The "Rural" and "Roaded natural" classifications apply to the drainage in the non-winter months and the "Rural" and "Semi-Primitive Motorized" classifications apply to the drainage in the winter months.

"Rural settings are natural environments that are culturally modified yet attractive. Backdrop modifications range from obvious to dominant. Self-reliance on outdoor skills is of little importance, and there is little challenge and risk. Interaction between and evidence of other users may be high." (Detailed Description Decision, Travel Plan FEIS, 2006)

"Semi-Primitive Motorized settings are predominantly natural–appearing environments where there is often evidence of other users and moderate probability of solitude." (Detailed Description Decision, Travel Plan FEIS, 2006)

"Roaded Natural" settings are areas that are within ½ mile of a better than primitive road. Access is primarily via conventional motorized use on roads, which can occur at a moderate frequency. The area is generally natural appearing as viewed from visually sensitive roads and trails. (Detailed Description Decision, Travel Plan FEIS, 2006, Main Boulder Fuel Reduction, FEIS, 2004)

Based upon the Recreational Spectrum, the Forest Service vision for recreational opportunities in the Main Boulder corridor is to transition from a more rural and roaded setting to a more semiprimitive setting to a primitive setting over the length of the corridor. The objective throughout this transition from "more" to "less" developed is to provide for road, trail, camping, and other infrastructure that offer visitors a range of appropriate quality recreational opportunities that fit their setting and natural environment.

Amendment #12 of the Gallatin Forest Plan (June 1993) mandates that the Boulder River be managed to protect its values for future consideration and potential classification for inclusion into the Wild and Scenic River system. Protection will continue until suitability studies are completed. The eligibility classification of the Main Boulder River prior to formal study is:

***Table 5. Wild and Scenic River Classifications***

| Classification | Direction | Location in Main Boulder Drainage |
|---|---|---|
| Recreation | Protect the immediate river environment, water quality, scenic, fish and wildlife, and other values. | From the Gallatin National Forest boundary to Blakely Creek |
| Recreation | Protect the immediate river environment, water quality, scenic, fish and wildlife, and other values. | From Miller Creek to Bramble Creek |
| Scenic | The river area should be maintained in its near natural environment. | From Blakely Creek to Miller Creek |
| Scenic | The river area should be maintained in its near natural environment. | From Bramble Creek to the wilderness boundary |

The Gallatin National Forest has set a precedent of using the visual quality objective of partial retention as the standard to use in evaluating potential impacts to scenery.

**Cultural Resources**

There have been 19 cultural resource inventories conducted in the area. Much of the project area has been covered by these previous inventories, however, there are several creek confluences (the Main Boulder River with Bramble Creek, Ruby Creek, Upside-Down Creek, Shorty Creek, and Speculator Creek) that have not had on-the-ground inventory and are areas where archeological sites are likely to be found.

Fifteen historic and prehistoric cultural sites are known in the project area—including the Main Boulder Road which is a historic site but has not been documented as such. Approximately half of the known sites are outside of the road area. Others are in or immediately adjacent to the road. Field inventory of the creek confluences will be needed before ground disturbing activities can take place.

Known site types include;

- Rock piles, stone features
- Lithic scatters
- Prehistoric camp
- Historic agriculture
- Historic cabins
- Historic Civilian Conservation Corp
- Historic Forest Service administration
- Historic mill
- Historic mine
- Historic trails and roads

The Main Boulder Road itself will need to be documented as an historic site. The Main Boulder River Ranger Station is listed on the National Register of Historic Places. Any impacts to the Ranger Station, to other sites determined to be National Register-eligible, or to sites for which National Register eligibility has not been determined will need to be mitigated if the impacts cannot be avoided.

Main Boulder Historic Ranger Station

**Aesthetic Resources: Landscape Character and Scenic Attractiveness**

"Landscape character is the overall visual and cultural impression of a geographic area that includes its natural scenic attributes in combination with the land use patterns that have become accepted over time, contributing to the area's sense of place and character." (Main Boulder Fuel Reduction FEIs)

High quality landscape character is a special attribute of the Main Boulder corridor—mentioned at the project initiation meeting with the planning team, each public meeting , and in the Gallatin Forest Plan. According to the Main Boulder Fuel Reduction FEIS, "Based on the landforms, rock forms, vegetation, and water forms...it can be classified as mostly in the "distinctive" category." There are three categories—distinctive, common, and minimal—in the Character Type of the Visual Management System used by the Forest Service. One criterion for the distinctive category is "strong patterns created by the interplay of coniferous, deciduous, and grass vegetation." This interplay is visible along the river and open meadows along the Main Boulder River.

One participant at the May 2012 public meeting stated that "the road needs to maintain its wilderness character. This character is the most important thing." The public repeatedly expressed their desire to protect the visual quality in the corridor from degradation.

The Gallatin Forest Plan contains forest-wide direction to "provide visitors with visually appealing scenery." According to the Forest Plan, the Main Boulder corridor has a visual quality objective of partial retention except for those areas immediately around recreation sites where the objective ranges from partial retention to modification.

***Table 6. Gallatin Forest Plan Visual Quality Objectives for the Study Area***

| Visual Quality Objective | Definition and direction |
|---|---|
| Partial Retention | The characteristic landscape may appear to be altered slightly and that any noticeable deviations must remain visually subordinate to the landscape character being viewed. |
| Modification | Land where human activity may dominate the landscape but must, at the same time, utilize naturally established line, form, and texture. |

Most of the corridor study area, the road itself and the developed recreation areas are in the foreground. Areas that are visible from the road are referred to as "seen areas." The Forest Service uses the Scenery Management System in which the scenic integrity is a measure of the degree of intactness and wholeness of the landscape character. Maintaining scenic attractiveness is an important issue for the Main Boulder River road project.

## Projected Social, Economic, and Environmental Conditions

Since only approximately 2% of the corridor study area is in private ownership, there is little opportunity for major changes in population in the drainage itself. According to the Sweet Grass county commissioners, there is little potential for development in the drainage and none is expected. The Forest Service manages special uses on federally-owned lands in the Main Boulder. These uses consist primarily of the 24 recreation residences and one church camp. The Forest Service reports that none of the permit holders has informed them of any plans or proposals that would alter the usage of facilities under special use permit. Proposed changes to existing permits would undergo thorough review by the Forest Service prior to approval to determine the appropriate level of analysis and documentation.

Population increases or decreases in the communities located most closely to the drainage (Big Timber and Livingston) or the two counties, could potentially affect the use of the Main Boulder River and corridor to some extent—primarily through increased or decreased seasonal recreational usage. However, significant changes in the types or extent of use in the Main Boulder drainage are not anticipated.

The population of Sweet Grass County increased by 42 people from 2000 to 2010 for a 1.2% increase over the decade. The population of Park County remained constant between the 2000 and 2010 census. Park County lost only 58 people for a .4% decrease during the years from 2000 to 2010. Both counties have had relatively stable populations. There are currently no trends or indicators that there will be significant growth or decline in the populations of either Park or Sweet Grass counties over the 20-year planning horizon.

Economic conditions in the larger area are dependent on agriculture, tourism, construction, health care, government, and mining. Significant changes in any of these economic sectors could affect the local economies in Park and Sweet Grass counties. For example, hiring or lay-offs at the Stillwater/East Boulder Mines could affect the economy in Sweet Grass County, while decreasing or increasing funding for Yellowstone National Park or the Gallatin National Forest could have an impact on the economy in Park County.

It is anticipated that the level of recreation use will not markedly change as a result of improvements to the Main Boulder road. While somewhat anecdotal, road conditions in the Boulder have created patterns of use that require less roadway travel with users parking and recreating from earlier parking and pull-off areas, and riding horses and ATVs on the roadway itself. Improvement of the road may provide for more traditional access to portions of the drainage that have been less desirable under poor road conditions.

Numerical data to support assumptions that increased recreational use will occur associated with road improvements does not exist. Assumptions about how recreationists behave can be made based upon how recreationists currently use the corridor and public facilities, and trends on a Forest and National basis. No comparable data exists to project what this increase might be. National data sets do project that recreation use on public lands may increase as the percentage of

the population in retirement age increases, however participation in outdoor activities, including hunting have dramatically decreased over the past 30 years.

Many of the recreation facilities in the Main Boulder are at or approaching the end of their useful design life, and are no longer meeting accessibility or Forest Service standards. There is a need to take a comprehensive look at the recreation facilities in the Boulder and examine the quality of recreational opportunity currently available, the public need and desire, and fiscal realities of recreation and Forest Management. It is anticipated the Forest Service will take a comprehensive look at recreational facilities and services in the near future. However, for purposes of this study, on-going and routine maintenance to existing Forest Service facilities should be assumed with no major investments in infrastructure changes.

Environmental conditions are difficult to project with any degree of certainty. Situations or processes that could affect physical and biological environmental conditions in the Main Boulder drainage include the following:

- Vegetation mortality from mountain pine beetle or other insects and diseases,
- One or more major wildland fires,
- Timber harvest—private and/or federal lands,
- Aspen regeneration projects,
- Continued hazard fuel reduction activity on private and federal lands ,
- Changes in status of existing Threatened, Endangered, or Sensitive wildlife or plant species,
- Changes in timing and amount of precipitation as a result of climate change resulting in changes to composition of plant and/or wildlife species,
- Prolonged drought, and
- Major flooding, flash flooding.

There is no locally-specific evidence that major changes will occur in the physical, biological, social or economic environments over the planning period for this project.

**Existing Transportation System**

There are numerous challenges with the existing Main Boulder River roadway. The most serious of these problems include road surface, drainage, steep grades, and damaged bridges that exceed their design life. There are also several areas, for example the beaver ponds and Chippy Park, that present special challenges.

The existing road surface contains numerous areas where rocks and boulders have been exposed through frost heaving and/or erosion due to water runoff and vehicular traffic. Exposed rock presents constant maintenance challenges. Maintenance is performed by Sweet Grass and Park County maintenance departments. It takes Park County almost a day just to move equipment to the work site which contributes to the difficulty and cost of performing periodic/routine maintenance.

Flooding occurs along the roadway as a result of several conditions. Drainage issues include sediment-laden ditches and culverts along with possible springs within the roadway or above the roadway in the cut slope. A few areas are relatively low and flat compared to the adjacent land, which contributes to roadway flooding and failure.

The road is constructed near the river in several areas contributing to the risk of flooding and damage due to erosion of the river banks. In some sections of the road, the water level in the Main Boulder River is only 3'-5' lower than the roadway and the road is as little as 5'-10' horizontally from the river's edge.

The road has some areas with steep road grades, such as the area just north of the entrance to Chippy Park. These areas are steep enough that they cause problems under wet conditions and especially in the winter with snow and ice. Some sections along hillside cuts have a narrow roadway with steep slopes on the cut and fill sides.

There is local speculation that the bridges could be structurally sound. Locals suggested it may be possible to maintain the existing bridge structures and realign the road approaches to accommodate larger design vehicles. The design team believes the bridges need to be replaced.

Many bridges have dirt buildup from vehicular traffic and storm events that wash sediment into the waterway. Gravel road approaches and drain holes on the bridges contribute to sediment deposition in the river. Bridge approaches have roadway geometry issues. Larger design vehicles use the road to carry children to the church camps, to haul stock, remove timber, and for emergency response. These larger design vehicles have had trouble making the turns on to the bridges. This is evidenced by the guardrail damage the bridges have sustained over time. Existing bridges are believed to be well beyond their design life.

**Road use and traffic conditions**

The Boulder River Road is used by a variety of types of vehicles. Individual passenger cars and trucks make up the largest share of the vehicle use. These vehicles are used by year-round residents, seasonal residents, and recreationists. Recreationists and residents also travel the road in campers and RV's, four-wheelers, motorcycles, and pick-ups pulling stock trucks for horseback access to their private property and the National Forest.

There is somewhat limited bicycle traffic on the road and there are pedestrians and runners as well but surface conditions, dust, and sight distances serve as factors that may be discouraging these uses. In the winter, the road is plowed south to Fleming Bridge. From there, the road is used by snowmobilers who travel as far as the boundary of the Absaroka Beartooth Wilderness Area.

Sweet Grass County reports traffic volumes as high as 400 ADT (average daily traffic) during the busiest months of June, July, and August. These are the months that the road receives the most traffic. The traffic is due to the presence of seasonal residents in addition to year-round residents, summer recreational traffic, the operation of the church camps, and Forest Service administrative activities.

Montana Department of Transportation makes Average Annual Daily Traffic (AADT) count information available in a data base available on the web. This Statewide Traffic Count information shows AADTs for the Main Boulder Road at Natural Bridge (the study's origin point and point furthers north) at 180 for 2009, 2010, and 2011. According to Park County, MDT has estimated these numbers.

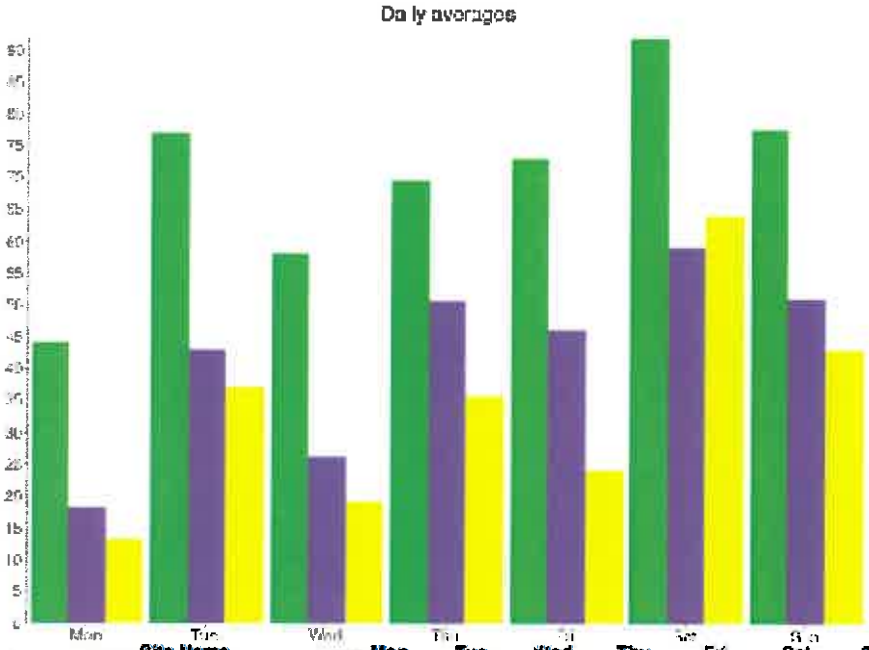
Traffic counts conducted by Park County in November of 2011 are shown in the following figure. The ADTs for the two-week count period range from a low of 25 on Mondays to a high of 72 on Saturdays. The sites in the graph are #1 Natural Bridge, #2 Fleming Bridge, and #3 Two Mile Bridge.

## Days of the week

From 2011-11-09 to 2011-11-21

Report generated on 2011-11-22 08:23:54 (UTC -07:00) by mmalone@parkcounty.org

TRAFx DataNet (http://www.trafx.net/)




| Site Name | Mon | Tue | Wed | Thu | Fri | Sat | Sun |
|---|---|---|---|---|---|---|---|
| Boulder #1 11-21-11 | 44.0 | 77.0 | 58.0 | 69.5 | 73.0 | 92.0 | 77.5 |
| Boulder #2 11-21-11 | 18.0 | 43.0 | 26.0 | 50.5 | 46.0 | 59.0 | 51.0 |
| Boulder #3 11-21-11 | 13.0 | 37.0 | 19.0 | 35.5 | 24.0 | 64.0 | 43.0 |
| Daily Averages | 25 | 52 | 34 | 52 | 48 | 72 | 57 |

A = adjustment applied, D = divide by 2 applied, F = filtering applied

*Figure 6. Park County Traffic Counts*

Both the Sweet Grass and Park County Sheriffs were queried for crash data. Neither county maintains this information. Both counties indicated that crash data for the Main Boulder Road, if any existed, would be maintained by the Montana Department of Transportation (MDT.) Montana's crash data is maintained by legal location. The townships, ranges, and section numbers for the Main Boulder study area were submitted to MDT.

A query of the state's data base returned information for eight crashes on the Main Boulder Road. The data covers the five-year period July 1, 2006 – June 30, 2011. Of the eight crashes, one was a bus, one a motorcycle, three pickups, one a passenger car, and three were unclassified as to type of vehicle. The crashes occurred primarily in the afternoons and evenings on all days of the week except for Monday. There were crashes during seven different months with two crashes during the month of July. For all but one crash, the weather conditions were clear and the road conditions dry. Ice was a factor in one crash. Three of the crashes disabled the vehicles. Vehicles were functional following the remaining five crashes.

The contributing circumstances to the crashes were as follows. Some crashes had more than one contributing circumstance-- inattentive/careless driving (3), too fast for conditions /careless driving (3), disregard traffic signs (2), other (1.) Violations were issued for three of the crashes. The bulk of the crashes occurred in the linear center of the study area between the Main Boulder Ranger Station and Four Mile (Ranges 4 and 5 South.)

**Existing geometric issues**

Roadway geometry is concerned with both horizontal and vertical alignment. Horizontal alignment of a roadway is where the road is located. Public input was clear and united that the horizontal alignment should not be significantly altered. The primary issue related to horizontal alignment is site-specific at the major bridges. Bridge approaches are not currently optimally aligned with the river. Prior to bridge replacement and construction, approaches would be engineered considering functional alignment, riverbank conditions, rights-of-way issues, aesthetic effects, and impacts to fisheries and aquatic organisms.

Vertical alignment of a roadway refers to its shape in profile, including steepness of the grade. Road segments that are too steep can cause problems when wet and especially when there is snow or ice on the roadway. The primary location of concern with respect to grade is Chippy Park hill. Reducing the grade in this section of road would require cutting the grade near the top of the hill and using excavated material to fill to the bottom of the hill. In the case of the Chippy Park hill some minor horizontal road realignment may also be desirable to get the grade to an acceptable standard.

**Bridges**

Three off-system county bridges span the Boulder River in the study area. All three of these bridges are located in Park County. The Montana Department of Transportation (MDT) maintains a bridge management system containing inspection data. The state inspects bridges using the National Bridge Inventory system. The three bridges are the Four Mile Bridge (#L34210000+03001), the Boulder River Bridge (L342110000+08001) and the Boulder River Bridge (L34210004+06001.) The following table provides summary information on the three subject bridges. This information is taken from the MDT Bridge Management System for Park County.

***Table 7. Bridge Inspections***

| # | Milepost | Name | Sufficiency Rating (%) | Structure Sufficiency Status | Year Built | Last Inspection Date |
|---|---|---|---|---|---|---|
| L34210000+03001 | .48 | Four Mile | 87 | Not deficient | 1938 | Sept 2012 |
| L342110000+08001 | 1.29 | Boulder River | 60.1 | Not deficient | 1938 | Sept 2012 |
| L34210004+06001 | 7.40 | Boulder River | 45.3 | Functionally obsolete, eligible for replacement | 1933 | Sept 2012 |

The sufficiency rating shown in the table above is calculated using the National Bridge Inventory System (NBIS) formula that produces a numeric value indicative of bridge sufficiency to remain in service. The result of this method is a percentage in which 100% would represent an entirely sufficient bridge and zero % would represent an entirely insufficient or deficient bridge. Four separate factors are used to produce this rating. Structural adequacy and safety constitutes 55% of the rating. Serviceability and functional obsolescence constitute 30% of the rating, and essentiality for public use constitutes 15% of the rating. Special reductions of up to 13% are also considered.

The planning team is recommending replacement of the bridges not based upon traffic volumes (current or projected traffic volumes), but based on the fact that the Main Boulder is the only ingress and egress to a drainage likely to experience a wildland fire conflagration. A wildland fire conflagration or other large scale natural disaster would necessitate timely evacuation of the drainage while at the same time providing for emergency response traffic flowing in the opposite direction. Existing traffic on the road includes school buses, fire apparatus, road maintenance equipment, logging trucks, horse trailers, and other large vehicles. Physical damage to the bridges, age, and sufficiency ratings point to replacement as part of any reconstruction project.

**Transportation Forecasts**

The population of Park County remained constant between the 2000 and 2010 census. Park County lost only 58 people for a .4% decrease during the years from 2000 to 2010. Both counties have had relatively stable populations. There are currently no indicators that there will be significant growth or decline in the populations of either Park or Sweet Grass counties over the 20-year planning horizon.

However, traffic associated with activities on private property including new facility constructions, home remodeling and other structure modification, vegetation management, food and supply delivery, garbage service, utility installation is on-going.

There are not currently any significant increases anticipated in the use of the Main Boulder River Road. Traffic increases could occur as a possible result of additional National Forest visitors, church camp visitors, private cabin rentals, and guest ranch clients. Traffic could also increase if there was new mineral or energy development activity. Privately-held mineral claims do exist, however, no known mineral development is proposed or projected at this time.

A large wildland fire or other natural disaster could dramatically increase traffic during the incident itself with response vehicles driving up the drainage and church camp school buses and private vehicles coming down. Post-event rehabilitation and emergency mitigation activities following a major natural disaster event may also increase traffic for the time period during which they occurred. This increase in traffic would not be sustained over time but could be dramatic for a period of up to several months.

The improvements to the roadway as a result of this project are likely to cause changes in the use patterns that currently exist. Numerical data to support assumptions that increased recreational use will occur associated with road improvements does not exist.

## Chapter 4. Improvement Options

The following improvement options were developed as a collaborative effort between the local residents, public, local elected officials, the project engineering design team, and with input from the Forest Service.

### Option A: Three Gravel Sections

Option A would divide the road into three linear sections with standards varying by section. The concept behind Option A is to make the minimum amount of improvement necessary to improve functionality of the road—thereby increasing safety and improving the ability of the counties to maintain the road--while minimizing impacts to the character of the road. Option A recognizes that the amount of traffic on the road decreases with distance traveled up the drainage (south) and proposes improvements consistent with this pattern.

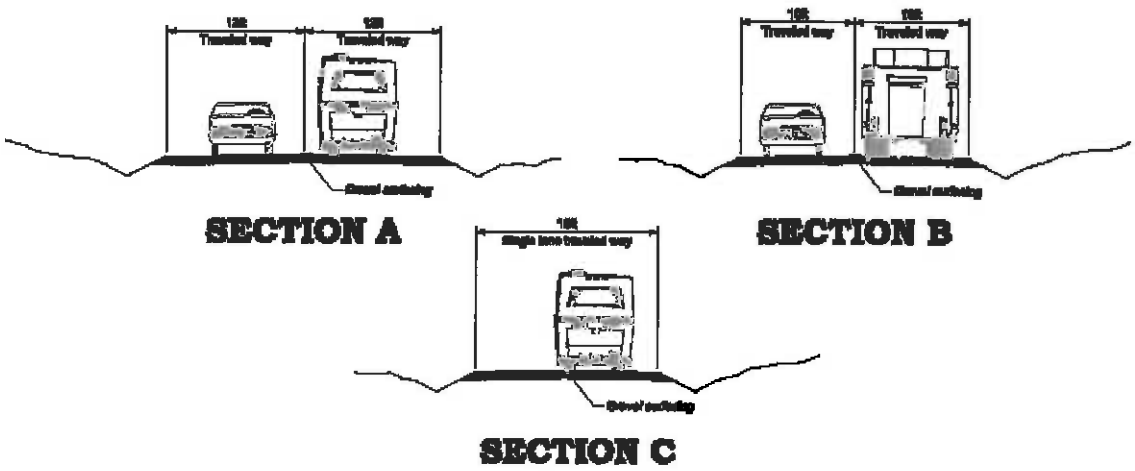
***Table 8. Option A***

| Section | Location | Width | Surface |
|---|---|---|---|
| A | Natural Bridge to Two Mile Bridge | Two 12-foot lanes | Gravel |
| B | Two Mile Bridge to Fleming Bridge | Two 10-foot lanes | Gravel |
| C | Fleming Bridge to Box Canyon | Single 16-foot lane with periodic 8-foot wide pullouts | Gravel |

**Section A, Natural Bridge to Two Mile Bridge:**
This section currently carries the largest amount of traffic with several residents who commute every day to and from Whispering Pines. The existing gravel roadway width varies from 24 to 30 feet and is severely worn with many small exposed rocks. Drainage patterns are impacted by the finer road materials being washed into, and building up, in the adjacent ditches and culverts. Park and Sweet Grass counties currently have a project installing new culverts and grading the ditches through this section.

The proposed design of this section includes an improved two-lane gravel road from the end of the existing pavement at the Natural Bridge area to Two Mile Bridge. The roadway width would consist of two 12-foot lanes for a total road width of 24 feet. The existing road is wide enough to accommodate the proposed 24-foot design width. The Two-Mile Bridge would be replaced with a modern bridge structure that would be skewed to better accommodate larger/longer vehicles. The proposed bridge would be located immediately adjacent to one side of the existing bridge so that the existing bridge could maintain traffic during construction. Due to the current drainage project, additional drainage improvements would be minimal and designed to take advantage of the recently improved drainage system.

*Figure 7. Roadway Cross Sections*




**Section B, Two Mile Bridge to Fleming Bridge:**

Much of the traffic through this section is visitors and traffic generated by the various residents, church camps, and dude ranches. Vehicles on this section generally consist of cars and pickup trucks, but the camps and ranches also use buses and stock trailers. The existing gravel roadway width varies from 16 to 24 feet and is severely worn with many small rocks exposed in the roadway. Drainage issues are similar to section A, and are impacted by the finer road materials being washed into the adjacent ditches and culverts.

The proposed design of this section includes an improved two-lane gravel road. The roadway would consist of two 10-foot lanes for a total width of 20 feet. Areas where the 20-foot road width could not be achieved, would be reduced to a minimum of 16-foot with intervisible turnouts constructed at each end of the narrow areas. The Flemming and Miller Creek Bridges would be replaced with modern bridge structures that would be skewed to better accommodate larger vehicles. The proposed bridges would be located immediately adjacent to one side of the existing bridges such that the existing bridges could maintain traffic during construction.

This section also contains areas of specific concern such as the Beaver Pond, Chippy Hill, and the Miller Creek Pit. The road through the Beaver Pond area is narrow and abuts the base of a talus slope. The proposed design in this location would raise the road surface so as to slightly increase the width without filling in any wetlands. Drainage improvements would be needed here as well to pass water from the adjacent slope and roadway while protecting water quality. Chippy Park Hill has a steep grade that would need to be lessened. This would be done by re-grading the roadway at

the top and bottom of the hill. Miller Creek Pit is planned to serve as the material source for the project and would need to be approved and treated for weed control prior to use.

Drainage would be improved in this section by installing new culverts to replace damaged ones and re-grading ditches to remove sediment. This section also contains possible spring activities that would need to be intercepted and routed to the ditches.

**Section C, Fleming Bridge to Box Canyon:**

The amount of traffic is reduced through this section relative to the previous sections and consists of visitors and traffic generated by the various church camps and dude ranches, and those proceeding to the final wilderness trailhead. Vehicles on this section generally consist of cars and pickup trucks, but the camps and ranches also use buses and stock trailers.

The existing gravel roadway is very rough and the width varies from 10 to 18 feet. The roadway is severely worn with many larger rocks exposed. Drainage issues are similar to the previous sections, impacted by finer road materials being washed into the adjacent ditches and culverts.

The proposed design of this section includes an improved one and a-half lane gravel road. The roadway width would consist of one 16-foot wide lane. Smaller vehicles would be able to pass easily and 8-foot wide intervisible pullouts would be located to aid passing of larger vehicles. Areas where the 16-foot road width could not be achieved would be reduced to a minimum of 12 feet with intervisible turnouts constructed at each end of the narrow areas.

The wooden bridge just past the Speculator Creek trailhead could be replaced with a modern bridge structure or large culvert. This section also contains areas of specific concerns such as a few spots where the roadway is located along the river bank, springs in the roadway, and areas with steep grades. Areas where the roadway is adjacent to the river bank will need to be analyzed on a case by case basis to create designs that protect the road while also minimizing impacts to the river. Springs in or above the roadway would need to be intercepted and routed to the ditches. Areas with steep grades may be resolved by re-grading the profile to lower the top of the hills and fill the bottom areas.

## Option B: Four Sections, One Asphalt, Three Gravel

Option B was developed proposing one asphalt section, on the north end of the study area, based on the recognition that this section of the road receives the most traffic and as such presents the most persistent maintenance challenge.

***Table 9. Option B***

| Section | Location | Width | Surface |
|---|---|---|---|
| A | Natural Bridge to Boulder River Ranch | Two 12-foot lanes | Asphalt |
| B | Boulder River Ranch to Two Mile Bridge | Two 12-foot lanes | Gravel |
| C | Two Mile Bridge to Fleming Bridge | Two 10-foot lanes | Gravel |
| D | Fleming Bridge to Box Canyon | Single 16-foot lane with periodic 8-foot wide pullouts | Gravel |

This option would include all the work in Option A, except for the changes to limits and Section A would be paved and brought up to current Montana State asphalt road standards. In addition, the Fourmile Creek Bridge, two wooden bridges, and the Bridge Creek Bridges would be replaced with modern bridge structures that would be skewed to better accommodate larger vehicles. The proposed bridges would be located to either side of the existing bridges such that the existing bridges could maintain traffic during construction. The wooden bridges could be replaced with a modern bridge structure or large culvert.

This section also contains areas of specific concerns such as a few spots where the roadway is located along the river bank, springs in the roadway, and areas with steep grades. Areas where the roadway is adjacent to the river bank will need to be analyzed on a case by case basis to create designs that protect the road while also minimizing impacts to the river. Springs in or above the roadway would need to be intercepted and routed to the ditches. Areas with steep grades may be resolved by re-grading the profile to lower the top of the hills and fill the bottom.

## Option C: Three Sections, One paved, Two gravel, based on ROS step-down

*(Note: ROS stands for Recreation Opportunity Spectrum. ROS is a framework for stratifying and defining classes of outdoor recreation environments, activities, and experience opportunities. ROS categorizes recreation opportunities into six distinct settings; urban, rural, roaded-natural, semi-primitive non-motorized, semi-primitive motorized, and primitive.)*

Option C would have three segments between Natural Bridge Recreation Area and Box Canyon Trailhead. The segments would be as follows, A) Natural Bridge to Aspen Campground area, B) Aspen Campground to Fourmile Trailhead Area, and C) Fourmile Trailhead to Box Canyon Trailhead. This would allow for more consistency between the Corridor Plan and the Forest Service vision for recreation in the corridor. This also provides an additional alternative for analysis.

***Table 10. Option C***

| Section | Location | Width | Surface |
|---|---|---|---|
| A | Natural Bridge to Aspen Campground | Two lanes | Pavement |
| B | Aspen Campground to Fourmile Trailhead | Single- lane | Aggregate |
| C | Fourmile Trailhead to Box Canyon | Single lane with occasional turnouts | Gravel |

In Option C, an effort to best preserve the primitive character of the drainage experience, the segments would be more definitive than option A, encouraging higher vehicle class users to drop out earlier in the drainage while still providing quality recreational values that match the primitiveness of the canyon. For example, large camp trailers and RV's would be encouraged to stop lower in the drainage since the facilities provided would best fit their vehicle type.

In principle, the Forest Service believes that having a uniform gravel road all the way to Box Canyon with the only variation being surface-width, may not achieve the goal of making the experience more primitive up the canyon. The Forest Service is proposing this broad concept:

Section A, Natural Bridge to Aspen Campground

Roadway users lower in the Canyon expect higher standard roads and more developed facilities. All or a portion of this road would be road; a double-lane paved surface. The portion of road beyond Two-Mile Bridge may drop to a double-lane aggregate if the alignments and volumes of use don't support a paved surface standard. This segment would be constructed to accommodate paving in the future should that eventually be desired.

Section B, Aspen Campground to Fourmile Trailhead

Roadway users midway up the Canyon should expect moderately improved roads and less developed facilities. This segment would be a single-lane aggregate surface with intervisible turnouts. The segment would provide a classic Forest Road users would be accustomed to driving and consistent throughout the Gallatin National Forest.

Section C, Fourmile Trailhead to Box Canyon

Roadway users higher in the Canyon should expect lower standard roads and primitive facilities. This entire segment would be a single-lane road with occasional turnouts with a coarse and durable surface that would calm speeds and give a sense of a primitive experience.

**Options Considered but not Recommended**

Over the course of the planning period, many ideas were proposed and evaluated. Some of these included paving the entire road, relocating the road above the historic Ranger Station and around the Boulder River Ranch where the right-or-way is constrained, and retaining all existing bridges. A brief discussion of why these options were not pursued is as follows.

Local residents and elected officials were not in favor of paving the entire road. Pavement would significantly change the character of the road, something opposed by a large majority of local road users. Residents were concerned with both the initial costs of paving and pavement maintenance over time. They were also concerned that pavement would increase speeds resulting in more accidents and wildlife mortality.

Road dust was an issue mentioned repeatedly during the public meetings. Except for the short segment of pavement where dust would be controlled by paving in Option B, dust treatment would not vary for most of the length of the project. Dust control will need to be addressed by the counties routinely with the retention of the gravel surfacing.

Rerouting the road to the west of the Main Boulder Ranger Station was discussed as a means of avoiding the section of road that passes directly through the Boulder River Ranch. Historic ranch buildings closely abut the right-of-way prohibiting any widening of the narrow right-of-way in this location. This option was discarded for two primary reasons—local opposition to a major re-route and environmental conditions. The alternate location for the road crosses a slope that is saturated and contains evidence of past mass failure and slumping. Moving the road in this area would also likely constitute an adverse effect to the integrity of the historic Main Boulder Ranger Station.

Anecdotal local input indicated that the bridges were sound and should not be replaced. Discussions of the age and design life of the bridges combined with physical evidence on the bridges themselves (damaged decking and approaches) has led the team to recommend that the bridges be replaced as part of this project. Bridge replacements would be designed to reduce impacts to aquatic organisms and the river channel. Bridge inspection information is provided in the Existing Transportation System section of this report. The bridges were built in the 1930's. One is functionally obsolete the other two are rated as functional. All of the bridges show signs of poor alignment and narrow widths based on end damage. These bridges would significantly impede emergency ingress and egress during an event such as a wildland fire.

## Analysis of Improvement Options

***Table 11. Options analyzed against screening criteria***

| Screening Criteria | Option A: 3 Sections | Option B: 4 Sections | Option C: 3 Sections |
|---|---|---|---|
| How well does the improvement option meet the project goals? | Option A would improve emergency response, improve the counties' ability to maintain the road, improve safety and functionality of the roadway, support economic uses, and retain the character of the corridor. | Option B meets the project goals however , Option B would negatively impact the character of the road for the section that is paved. | Option C would improve emergency response, improve the counties' ability to maintain the road, improve safety and functionality of the roadway, and support economic uses. Option C would negatively impact the character of the road for the paved stretch but best retain the character of the corridor on the farthest end. |
| Do the local elected officials and the public support the improvement option? | The elected officials and the public support Option A. | A small minority of the segment of the public commenting on this project support some paving. | This option was suggested by the USFS following the public comment period. |
| Do the stakeholder state agencies, federal agencies, and tribe(s) support the improvement option? | The primary stakeholder agency is the Forest Service. The Forest Service does not object to this option. Other stakeholder agencies did not comment on this option. | The stakeholder agencies did not comment on Option B. | This option is the Forest Service's preferred option. |
| Can potential adverse impacts from the project be adequately mitigated? | No adverse impacts have been identified. It is anticipated that potential adverse impacts could be adequately mitigated. | No adverse impacts have been identified. It is anticipated that potential adverse impacts could be adequately mitigated. | No adverse impacts have been identified. It is anticipated that potential adverse impacts could be adequately mitigated. |
| What are the benefits and what is the total cost for the improvement option? | The benefits of Option A are increased safety, improved road performance, and decreased maintenance costs over the present situation. The total cost for Option A is $20,202,851. This is slightly less than Option B and slightly more than Option C. | Paving the short first section of the road proposed under Option C would result in a small cost savings for maintenance because of the relatively higher AADT on this section. Construction costs of $21,180,571 would be higher than Options A and C. | The benefits of Option C are increased safety, improved road performance, and decreased maintenance costs over the present situation. This option would cost 18,884,603, less than Options A and B. |

*Note: Costing detail worksheet on file with Western Federal Lands.*

## Discussion and Recommendations

The goals of the study were to develop options to:

1. Increase the safety of residents and visitors using the Main Boulder River Road.
2. Improve roadway conditions and features such as bridges, alignment, drainage, bottlenecks, and sight distances where practicable.
3. Reconstruct the roadway to reduce long-term maintenance costs to the counties.
4. Maintain the aesthetic character of the corridor to the extent possible while addressing safety and maintenance issues.

The options meet the goals as follows:

All three options analyzed meet the first goal of increasing the safety of residents and visitors using the Main Boulder River Road. Safety is increased in all options by providing a better road surface (whether paved or gravel), greater visibility through intervisible turnouts, and addressing grade and drainage issues. All of the options would replace three bridges.

All three options analyzed meet the goal to improve roadway conditions such as bridges, alignment, drainage, bottlenecks, and sight distances where practicable. There are no differences between the options related to this goal.

All three options considered long-term maintenance costs to the counties. Because there is great uncertainty about whether future monies for heavy maintenance will be available from Federal Highways at periodic intervals, Option A best satisfies this goal because there is no pavement involved. The county commissioners and the public both expressed concerns about the counties' ability to maintain the Main Boulder Road. This is already an issue that drove the counties' application to the Tri-Agency and the public raised strong concerns about this issue into the future as well—asking that the recommended option from this study take this into account. The most likely scenario for county road budgets is that they will remain static. However, given the uncertainty of the federal Payment in Lieu of Taxes (PILT) upon which the counties depend heavily, it is possible funding available for county road maintenance could decrease. This would be a worst case scenario. One of the primary reasons the counties wish to reconstruct the road is to increase the ease of maintenance. Any option recommended must recognize the maintenance challenges of the road.

All three options considered potential impacts to the aesthetic character of the roadway. Road width (and associated clearing widths) and surface types can affect visual character. Option A retains the existing gravel surfacing so was preferred by residents for its lack of visual impacts. Options B and C were less desirable due to change in the visual character from gravel to pavement. However, Option C proposes the lowest standard of road for the southern-most segment, best transitioning into the "wilderness experience" according to the Forest Service's recreation opportunity spectrum or ROS. Options A and C better meet this goal than Option C.

Option A is the improvement option recommended by Federal Highways to move this project forward into the next phase. Option A meets the project goals as described above, meets the pre-determined screening criteria, and focuses heavily on meeting the concerns of local residents. Local elected officials and members of the public that participated in the development of this corridor study support Option A. Residents' concerns about preserving the character of the roadway, improving safety, and long-term cost effectiveness are met by Option A.

The Forest Service preliminarily supports Options A and C. The Forest Service's vision of transitioning the recreation experience in the drainage is best met by Option C.

The proposed recommended option, Option A, was refined based on input at the public meeting held at the Boulder River Ranch on August 23, 2012. It is anticipated that this option will guide the submission of additional grant applications by Park and Sweet Grass Counties to the Federal Highway Administration.

In the months following completion of this study, the counties and the Forest Service will be meeting to discuss application for project funding. Assuming an application for funding is submitted, if/when funds become available for project implementation, the next step in a road improvement project would include completion of the appropriate environmental analysis through the NEPA process. NEPA requires considering a range of alternatives, examination of potential environmental effects, identification of mitigation measures to address the environmental effects, and a formal public input process.

The final NEPA decision based on additional environmental analysis, formal agency input, historic consultation, and formal public comments may vary from the options in this document. The final decision will be made at the conclusion of the NEPA process by the appropriate officials.

# Appendix A: Other studies and plans

## Sweet Grass County

### Sweet Grass County Growth Policy

The Sweet Grass County Growth Policy is date for the period 2003-2008. The policy states" overall land use is projected to remain fairly consistent in Sweet Grass County." The policy goes on to state that there is some potential for conversion of ranch property to recreational uses. (Page 20)

According to the Growth Policy, Sweet Grass County maintains approximately 570 miles of roads. Each road in the county has been classified. The Main Boulder Road (MT 298) south of McLeod is a Class 3 road. Class 3 roads are elevated local, feeder roads with distinct borrow pits and cross drainage. Standards require 21-foot roadway widths and 20-foot bridge and cattle guard widths. The county maintains Class 3 roads to all weather standards. Class 3 roads are surfaced with processed shale or pit-run gravel. Surfacing may also include native soils where stone or shale is a significant component of the soil. Snowplowing and patrol grading are performed as needed, although the maintenance priority for Class 3 is less than Classes 1 and 2.

The Growth Policy also provides a listing of off-system bridges with the most recent inspection information from the Montana Department of Transportation. These are bridges that the county is responsible for. There are 40 off-system bridges listed and of this number, four are south of McLeod on the Boulder River.

One of the goals in the plan addresses infrastructure, "Provide county infrastructure which satisfies transportation, utility and solid waste disposal needs of county residents, businesses/industries and visitors in an effective and efficient manner.

### Sweet Grass County Pre-Disaster Mitigation Plan

The Pre-Disaster Mitigation Plan (PDM) lists wildland fire as the top priority among all of the natural hazards in Sweet Grass County. Goal #3 in the PDM plan is to "Reduce wildland fire risk in the urban interface." The wildfire protection plan summarized below was prepared to be consistent with the PDM plan and provides greater discussion on the wildland fire hazard—a significant concern in the reconstruction of the Main Boulder Road.

The section titled "Implementation of the Mitigation Strategy" addresses project priorities. Road projects are rated as both highly urgent and highly beneficial to the communities. The plan states, "Road projects through grants and county funding are planned and completed by the County Road and Bridge Department. Reliable roads that can handle emergency traffic converts to better safety for the public and our responders." (page 69)

### Sweet Grass County Community Wildfire Protection Plan

The Sweet Grass Community Wildlife Protection Plan (CWPP) was adopted in September 2008. Park and Sweet Grass counties worked in cooperation to address the wildland fire hazard along the Main Boulder. The two overall goals of the CWPP are to:

- Reduce the risk of catastrophic events through fuels reduction and education, and
- Improve the planning and suppression capabilities of our emergency services sector.

Under the discussion of wildland urban interface risk the plan states, "Several areas within the county have an extreme danger of wildland urban interface fire. The Main Boulder has the highest risk, due to the potential consequences resulting in loss of life and personal property, the extremely heavy recreational use, the poor transportation system, and the potential for extreme fire behavior place the Main Boulder in the top category." (CWPP Page 3) Subdivisions are prioritized with Whispering Pines, Ken/Dan Acres, and the Main Boulder as the highest priority subdivisions in the WUI at risk for fire. The plan states that this area is particularly challenging due to lack of water and response times.

## Park County

### Park County Growth Policy

The Park County Growth Policy was adopted August 4, 2006. The vision for the county stated in the growth policy is "Park County will grow in ways compatible with the protection of property rights, and its quality of life, quality of place, and unique character." The plan has goals related to public input, land use, natural resources, county services, economic development, housing, public utilities, and transportation. Several of the goals have objectives that touch on topics related to this corridor study. The following table summarizes objectives relevant to the proposed Main Boulder Road reconstruction project.

*Table 12. Park County Growth Policy Guidance*

| Goal | Objective | Page # | Policy Guidance |
|---|---|---|---|
| Public Input | 1.1 | 23 | Encourage public participation in all planning processes. |
| Land Use | 2.2 | 25 | Identify, evaluate, and encourage best options for extending infrastructure, especially roads, in a manner that encourages growth close to existing communities in a cost effective manner. |
| Natural Resources | 3 | 28 | Protect Park County rivers from development and recreation-related impacts. |
| Natural Resources | 4 | 28 | Manage habitat for healthy wildlife populations by considering Montana Fish, Wildlife and Parks and landowner recommendations. |
| Natural Resources | 7 | 29 | Encourage the protection of Park County's natural amenities, Water courses, wildlife and wildlife habitat, and open spaces |
| County Services | 7 | 32 | Address new and existing infestations of noxious weeds. |
| Economic Development | 1 | 32 | Strengthen Park County's economy. |
| Economic Development | 1.2 | 32 | Support construction of new infrastructure that increases economic opportunity and development for Park County residents. |
| Transportation | 1 | 35 | Maintain and improve the condition and operational level of service of the existing and future road systems. |
| Transportation | 1.1 | 35 | Identify costs and revenue sources for maintaining and improving all roads and for accepting new roads into the Park County road system. |
| Transportation | 1.2 | 36 | Develop a plan for road and bridge management and maintenance. |
| Transportation | 1.3 | 36 | Make provisions for road systems to accommodate current and future needs and meet emergency service standards. |
| Transportation | 1.4 | 36 | Design and manage county roads to conform with city, state, and federal transportation systems. |

**Park County Pre-Disaster Mitigation Plan**

The Park County Pre-Disaster Mitigation Plan or PDM was revised in September 2011. According to the Executive Summary, wildland fire is ranked as a high level hazard in the county due to the probability and extent of potential impacts. Goal 2 of the PDM plan is to prevent losses from wildfires. Two of the 9 critical facilities in the county at risk from wildland fire are located in the West Boulder drainage—the Christikon and Yellowstone Bible camps. The PDM plan references the county's CWPP.

### Park County Community Wildfire Protection Plan (CWPP)

The Park County CWPP was adopted in the spring of 2006. The CWPP has direction consistent with the National Fire Plan. The following seven subject areas are addressed:

1. Program Development
2. Prevention
3. Community Assistance
4. Preparedness/Planning
5. Suppression
6. Reducing Hazardous Fuels
7. Rehabilitation/Restoration of Fire Adapted Ecosystems

The plan defines the Wildland Urban Interface (WUI) based on three weighted criteria. The criteria and their weighting are density of structures (50%), fuel type (25%), and probability of ignition (25%.) Based on the these criteria the WUI risk of lands along the Main Boulder road sections located in Park County are from 5.1 to 8.0 on a scale of 1 to 10 with 1 being the lowest risk and 10 being highest.

The plan has a total of eight goals. None of the eight goals in the Park County plan speak specifically to access, ingress and egress, or evacuation needs.

## Gallatin National Forest

### Forest Plan

The Gallatin Forest Plan was approved in 1987. The Forest Plan is the umbrella document for activities on the National Forest lands. The direction in the Forest Plan provides broad guidance for projects. Alternatives and site specific analysis of potential impacts is completed at the project level. The plan has been amended 36 times since 1987. The amendments either permanently altered the management direction in the 1987 plan or provided for a one-time exception. None of the amendments was specific only to the Main Boulder area.

Several sections of the plan contain guidance relevant to this corridor study—Forest-wide Management Direction, Outputs and Activities, Forest-wide Standards, and Management Areas. The Main Boulder corridor study area is located mostly within the Gallatin National Forest. The road is designated Forest Highway 64 and National Forest System Road 6639.

The introduction to the plan contains the following statement, "One of the major overall objectives of the Forest Plan is to recognize and manage for the high quality recreational, vegetative, and wildlife resources found on the Gallatin National Forest." The Main Boulder Road provides access to recreation, timber, minerals, and fish and wildlife habitat.

Chapter II of the Forest Plan contains the Forest Management Direction. The management direction is provided in terms of goals, objectives, and standards. The plan has 21 goals.

1. Provide for a broad spectrum of recreation opportunities in a variety of Forest settings.
2. Provide directional and interpretive signing for visitor information, as appropriate for the recreation setting.
3. Manage the existing and recommended wilderness resource to maintain its wilderness character and to provide for its protection and use.
4. Provide Forest visitors with visually appealing scenery.
5. Meet or exceed State of Montana water quality standards.
6. Maintain and enhance fish habitat to provide for an increased fish population.
7. Provide habitat for viable populations of all indigenous wildlife species and for increasing populations of big game animals.
8. Provide sufficient habitat for recovered populations of threatened and endangered species (i.e. grizzly bear, bald eagle, and peregrine falcon.)
9. Strive to prevent any human-caused grizzly bear losses.
10. Provide additional public access to National Forest lands.
11. Provide a road and trail management program that is responsive to resource management needs.
12. Provide a sustained yield of timber products and improve the productivity of timber growing lands.
13. Maintain or improve the forage resource.
14. Provide for a small increase in livestock grazing.
15. Provide for orderly and environmentally acceptable exploration and development of minerals, oil and gas, and geothermal resources.
16. Use prescribed fire to accomplish vegetative management objectives.
17. Provide a fire protection and use program which is response to land and resource management goals and objectives.
18. Manage National Forest resources to prevent or reduce serious long lasting hazards from pest organisms utilizing principles of integrated pest management.
19. Manage National Forest lands in their present ownership patterns except where opportunities arise to accomplish specific objectives.
20. Locate and protect cultural resources to maintain their scientific and historical value.
21. Coordinate with the land and resource management planning efforts of other Federal, State, local agencies, and private landowners. Strengthen this coordination within the entire Greater Yellowstone Area.

In the objectives section of Chapter II, the plan describes the Desired Future Condition of DFC. The DFC with respect to the road system is as follows: "The Forest Plan identifies the need to construct or reconstruct approximately 35 miles of additional road each year. This will be added to the existing 800 miles. An estimated 70 percent of these roads will be closed once their purpose is satisfied. This new mileage includes roads which will be built outside of the Forest boundary to provide additional public access to the Forest....." (Forest Plan, Page II-13)

Additional guidance related to transportation systems is summarized in the following table.

***Table 13. Gallatin National Forest Plan Guidance***

| Page # | Section of Plan | Policy Statement |
|---|---|---|
| II-6 | Forest wide Management Direction, Resources/ Activity Summaries | Facilities: Forest roads and trails will be located, constructed, managed and maintained to meet management objectives. |
| II-18 | Forest wide Standards Wildlife and Fish | Roads and forest cover will be managed to provide habitat security and diverse hunting opportunity. |
| II-19 | Forest wide Standards Wildlife and Fish | Structures installed within streams supporting fisheries will be designed to allow for upstream fish passage. |
| II-26 | Forest wide Standards Land Ownership | 1. Road and trail rights-of-way will be acquired across non-National Forest lands to assure adequate protection, administration, and utilization of National Forest resources. Areas where access is needed to meet the objectives of the Forest Plan including public access are identified on the Management Area Map.<br>2. The Forest will cooperate with other landowners in developing roads or road systems which serve mutual needs.<br>3. A satisfactory jurisdictional status for roads on the National Forest and other public land will be sought in cooperation with appropriate authorities.<br>4. Define National Forest interest on all existing road systems and trails to acquire necessary additional interests, as needed, to meet management objectives. |
| II-27 | Forest wide Standards Facilities | 1. Analysis for transportation needs will be integrated into resource area analysis and will be completed prior to transportation project work.<br>2. Road and trail management will be determined as part of the area transportation analysis and will be based on management area needs, such as recreation access, wildlife security, soil protection, economics, and protection of the investment....<br>3. N/A<br>4. Roads and trails will be designed to standards that meet resource management objectives.<br>5-7. N/A<br>8. Noxious weeds along roads and trails will be treated.<br>9. Existing roads and trails will be maintained consistent with Management Area goals. |

**Main Boulder Fuel Reduction Final Environmental Impact Statement**

The Main Boulder Fuel Reduction plan was prepared by the Gallatin National Forest in 2004. The purpose and need for this project was that fire behavior specialists did not find any safe areas in the Main Boulder corridor where large groups of people could take refuge from a large wildland fire. Evacuation was determined to be the only method of protecting the 2500-3000 members of the public from a large fire in the Main Boulder drainage.

Key issues identified during the preparation of the Environmental Impact Statement included:

- Threat of wildland fire to public safety and safety of firefighters
- Potential spread and density of noxious weeds
- Effects of fuel treatments on water quality
- Soil disturbance, erosion and sedimentation
- Integrity of scenery and Wild and Scenic River eligibility
- Effects to wildlife and plants
- Effects on recreation opportunities
- Increased particulate matter from prescribed fire

The fuel reduction plan proposed commercial harvest, small diameter treatment such as thinning, and prescribed fire within the corridor. The project area for this project included an approximately half-mile corridor along the bottom of the Main Boulder river drainage. The fuel reduction project is roughly the same area as this corridor study. The FEIS is the source of much of the information contained in this report describing the existing condition. Projects identified in the plan have been implemented over the past five years.

**East Boulder Fuel Reduction Plan**

The Gallatin National Forest completed an environmental assessment (EA) and issued a decision notice and "finding of no significant impact" (FONSI) concerning the implementation of the East Boulder Fuel Reduction Plan in 2011. This hazardous fuels reduction project is located on National Forest System lands in the East Boulder River Corridor drainage of the Yellowstone Ranger District. The East Boulder Road #205 branches off of the Main Boulder highway approximately 20 miles south and west of Big Timber and is a highly maintained gravel road that follows the East Boulder River from its confluence with the Main Boulder River to the Stillwater Mining Corporation's East Boulder Mine complex at its terminus.

The primary purpose and need for the East Boulder Fuel Reduction Plan is to improve public and firefighter safety by reducing the probability and effects of human caused fire starts along the corridor and reducing the effects of wildfire entering into the wildland/urban interface of the East Boulder River corridor. This will be primarily accomplished by breaking up the vertical and horizontal continuity of fuels by thinning trees, and removing ladder fuels and vegetation within identified fuel treatment units.

Although the project area for The East Boulder Fuel Reduction Plan is not located within the Main Boulder corridor study area, several of the key resource issues addressed in the East Boulder Fuels EA (e.g., noxious weeds, water quality and fisheries, and wildlife/wildlife habitat) are similar to those identified for the Main Boulder corridor due to their proximity. Relevant information from the East Boulder Fuels EA was used for this corridor study and should also be incorporated into any future NEPA analyses.