

# CHAPTER 1 PURPOSE AND NEED FOR ACTION

## INTRODUCTION

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The purpose of this document is the Glacier National Park (GNP) consideration of a Burlington Northern Santa Fe Railway (BNSF) special use permit request for the use of explosives in the park for avalanche hazard reduction. The explosive avalanche hazard reduction request is based on the need for both the protection of BNSF employees, Amtrak train passengers, freight, and equipment along the southern boundary of GNP in John F. Stevens Canyon and the reduction of avalanche caused interstate commerce delays. Historically the railroad constructed snowsheds in this area to protect the trains from avalanches originating in GNP avalanche paths. Eight of the original nine snowsheds remain, but do not provide adequate protection across seven avalanche paths. Explosive use for avalanche hazard reduction would be an unprecedented action in Glacier National Park, and the park has many serious concerns about impacts to park values, including threatened and endangered species and recommended wilderness. However, the park agrees that there are avalanche safety issues in this area and park staff have agreed to consider and analyze BNSF's proposal as well as a range of alternatives to explosive use in the park. This environmental impact statement (EIS) was prepared to analyze the impacts of the proposal and alternatives. The Flathead National Forest (FNF) and Montana Department of Transportation (MDT) are cooperating agencies on this environmental impact statement.

John F. Stevens Canyon is located in northwest Montana and was formed by the Middle Fork of the Flathead River, a National Wild and Scenic River, and Bear Creek. The canyon is bisected by the southwestern boundary of GNP and the FNF (Map 1-1). The Great Bear Wilderness lies to the west and southwest. The railroad and U.S. Highway 2 traverse the length of the canyon.

The tracks through John F. Stevens Canyon were laid by the Great Northern Railway in 1891 connecting St. Paul to Seattle. Louis Warren Hill, President of the Great Northern Railway and son of founder James J. Hill, was instrumental in passing legislation in 1910 creating Glacier National Park. That same year a second set of railroad tracks was added to the corridor to allow simultaneous east and west bound traffic. A shrewd businessman, Hill recognized the natural beauty and recreational opportunities that GNP offered. Hill supported protection of the area and he financed much of the early infrastructure in the park including lodges, chalets, trail system, and roads (Hannah 1988). The railroad was the primary means of transportation for visitors to the GNP area and when they arrived, they experienced railroad sponsored accommodations, roads, and trails to enjoy the area.

Today, approximately 50 freight trains and two Amtrak passenger trains pass through the canyon each day. Approximately 61 million tons of freight including hazardous materials, grain, and commodities are transported through the canyon per year ([www.bnsf.com](http://www.bnsf.com) accessed July 24, 2006). The number and length of trains has increased over the past decade. Future train traffic is expected to grow as demands for freight transfer increase.

The steep mountainsides and deep snowfall in the canyon leave the railroad tracks and the highway susceptible to avalanches during the winter months. Beginning in the early 1900s, snowsheds were built over the tracks at the base of many of the avalanche paths to protect the tracks from avalanches and avalanche debris. However, there are 81 accounts of avalanches in unprotected paths that have interrupted train traffic and resulted in the death

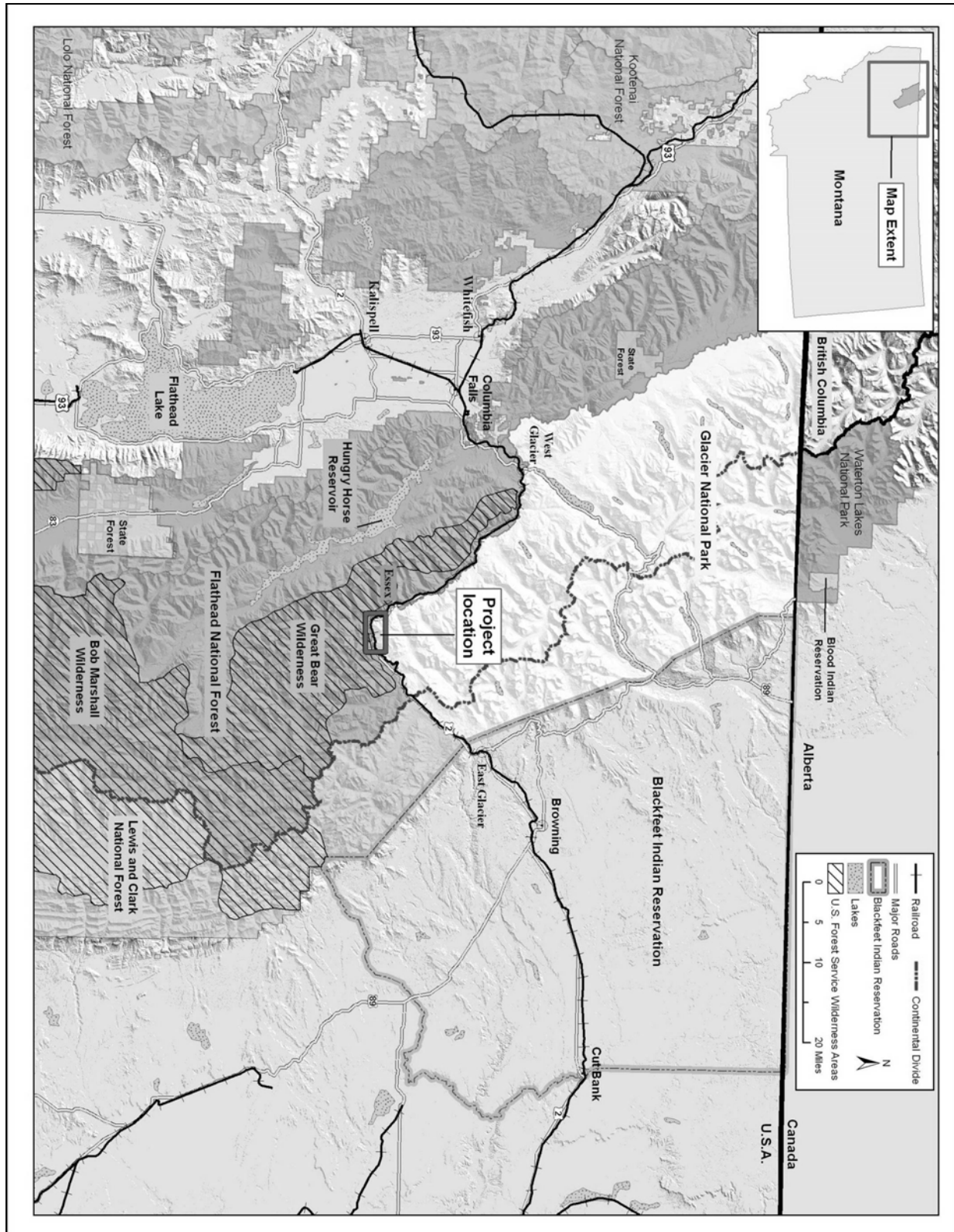
of three railroad workers in March, 1929 (Appendix B). In three of the past four years, avalanches have temporarily disrupted train service through the canyon. The current request relates to avalanches which occurred in January, 2004. At that time the railroad was delayed during a storm for 29 hours due to avalanches originating within GNP. On January 28<sup>th</sup>, an empty 119 car freight train was hit by an avalanche and derailed. While it was stopped, it was hit by another avalanche from an adjacent path that caused more cars to derail. A third avalanche just missed cleanup crews and a fourth slide hit a truck traveling on US Highway 2 below the railway. The truck was hit by an avalanche originating in an avalanche path that does not affect the railroad. West bound passenger service on Amtrak was shut down and freight trains were delayed on both sides of Marias Pass. At this point BNSF requested permission from the park to perform immediate explosive avalanche hazard reduction within the boundaries of GNP to mitigate the hazardous situation along the railroad. The park issued a 3 day emergency permit to allow this activity provided that snow conditions warranted control actions. This was the first time in the park's history that an outside request to use explosives was considered. After evaluation by GNP and BNSF personnel, it was determined that the snowpack had stabilized during the 3 day period and no explosive use was necessary.

BNSF requested another emergency special use permit for explosive use in February 23, 2006. The Park issued a three-day emergency permit on February 24, 2006. The explosive use occurred February 25, 2006. Train traffic was stopped and a helicopter was used to drop ten cast primer charges on four avalanche paths (Path 1163, Infinity, Shed 8 and Shed 7). The first charge was a dud and was recovered the following day. The remaining nine explosives started two small avalanches in Path 1163 and a larger slide in Shed 8 path. Infinity and Shed 7 did not slide. The following week, a warm weather cycle with rain, caused avalanches in several paths including the paths where explosives were used.

After the 2004 event, BNSF contacted GNP requesting an annual permit to conduct avalanche hazard reduction in John F. Stevens Canyon to protect employees, freight, and Amtrak passengers from damage, injury, and possibly death during periods of high avalanche hazard. BNSF also expressed concern about avalanche caused derailments. Trains on this route carry all types of freight including hazardous materials that could significantly harm natural resources if they are spilled or released into the environment.

BNSF hired Chugach Adventure Guides to perform and prepare an avalanche risk analysis of the John F. Stevens Canyon. The avalanche risk analysis involves the compilation of variables specific to the area including avalanche magnitude and frequency, traffic numbers, equipment replacement costs, and human exposure. The report *Avalanche Risk Analysis John F. Stevens Canyon, Essex Montana* (Hamre and Overcast 2004- Appendix A), concluded that the avalanche hazard for the railroad was high and contained risk reduction alternatives for BNSF to consider.

BNSF forwarded the report to Glacier National Park and after consideration of the alternatives contained in the report as well as BNSF's request to conduct explosive avalanche hazard reduction, the park determined that an environmental impact statement (EIS) would be required to analyze the impacts on Glacier National Park and Flathead National Forest resources. Flathead National Forest and Montana Department of Transportation (MDT) agreed to be cooperating agencies in accordance with the National Environmental Policy Act (NEPA) for this EIS process. This document was prepared by subject area experts and staff from the cooperating agencies.



## Scope of the Federal Action

The EIS evaluates a range of alternatives that would reduce or remove avalanche risk to the railroad. The alternatives include explosive use on lands within GNP and associated activities on FNF lands and within the right-of-way (ROW) of MDT. Non-explosive alternatives are also analyzed. Not all of the avalanche hazard reduction solutions lie within the boundaries or the jurisdiction of the National Park Service (NPS), United States Forest Service (USFS) or MDT. Other solutions lay within the BNSF right-of-way (ROW) on National Forest System (NFS) lands. A range of alternatives, including those outside the jurisdiction of the federal agencies, are analyzed in this EIS. This EIS does not analyze the impacts from the use of explosives in other National Park areas, on NFS lands or by other state highway departments.

## Legislative History, Right of Ways, Jurisdiction and Partners

Glacier National Park was established in 1910 and “.....dedicated and set apart as a public park or pleasure ground for the benefit and enjoyment of the people of the United States under the name of “The Glacier National Park” ..... Provided further, that rights of way through the valleys of the North and Middle forks of the Flathead River for steam or electric railways may be acquired within said Glacier National Park under filings or proceedings heretofore or hereafter made or instituted under the laws applicable to the acquisitions of such rights..... which regulations shall provide for the preservation of the park in a state of nature so far as is consistent with the purposes of this act and for the care and protection of the fish and game within the boundaries thereof.”

In the 1914 Act accepting cession by Montana for exclusive jurisdiction over the lands embraced within Glacier National Park, the act stated “That the Secretary of Interior shall make and publish such rules and regulations as he may deem necessary and proper for the management and care of the park and for the protection of the property therein, especially for the preservation from injury or spoliation of ..... natural curiosities or wonderful objects within said park, and for the protection of the animals and birds in the park from capture or destruction, and to prevent their being frightened or driven from the park;.....”

The Railroad right-of-way marks the southern boundary of the park. The portion of the BNSF Railway property that is the subject of this EIS (between US Highway 2 reference posts 185-191 and railroad mile posts 1159-1164) lies within the John F. Stevens Canyon. The railroad lies on a right-of-way (ROW) issued by the FNF in 1891, however, one segment has an amendment easement from 1968 when the ROW was changed slightly. According to Beth Burren of the Flathead National Forest (Pers. Comm. May 25, 2006), BNSF has a 200’ wide ROW in the project area, 100’ feet each side of the centerline between the two tracks. The only exception to this in this area is at Blackfoot, where the ROW is 325’ wide.

US Highway 2 lies adjacent to the railroad ROW on right-of-ways issued to MDT by the USFS between 1981 and 1985. The width of the highway right-of-way varies in this area. USFS lands continue south of the railroad ROW and south of the MDT ROW.

GNP consists of 1,013,572 acres situated on the Canadian border in the northwestern section of Montana. The Park is in the northern Rocky Mountains of the United States, and contains the rugged mountains of the Continental Divide. Together with Canada’s Waterton National Park, it forms the Waterton-Glacier International Peace Park. Superb natural and cultural resources are found in both parks. GNP and Waterton Lakes National Park are also together

recognized as a World Heritage Site and individually as Biosphere Reserves. According to Glacier's General Management Plan, 1999:

**The purposes of Glacier National Park are to:**

- Preserve and protect natural and cultural resources unimpaired for future generations (1916 Organic Act);
- Provide opportunities to experience, understand, appreciate, and enjoy Glacier National Park consistent with the preservation of resources in a state of nature (1910 legislation establishing Glacier National Park); and
- Celebrate the on-going peace, friendship, and goodwill among nations, recognizing the need for cooperation in a world of shared resources (1932 International Peace Park legislation).

**Glacier's significance is explained relative to its natural and cultural heritage:**

- Glacier's scenery dramatically illustrates an exceptionally long geological history and the many geological processes associated with mountain building and glaciation;
- Glacier offers relatively accessible spectacular scenery and increasingly rare primitive wilderness experience;
- Glacier is at the core of the "Crown of the Continent" ecosystem, one of the most ecologically intact areas remaining in the temperate regions of the world;
- Glacier's cultural resources chronicle the history of human activities (prehistoric people, American Indians, early explorers, railroad development, and modern use and visitation) and show that people have long placed high value on the area's natural features; and
- Waterton-Glacier is the world's first international peace park.

**The purposes of the Flathead National Forest are to:**

- Contribute to the sustainability of the health, diversity, and productivity of our Nation's forests and grasslands to meet the needs of present and future generations.

**The Flathead National Forest's significant contribution towards this mission is summarized with the following statements:**

- Encircled by other national forests and protected lands, the Flathead National Forest is the heart of the northern Rocky Mountain wild ecosystem. Large wilderness areas, such as the Bob Marshall Wilderness Complex and the Mission Mountain Wilderness, in concert with other special areas such as Wild and Scenic River systems, the Jewel Basin Hiking Area, and other undeveloped backcountry areas provide habitat strongholds for federally listed species such as grizzly bears, gray wolf, Canada lynx, and bull trout.
- The Flathead National Forest contains productive forest lands that contribute to the local and regional supply of forest products and is an important contributor to the local economy. Managing vegetation composition and structure, including fuels, using modern harvesting techniques contributes to people's livelihoods and enriches their lives.

- Recreation opportunities abound in any season. Hiking, horseback riding, boating, whitewater rafting, kayaking, hunting, fishing, camping, pleasure driving, skiing, snowshoeing, and snowmobiling are just a few of the recreational activities that occur on the Flathead National Forest. About 3,500 miles of system roads and 2,100 miles of system trails provide a mixture of motorized and non-motorized travel opportunities on the Forest for resource management, recreation, and public access.

**The mission of Montana Department of Transportation is to:**

- Serve the public by providing a transportation system and services that emphasize quality, safety, cost effectiveness, economic vitality and sensitivity to the environment.
- Primary responsibilities of MDT are planning and design, contract administration, materials design and testing, property acquisition, fiscal programming and cost accounting, enforcement of vehicle weight and dimension laws and the Outdoor Advertising Control Act, management of the state motor pool, highway, bridge and rest area maintenance, public transportation and rail programs and planning, general aviation airport planning and highway traffic safety.

**The vision of the Burlington Northern Santa Fe Railway Corporation is to:**

- Realize the tremendous potential of BNSF Railway by providing transportation services that consistently meet customers' expectations.

BNSF employs a diverse group of 38,000 professionals who embrace a set of shared values, listening to customers and doing what it takes to meet their expectations, empowering one another, showing concern for our colleagues' wellbeing and respect for their talents and achievements, continuously improving by striving to do the right thing safely and efficiently and celebrating their rich heritage and building on success as they shape a promising future.

BNSF sees their success in living their vision and values when they fulfill the highest expectations of their four key stakeholder groups:

- Our customers find it easy to do business, receive 100% on time, damage-free service, accurate and timely information regarding their shipment and the best transportation value.
- Our employees work in a safe and secure environment, are focused on continual improvement, share in the opportunity for personal and professional growth available to all team members, and take pride in their association with BNSF.
- Our owners earn financial returns that exceed other railroads and the general market as a result of BNSF's superior revenue growth, an operating ratio in the low 70s, and a return on invested capital that is greater than our cost of capital.
- The communities we serve benefit from our sensitivity to their interests and to the environment in general, our adherence to the highest legal and ethical standards, and the participation of our company and our employees in community activities.

**The Great Northern Environmental Stewardship Area (GNESA)**

The Great Northern Environmental Stewardship Area (GNESA) was formed in 1991, after grain spills along the BNSF tracks led to the deaths of 8 grizzly bears. GNESA is focused on

stewardship and management of the railroad and US Highway 2 transportation corridor and surrounding public and private lands between East and West Glacier. The area includes unparalleled wild lands in Glacier National Park, Flathead National Forest, and Lewis and Clark National Forest. The GNEA mission is to provide for effective stewardship of the natural areas while acknowledging the importance of the transportation corridor and human activities associated with the railroad and highway. GNEA partners have a presence in the stewardship area and include BNSF, GNP, FNF, Lewis and Clark National Forest, MDT, MDFWP, Flathead and Glacier County Commissioners, the Blackfeet Tribe, the Flathead Land Trust, private landowners, and businesses. GNEA partners coordinate activities and assist in developing management actions in a mutually beneficial and non-regulatory manner.

In the recent past it is estimated that approximately 14 grizzly bears have died as a result of railroad related grain spills and attractants on the tracks. GNP, FNF, Montana Department of Fish, Wildlife and Parks (MDFWP) and BNSF signed a protocol in which they mutually agreed to create an “*operationally and environmentally safe and compatible rail corridor.*”

Implementation of this protocol is overseen by a steering committee composed of local businesses, a land trust organization, and BNSF, federal, state and local officials. In the protocol, BNSF agreed to pay particular attention to the railroad system operation and maintenance in the corridor because of the threat to several threatened and endangered species. The protocol calls for the following actions conducted with interagency cooperation and guidance.

- Expedited clean up of past attractant spills and prevention of future spills
- Control of human waste and debris along the tracks
- Preventative actions to reduce hazardous material spill potential
- Close cooperation between the railroad and MDFWP biologists to identify specific railroad actions to reduce wildlife hazards
- Education of train crews regarding speed restrictions and wildlife hazards
- Installation of continuously welded steel rail and concrete ties
- Establishment of a million dollar conservation trust fund to be used for actions such as the purchase of conservation easements, support for a bear management biologist, and interpreters on Amtrak trains
- The sale of two train depots to the Glacier Natural History Association for a nominal amount

Since its establishment, GNEA has been responsible for many achievements including improved rail infrastructure, employee safety, reduction and cleanup of grain and attractants along the railroad, development of a quick response action plan for attractant spills, and support for a grizzly bear manager who has implemented educational and management actions resulting in a reduction of bear-human conflicts. GNEA partners supported the construction of a fish passage structure under the railroad at Stanton Creek for spawning cutthroat and bull trout. A close relationship has developed between railroad officials and other GNEA partners which have led to improved resource management, cooperative problem solving, and educational opportunities for stakeholders.

Current GNEA goals include: assistance in implementing BNSF’s proposed habitat conservation plan pursuant to the Threatened and Endangered Species Act; improvement of

emergency response capability in the corridor; hazardous material transportation assessment in the corridor; easements; and improved education and outreach to residents of the corridor. GNEA has been an integral part of land management and activity in the canyon.

### Decisions to Be Made

The decisions to be made by GNP are: 1) whether to allow the use of explosives or other devices for avalanche hazard reduction within GNP to protect BNSF personnel, passengers, freight, and trains and for what length of time; and 2) to determine which method best protects recommended wilderness, park resources and visitor experience. If explosives were permitted for avalanche hazard reduction, decisions to be made would be: (a) types of explosives, (b) methods of explosive delivery, (c) explosive use duration, (d) frequency of annual explosive use, (e) fixed structures for explosive delivery or detonation, and (f) extent of explosive avalanche hazard reduction within the park. Decisions would also be made as to what type and location of fixed structures for weather data collection and avalanche monitoring would be placed within GNP for the purpose of avalanche potential determination and what monitoring would occur to insure that resource impacts do not exceed thresholds. The use of explosives would be granted under a special-use permit in which specific guidelines and conditions for explosive use would be described. Issuance of the permit would be dependent on an agreement between the National Park Service (NPS), US Forest Service (USFS), and Montana Department of Transportation (MDT). GNP and FNF would make decisions concerning resource monitoring protocol and resource thresholds.

FNF would make a decision as part of the EIS process whether to permit the installation of a weather station along US Highway 2 to support the avalanche safety program and whether to permit the installation of approximately 600 feet of road and three artillery pads off of the US Highway 2 ROW under Alternative D.

MDT would make a decision as part of the EIS process to concur with the conditions and restrictions of the preferred alternative, including US Highway 2 traffic delays and maintenance operations resulting from explosive use in Alternatives C and D. MDT would also have to approve actions under Alternative D permitting access to artillery pads from the US Highway 2 ROW.

## PUBLIC INVOLVEMENT AND MAJOR ISSUES

The public involvement process began with a scoping letter sent on May 17, 2005 to GNP and FNF mailing list and with publication of a *Notice of Intent* (NOI) in the *Federal Register*. The NOI was published on June 21, 2005 (Volume 70, #118). Public open houses were held on May 25<sup>th</sup> in Essex, Montana and May 26<sup>th</sup> in Kalispell, Montana. Seven people attended the Essex meeting and four people attended the Kalispell meeting. A total of 954 written comments were received during the scoping process in addition to the comments made at the public meetings. Comment letters received during the scoping period were from the following groups and agencies: Swan View Coalition, Great Bear Foundation, US Environmental Protection Agency, the Blackfeet Tribe and the National Parks and Conservation Association. The deadline for receipt of scoping comments was extended from July 1 to July 22 due to an unexpected delay in publishing the *Federal Register* notice.

The FNF and MDT agreed to participate as cooperating agencies. The Blackfeet Tribe requested to be included in the consultation process for the project.

Below is a discussion of concerns and issues that were identified during scoping by the public, other agencies, BNSF, and Park and Forest Service staff. These issues and concerns provided the framework for the development of alternatives and selection of impact topics for environmental analysis. Each scoping concern or issue was examined and some were dismissed as being beyond the scope of this EIS or not being relevant to the project. Those that were considered but dismissed are found under **Issues Dismissed from Further Analysis**.

## Wilderness

The majority of the project area is within recommended wilderness in GNP. In 1974, The Secretary of Interior sent a recommendation to President Nixon that 90% of the park be designated wilderness. The recommendation was forwarded by President Nixon to Congress that same year. This recommendation included all NPS lands in the project area. Although the bill to formally designate the recommended areas has never been signed into law, the recommendation stands and is treated as if it were designated wilderness. NPS policy requires areas that are recommended wilderness be managed as if they are designated wilderness until such time as Congress designates or de-lists the land as wilderness. The *National Park Service Management Policies 2006*, section 6.3.1, state:

The National Park Service will take no action that would diminish the wilderness suitability of an area possessing wilderness characteristics until the legislative process of wilderness designation has been completed. Until that time, management decisions will be made in expectation of eventual wilderness designation. This policy also applies to potential wilderness, requiring it to be managed as wilderness to the extent that existing non-conforming conditions allow.

Permitting explosive use for avalanche hazard reduction would be in conflict with this policy and would require permission from the Director of the National Park Service as a non-conforming use within proposed wilderness. Explosive use would leave shrapnel from artillery use in starting zones and noise issues would impact wilderness values. Additionally, placement of structures within the recommended wilderness for reasons other than management of wilderness and permitting low flying aircraft would also conflict with NPS policy.

Explosive use would also impact parts of the nearby Great Bear Wilderness on NFS lands. Noise and sympathetic avalanche impacts in this wilderness area would be of concern on NFS lands within the canyon.

Neither GNP nor FNF conducts explosive avalanche control in wilderness areas for backcountry users. The agencies provide avalanche advisories and information on websites, visitor centers, and public information. Wilderness offers visitors a chance to experience nature in an “untrammled” state. The *National Park Service Management Policies 2006*, section 6.4.1, state:

Park visitors need to accept wilderness on its own unique terms. Accordingly, the National Park Service will promote education programs that encourage wilderness users to understand and be aware of certain risks, including possible dangers arising

from wildlife, weather conditions, physical features and other natural phenomena that are inherent in the various conditions that comprise a wilderness experience and primitive methods of travel. The National Park Service will not modify the wilderness area to eliminate risks that are normally associated with wilderness, but it will strive to provide users with general information concerning possible risks, any recommended precautions, related user responsibilities, and applicable restrictions and regulations...

### **Threatened and Endangered Species and other Wildlife**

Winter wildlife observations were conducted during 2005 and 2006. Federally listed threatened and endangered species are known to occur in the project area. These are the gray wolf, grizzly bear, bull trout, Canada lynx, and bald eagle. Critical Habitat for the Canada lynx has been proposed in Glacier National Park but not finalized. In addition, this area serves as winter range for several ungulate species preyed upon by federally listed species. The Endangered Species Act requires that any action authorized by a federal agency does not jeopardize the continued existence of a listed species or its critical habitat. There are also a number of state listed species that occur in the project area. Impacts from the proposed action and its alternatives on all of these species were analyzed in this EIS.

### **Avalanche Risk to Human Safety and Trains**

BNSF has expressed concern about employee and passenger safety in the project area from avalanche activity. The concern is based on past avalanche caused fatalities and train derailments. The historic data show 81 avalanche events that disrupted railroad or motor vehicle traffic or both in the canyon from 1910 to 2004. These events occurred in 46 winters of the 94-year period. The events happen on average of once every 2.04 winters (Reardon et al. 2004). However the historic record is incomplete and only known incidents at this time are listed. Based on known information, three railroad fatalities and several avalanche related derailments and accidents demonstrate the threat to trains traveling through John F. Stevens Canyon. BNSF safety ratings on the entire railroad show an average fatality of 1 per 15,000,000 person-hours or a rate of .013 per 200,000 person-hours (Hamre and Overcast 2004). The fatality rate in the canyon is 2 to 4 times higher than the average for the whole railroad. Hamre and Overcast predict that each avalanche hazard reduction alternative would decrease the individual probability by 80-90% bringing the fatality rate closer to the risk rate along the rest of the railroad.

The Great Northern Railroad initially addressed railroad avalanche hazard by constructing snowsheds in several paths between 1910 and 1941. The Railroad also installed signal fences for avalanche detection along the tracks in paths not protected by snowsheds. BNSF conducted sporadic avalanche rescue training during the 1970's, 1980's and mid 90's. However, recent events caused BNSF to become more concerned about the threat to employee safety from avalanches. They implemented a more comprehensive avalanche forecast and training program in the 2003/2004 winter season. The program includes the use of forecasting, monitoring, snowpack analysis, and non-explosive stability testing conducted by the Avalanche Safety Director (ASD). Avalanche hazard information derived from this information is used by BNSF to determine the risk exposure level for trains, employees, and passengers. BNSF then makes a decision to modify, limit, or delay operations. BNSF employees are trained in avalanche rescue, avalanche conditions, and avalanche transceiver

use. Avalanche risk awareness and training are institutional changes that have inherently lowered the risk of BNSF employee avalanche exposure.

After the incident in 2004 BNSF contracted Dave Hamre and Mike Overcast of Chugach Adventure Guides to analyze the AHI for the railroad within this area. The results of this analysis are discussed in more detail under **Relationship of this Study to Other Plans, Programs and Projects**. Their report is also attached as Appendix A.

Public comments questioned why BNSF has now decided to take advanced measures to improve employee safety and train protection after coping with avalanche hazard for over a hundred years. This is addressed in Chapter 2.

## US Highway 2

Concerns were raised about the effects on US Highway 2; operation of explosive technology from the highway and impacts on traffic traveling on the highway from avalanche hazard reduction activities. The EIS addresses these concerns. There are other issues raised in regards to US Highway 2 that are discussed under **Issues Dismissed from Further Consideration**.

## Use of Explosives in Glacier National Park

Most of the public comments expressed concerns about the appropriateness of explosives in Glacier National Park to reduce the hazard from avalanches. Concerns over the compatibility of BNSF explosive use with park values, recommended wilderness, and federal law were expressed. Concerns were also expressed that approval of explosive use by BNSF, a private company, on NPS lands could set a precedent for similar actions in other NPS areas.

The public expressed concern regarding toxic substances from explosives, unexploded ordnance, the frequency of and duration of explosive use, and impacts on Park and Forest lands. Public comment letters identified wildlife, threatened and endangered species, vegetation, water quality, air quality, natural sound, visitor experience, and recreation as impact topics for analysis. These issues are all addressed in this document.

Some comments asked about NPS use of explosives in GNP and under what conditions they are used. Hand charges are occasionally used for trail construction, maintenance and snow treading (construction of a temporary trail on a steep slope covered with snow) and during road opening to reduce the size of snow walls snow walls caused by plowing. This used to be more frequent (approximately every other year) because older snow removal equipment would create 30'-50' overhangs above the plowing equipment operators. However newer and better designed equipment has resolved this issue and reduced the need for hand charges. According to the Chief Blaster they are now used very infrequently (Pers. Comm. Cory Shea, May 19, 2006). Hand charges are sometimes used to remove rocks that fall on the road that are too big to move by hand or with road equipment. Avalanche hazard reduction is currently not conducted in any location in the park. Earlier attempts were unsuccessful. In 1957, artillery was employed to trigger avalanches along the Going to the Sun Road. Military personnel used a 75 mm to attempt to bring down a 100 foot long cornice on Piegan Mountain above Siyeh Creek valley on May 2 (Hungry Horse News, December 27, 1957). This attempt was not successful. Unconfirmed reports indicate that it may have been tried again in the early 90's with a 75mm recoilless gun. While some slides were triggered, others were not and the staff felt there was limited if any value. In 1996, a helicopter was used to deliver

explosives to destroy a cornice on Siyeh Bend on the Going to the Sun Road and this attempt was also unsuccessful. A 1960 paper about avalanche forecasting and control reports that Glacier National Park was testing the use of sonic booms from low-flying US Air Force jets to trigger avalanches on Logan Pass during the winter of 1959-60. The paper states that supersonic dives were used in strategic locations to focus shock waves on the snowpack (LaChapelle, 1960). The success of this operation was unconfirmed and this action was not continued in subsequent years.

Due to the lack of success of these early avalanche control attempts as well as concerns about impacts on wildlife, the park decided not to use explosives during spring road opening. The park hired a part-time avalanche forecaster beginning in 2002 to analyze snow conditions and provide up to date information to protect road crews from avalanches during the spring opening operation. Avalanche forecasting was increased to a two full-time positions the following year. Crews are relocated to clearing lower roads when snow conditions are found to be unstable.

### **Wildlife Crossings**

Several comment letters received during scoping state that BNSF should incorporate wildlife crossings into their snowshed designs. Park and Forest biologists have examined avalanche paths in the project area to determine the potential for wildlife crossings. Wildlife trails across the tracks are apparent in many locations. Park staff and BNSF engineers discussed the possibility for the incorporation of wildlife crossings into snowshed designs under those alternatives that involve snowshed construction. There are several issues with wildlife crossing structures. A ramp-like structure that is built over the snowshed and planted with vegetation would be subject to damage from avalanches. In most cases, a snowshed would be less than 1000 feet long and mobile wildlife would be able to travel around the shed. A crossing that passes under the railroad would be difficult to keep from eroding due to snow and avalanche debris meltwater drainage. Another issue with wildlife crossings is ensuring that the location is suitable for the greatest number of wildlife. Wildlife crossings would be beneficial if they were used to keep animals from train encounters. If BNSF selected a culvert snowshed design with backfill on the uphill side, wildlife crossings may be a less expensive option than steel and concrete design wildlife crossing options. The NPS would recommend that BNSF incorporate wildlife crossings into snowshed structures where possible, however, ultimately snowshed design in the right-of-way is dependent upon BNSF. Wildlife crossings for US Highway 2 are beyond the scope of this EIS.

### **Recreation and Visitor Experience**

The public has raised concerns about explosive noise, visitor safety, and restrictions on public use of the area. John F. Stevens Canyon, the Middle Fork of the Flathead River, Bear Creek, and Marias Pass are used for recreation during all seasons. The rivers and streams offer fishing, rafting and kayaking opportunities. There are 2 campgrounds in the area. Hiking and horseback riding take place on GNP lands. Hiking, horseback riding and biking take place on NFS roads and trails. During the winter months, backcountry skiers, and snowshoers use the GNP lands. Backcountry skiers, snowshoers and snowmobilers use NFS lands. Throughout the year, pullouts along Highway 2 are used for wildlife viewing by many visitors to the area. The Izaak Walton Inn, Glacier Park Ski Tours, and Big Mountain Resort provide commercial ski trips into GNP and NFS lands.

## Scenic Resources

The US Highway 2 corridor through the John F. Stevens Canyon is managed as part of the Northern Continental Divide Scenic Loop, administered by the USFS, MDT, and various state, federal, and tribal entities. The towering peaks on the north side of the highway and above the railroad are within GNP. Both sides of US Highway 2 are surrounded by steep mountainous terrain that significantly contributes to the scenic beauty of the area. Explosive avalanche hazard reduction, particularly the use of military artillery (105 howitzers), could damage or destroy park features such as rock outcroppings and vegetation visible from the corridor. Construction of new snowsheds and lengthening of existing snowsheds would change the scenic views from the highway as well as change passenger's views from the train as they travel through the area. In some locations, views into the park could be affected by the presence of snowsheds.

## Fire Suppression Zones in John F. Stevens Canyon

BNSF has expressed concern that if a large-scale forest fire occurred in John F. Stevens Canyon, the railroad would be subject to elevated avalanche hazard. Vegetation acts as an anchor for snowpack on steep slopes. If fire removes vegetation, avalanche risk could increase in paths without snowsheds where previously there was little avalanche danger. Fires during 1910 increased avalanche hazard greatly and BNSF built the first snowsheds in response to avalanche risk in Burn Out, Shed 5, Shed 6, Shed 7, Shed 8, Shed 9, Shed 10, Shed 10.7, and Shed 11 paths.

Few fires have occurred in the project area in recent decades. Those that have occurred were caused by trains and started along the railroad tracks. They burned relatively small areas, approximately 82 total acres since 1970. Larger fires have occurred in the Middle Fork drainage in recent years including the Rampage fire in 2003 (21,630 acres) and the Crystal Creek fire of 1984 (3,104 acres) but these were located several miles to the northwest of the project area.

The project area lies within Fire Management Unit B as described in the *Interagency Fire Management Plan* (USDA and USDOJ 2005), which represents a variety of resource values and uses, and is applied to remote locations as well as wildland/urban interface. Lands in this unit are generally those that historically have seen the most intensive access development and land and resource management activity. Approved management actions include wildland fire use and suppression of unwanted fires. Management of the latter strategy may employ the full spectrum of suppression responses from surveillance to aggressive tactical actions, depending on land management objectives and other criteria specific to the location and circumstance of the ignition.

Wildland fire use is the management of natural fire for resource benefit. Wildland fire use would be used in the Park only under limited conditions because of the elevated threat to developed areas in the canyon. The canyon is designated as a suppression zone on NFS lands and wildland fire use is not an option in the project area. Wildland fire use is limited for the project area in GNP as the prescriptions may pose a threat to development adjacent to the park.

Current wildland fire operations on Park and Forest land within the project area primarily involve fire suppression. Fire suppression would allow vegetation to remain as anchors within avalanche paths. While tree and vegetation growth are anchors for snow within the

avalanche paths, it is important to note that natural avalanche processes frequently remove vegetative anchors. Fire policy is discussed in this section as it was raised during scoping. Wildland fire policy for both the Forest and the Park is beyond the scope of this document.

## **Socioeconomics**

BNSF has expressed concern about the economic ramifications of railroad traffic delays during the time periods of high avalanche risk. These delays could last hours or days depending on weather conditions. When the railroad is delayed, trains must wait until the avalanche hazard abates or they may be rerouted. These delays cause train congestion along the rest of the railroad until the line reopens. Closures affect the whole railroad transportation system between Seattle and Chicago. Railroad delays during all seasons of the year occur occasionally due to maintenance operations, derailments, or natural hazards. According to BNSF, time sensitive product deliveries such as chlorine for Seattle's water supply are affected by closures. The cost of snowshed construction and track delays during the construction period are a concern for BNSF. The cost of an avalanche caused derailment and subsequent cleanup is a BNSF economic concern. Train and highway closures and delays resulting from explosive avalanche reduction would have costs for the BNSF. Costs from temporary delays would result from snowshed construction on the railroad.

## **ISSUES DISMISSED FROM FURTHER ANALYSIS**

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The following issues were determined to be unaffected or negligibly affected by the proposed alternatives. They will not be discussed further in this document.

### **Threat to Traffic on US Highway 2 from Naturally Occurring Avalanche Activity**

BNSF has expressed concern about the safety of the traveling public on US Highway 2 from avalanches. They feel that an avalanche hazard reduction program would also result in protection of highway travelers and have stated that snowsheds do not protect the highway and may in some cases increase the risk from avalanches. According to MDT there are sufficient operation controls in place during periods of high avalanche danger to protect the traveling public. When avalanche danger is high, MDT closes the highway. The amount of traffic along the highway is very different from that on the railroad. MDT has not requested explosive use for avalanche hazard reduction on public lands surrounding the highway corridor. The AHI analysis conducted for the railroad does not apply to US Highway 2. An AHI analysis was not conducted by MDT because during times of high avalanche activity, the Highway closes. An AHI was calculated for the railroad because they needed to understand the risk level in order to justify expenditure of funds to protect the train traffic, equipment, passengers and employees. While experts in the field do not always agree, it is the opinion of two avalanche experts consulted by the National Park Service that the presence of snowsheds does not increase the risk to the highway from avalanches. The highway remains in the run out zone of avalanche paths whether a snowshed is present or not.

### **Explosive Avalanche Mitigation in Other National Parks and National Forests**

The use of explosives in other NPS areas for avalanche hazard reduction was an issue raised during the public scoping period. The use of explosives in other National Park Service areas is beyond the scope of this EIS. Questions have been raised concerning why Glacier has prepared an EIS under the National Environmental Policy Act (NEPA) while other parks

have not undergone an extensive NEPA analysis. NPS permitting of the BNSF explosive use request is a controversial action with extensive resource impacts and must be analyzed as a federal action under NEPA. The other national parks that have used explosives for avalanche hazard mitigation are: Yellowstone National Park, Wyoming; Yosemite National Park, California; and Mount Rainier National Park, Washington. Washington Department of Transportation does use artillery for avalanche control on Forest Service lands along the Washington Pass section of State Route 20 (North Cascades Highway), near North Cascades National Park, however, they do not conduct explosive avalanche control within the park (Pers. Comm. Mike Stanford, Washington Department of Transportation April 3, 2006).

Yellowstone National Park staff uses explosives on Sylvan Pass on the East Entrance Road for public and employee winter travel safety. The program uses a fixed 105 mm howitzer and talus slopes are targeted for avalanche hazard mitigation. The operations staff has to travel through the avalanche hazard area to reach the gun. Helicopter explosive delivery took place in March of 2005 (Billings Gazette, December 15, 2005). According to park personnel, there is currently no Record of Decision or Finding of No Significant Impact document for this federal action. The Billings Gazette (March 19, 1999) reported an incident where a visitor found an unexploded (dud) explosive shell on Sylvan Pass. Since that incident, there have been several attempts to find and remove unexploded ordnance from Sylvan Pass.

Yosemite uses explosives to reduce the avalanche hazard on the Tioga Pass road for spring opening. This program uses hand charges, ammonium nitrate and fuel oil (ANFO) mixture, and detonating cords to clear snow and cornices above the roadway. These methods have been employed since the 1970s. Other snow removal methods used include, black charcoal spread over hazardous snowpack to melt snow quickly and saturating snowpack areas with water to melt snow quickly. According to park personnel, Yosemite is currently preparing to initiate environmental compliance in accordance with NEPA on this road opening program (Pers. Comm. Tim Ludington, Yosemite National Park, January 30, 2006).

Washington Department of Transportation routinely uses a variety of forecasting and hazard reduction methods within the boundaries of Mount Rainier National Park, for stability testing and control work adjacent to State Route 123 and State Route 410. The primary tools are non-explosive (ski cuts, snow casting, etc). The last time explosives were used in these areas was in 1999 when snow pack in Washington reached record depths. Park management is currently investigating a full range of avalanche hazard reduction options such as forecasting and road closures, including the possible use of explosives for avalanche hazard reduction during the spring opening of park roads. Park planning and management staff are beginning to assess a wide range of options, scope associated impacts, and evaluate likely NEPA pathways, in the event that an action becomes necessary. Because the area is in designated wilderness, this scoping is taking place within a minimum tool requirement perspective. (Pers. Comm. Pat Iolavera, Mount Rainier National Park, April 19, 2006).

Most ski area and highway corridor avalanche control operations are conducted on National Forest System lands under special use permit. Permitted blasting at ski areas is conditioned under individual area safety and operating plans with accompanying NEPA compliance. Actual avalanche blasting procedures and explosives storage are accomplished under guidelines issued by the National Ski Area Association and regulated by the Bureau of Alcohol, Tobacco and Firearms (ATF) and state regulators. Highway corridor avalanche blasting on Forest Service lands is accomplished under guidelines and procedures developed by state departments of transportation.

The explosive delivery method has become a controversial topic due to high dud rates and safety concerns with artillery use for avalanche hazard reduction on Sylvan Pass in Yellowstone National Park. There is a public perception that military artillery does not belong in a national park, based on the high number of scoping comments concerning the use of military artillery. Ammunition discharged by artillery leaves shrapnel in starting zones and occasionally unexploded ordnance and impact craters in the target area. Military artillery for avalanche hazard reduction programs is under the control of the Department of Defense. While the Department of Defense has supported the use of artillery for avalanche programs for the past 60 years, the programs are currently under scrutiny due to safety concerns. On March 23, 2005, a Utah Department of Transportation avalanche control operation resulted in an overshoot of a 105 mm Howitzer charge in Provo Canyon. The required removal of two black powder bags from the ammunition did not occur. The extra powder bags resulted in an overshoot and the ammunition traveled 5.84 miles, landing in a residential backyard of a Pleasant Grove, Utah subdivision (AAUNAC meeting notes 2005). The Department of Defense has taken this incident very seriously and artillery programs in the United States have been warned that another serious safety incident would lead to the end of the program (Pers. Comm. Doug Abromeit, National Avalanche Center, April 17, 2006).

### **Use of Avalanche Hazard Mitigation on Other Railroads**

The Central Pacific Railroad constructed snowsheds at Donner Pass, California on the Tahoe National Forest. The Canadian Pacific Railroad and BNSF have built tunnels to reduce avalanche hazard crossing at Rogers Pass, British Columbia and Stevens Pass, Washington, respectively. The Alaskan Railroad uses a 105 mm recoilless rifle, a 105 mm howitzer, and blaster boxes for explosive avalanche hazard mitigation on its Anchorage to Seward track. The explosive work for the Alaskan Railroad takes place on Chugach National Forest lands. Each railroad situation is unique and requires a solution that fits the parameters surrounding the specific area. These avalanche hazard reduction methods have been considered or rejected during alternative development for this document.

### **Global and Regional Climate Change**

Questions were asked as to how global climate change may affect future avalanche conditions in this area. Specialists have researched global warming trends and their influence on regional and local weather patterns concerning future regional trends in the Crown of the Continent Ecosystem. While climatologists are unsure about the long-term results of global climate change, it is clear that the planet is experiencing a warming trend that will affect ocean currents, sea levels, sea ice at the poles, and weather patterns. The weather in John F. Stevens Canyon is strongly influenced by warm, moist Maritime weather patterns west of the Continental Divide and cold, dry Continental weather patterns east of the Divide. Snow water equivalents (SWE), the measure of the water content of snow, are similar to the Idaho/Western Montana region which has the highest snow moisture content of any region in the United States (Serreze et al. 1999). The Pacific Decadal Oscillation (PDO) strongly influences the snow water equivalent of the region in 20-30 year trends (Selkowitz et al. 2002); although, the avalanche climate in the canyon are classified as northern intermountain snow (Mock and Birkeland 2000). Average temperatures for December and January are -7°C (Reardon et al. 2004). While the canyon does have a combination of Maritime and Continental weather patterns, warm rain-on-snow (ROS) events follow large continental snow events, creating avalanche cycles when SWE rise (Reardon et al. 2004). Global climate

fluctuations may generate more frequent ROS events and avalanche cycles in the canyon; however, the amount of snow may be significantly lower than it has been historically, reducing the number of avalanches that reach the railroad tracks. It is difficult to determine the precise weather changes and results in John F. Stevens Canyon as there are many variables that are not fully understood and there may be variables not currently defined. Therefore, this analysis is based on past and current weather patterns and the effects of future global climate changes are not discussed.

## RELATIONSHIP OF THIS STUDY TO OTHER PLANS, PROGRAMS AND PROJECTS

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The following related plans programs and projects are either planned, have begun, or completed.

- **General Management Plan for Glacier National Park (NPS 1999).** This plan provides overall guidance and direction for the park and describes the geographic areas and management zones of the park. John F. Stevens Canyon lies within the Middle Fork Geographic Area and consists primarily of backcountry management zone. This zone consists of recommended wilderness and “will be managed to achieve a wild character and maintain natural processes”.
- **Flathead National Forest Land and Resource Management Plan.** The objective of this plan is to integrate a mix of management actions that allow for the use and protection of all forest resources, satisfy guiding legislation, and address public issues and concerns. The last approved plan was completed in 1986, though a revision is currently being prepared. The Forest Plan uses defined “management areas” to guide management of National Forest System lands. Each management area (MA) provides a unique combination of activities, practices, and uses. The John F. Stevens Area includes several MA’s. These MA’s and their emphasis are listed below:

**MA2C:** Provide for a variety of roaded natural appearing recreation opportunities

**MA5:** Maintain a pleasing, natural appearing landscape in which management activities, including timber management with roads do not dominate

**MA12:** Enhance riparian vegetative and wildlife diversity and maintain or enhance water quality and fisheries.

- **Going-to-the-Sun Road Rehabilitation.** The Record of Decision for the Going-to-the-Sun Road Rehabilitation Plan was signed in November 2003. It was determined that the project would have an adverse impact on Grizzly Bears. Traffic may increase along Highway 2 during the summer as construction creates delays along the Going-to-the-Sun Road.
- **Environmental Assessment for Improved Parking Facilities and Amenities for Horse Riders with Disabilities at Walton.** This is an approved project to construct a small, gravel parking area for horse trailers and overnight backcountry users along US Highway 2 at Walton. This is approximately four miles west of the project area on US Highway 2. No commencement date for this project has been determined.
- **BNSF Habitat Conservation Plan for Grizzly Bears.** BNSF is currently preparing an application for an Incidental Take Permit (ITP) that will include a Habitat

Conservation Plan (HCP), Implementation Agreement, and an Environmental Assessment. Avalanche hazard reduction was determined to be beyond the scope of the HCP according to the US Fish and Wildlife Service (pers. comm. Tim Bodurtha June 13, 2006) The incidental take of grizzly bears may result from the operation and maintenance of the railroad within the Middle Fork Flathead River corridor between Hungry Horse and Browning, Montana. The HCP and EA will clarify the activities in this area associated with the operation and maintenance of the railroad (not including avalanche hazard mitigation) which may affect grizzly bears; evaluate other factors contributing to human caused grizzly bear mortality in the corridor; evaluate alternative strategies to minimize the effects of railroad operations on grizzly bears; and, develop a management framework for grizzly bear conservation in the corridor that can be changed to respond to new data or information.

- **Proposed Rock Salvage Along US Highway 2 for Use on the Going-to-the-Sun Road.** Montana Department of Transportation (MDT) has determined that two sites (reference posts 155.5 and 166.6) along US Highway 2 present potentially unsafe rockfall conditions. The park has identified these areas as a potential source for rock for use on the Going-to-the-Sun Road rehabilitation. The two locations are on MDT right-of-way easements granted by the US Forest Service. Consultation, review and analysis are underway.
- **Interagency Fire Management Plan between the Flathead National Forest and Glacier National Park.** The plan is a cooperative management plan designed to maximize collaboration and result in better planning and response to fire activity in the area. It provides strategies that include suppressing unwanted wildland fires and expanding opportunities under a multi-year treatment schedule for increasing the use of prescribed fire to meet resource objectives and improve fuel reduction treatments that would enhance defensibility around structures.
- **Exotic Vegetation Management Plan for Glacier National Park.** This plan guides the park's management of invasive exotic plant populations. It includes inventory, treatment, monitoring, and education strategies. This plan was originally completed in 1991 and is currently being updated.
- **Glacier National Park Policy for Administrative Flights as described in the Aviation Management Plan (2004).** The use of aircraft in GNP is generally limited to activities involving fire, health and safety, search and rescue, (which are considered emergencies) critical research, and/or to gain access to areas of the park permanently or temporarily inaccessible by other means to accomplish administrative goals or objectives. Administrative flights are subject to analysis before approval to determine if there is any other way to perform the required work. If the flight is shown to be necessary it is permitted under specific conditions to reduce impacts on park users and park resources by utilizing the least obtrusive and impacting schedules, flight routes, altitudes, and by adhering to other prescriptions as may be appropriate. Emergency flights are not required to go through the same level of analysis. Helicopter flights for explosive delivery to achieve avalanche hazard reduction during a defined avalanche cycle would be considered an emergency action.
- **Yule Creek Avalanche Services requested an explosive use special use permit during the winter of 1990-91 for the Raggeds Wilderness Area on the White River**

**National Forest in Colorado.** The purpose of the explosive use request was to protect an access road into a marble quarry from avalanches. The USFS Sopris Ranger District denied the request citing Wilderness Bill legislation and the Congressional intent that Wilderness remains free of manipulation. Temporary snow stake placement adjacent to avalanche paths was permitted in designated Wilderness and a weather data collection station was permitted outside of wilderness area start zones. A forecasting and road closure program was instituted by Yule Creek Avalanche Services and the program was successful in preventing avalanche related injury or death for 7 years on the 4-mile length of road. The program ended after the winter of 1997-98 when the quarry ceased operations (Pers. Comm. Don Bachman, Retired Snow Safety Consultant, January 3, 2006/ March 10, 2006).

- **The Twin Peaks Wilderness area was legislated in the Utah Wilderness Act of 1984 (Public Law 98-428).** This wilderness area is located adjacent to an area of extensive explosive avalanche mitigation in Little Cottonwood Canyon. Avalanche control in the area was grandfathered into the wilderness legislative history for this area as it was an existing activity prior to wilderness designation. (**Public Law 98-428** Legislative History).
- ***Avalanche Risk Analysis John F. Stevens Canyon Essex, Montana.*** Dave Hamre and Mike Overcast of Chugach Adventure Guides, under contract with BNSF, determined current avalanche hazard indices for the operations area in the 2004 document *Avalanche Risk Analysis John F. Stevens Canyon Essex, Montana* (Appendix A). Chugach Adventure Guides, a private company, would most likely provide avalanche hazard reduction services in the future under contract with BNSF. The document *Avalanche Risk Analysis, John F. Stevens Canyon* (Appendix A) examines the avalanche hazard index (AHI) of each avalanche path as a function of avalanche frequency, avalanche magnitude, equipment cost, traffic numbers, and human exposure. The AHI evaluation for each path is listed in Table 3-1. This report analyzes the residual hazard of different avalanche reduction alternatives. The document incorporates some of the alternatives that are analyzed in the risk analysis. The Affected Environment section in Chapter 3 summarizes the findings of the report and the full report can be found in Appendix B of this document.
- **Previous Emergency Special Use Permits Issued to BNSF.** While a special use permit was requested by BNSF and issued by Glacier National Park during the 2004 avalanche cycle, explosive use was not implemented. BNSF requested another emergency special use permit for explosive use on February 23, 2006. The Park issued a three-day emergency permit on February 24, 2006. The explosive use occurred February 25, 2006. Train traffic was stopped and a helicopter was used to drop ten cast primer charges on four avalanche paths (Path 1163, Infinity, Shed 8 and Shed 7). The first charge was a dud and was recovered the following day. The remaining nine explosives started two small avalanches in Path 1163 and a larger slide in Shed 8 path. Infinity and Shed 7 did not slide. The following week, a warm weather cycle with rain, caused avalanches in several paths including the paths where explosives were used.

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