

Final
General Management Plan and
Environmental Impact Statement
Volume I

GLACIER NATIONAL PARK

A Portion of Waterton-Glacier International Peace Park
Flathead and Glacier Counties, Montana

ABSTRACT

This *Final General Management Plan and Environmental Impact Statement* is intended to guide the management of Glacier National Park for the next 20 or more years. Because Glacier is such a special place — a national park, the world's first international peace park, a world heritage site, and a biosphere reserve — it is important to plan carefully for its future. After a long planning process that included a great deal of public involvement, an overall guiding management philosophy has been developed: Glacier National Park would be managed in such a way that it would retain its classic western national park character. Visitor use and resource protection decisions would perpetuate this tradition. Large portions of the park would be managed for their wild character and for the integrity of Glacier's unique natural and cultural heritage, while traditional visitor services and facilities would remain. Visitors would be able to enjoy the park from many vantage points. Visitor use would be managed to preserve resources, but a broad range of opportunities would be provided for people to experience, understand, study, and enjoy the park.

With this overall philosophy in mind, a management strategy has been developed that would guide current and future management decisions. Geographic areas and management zones, which are described in detail in this document, provide the foundation for this strategy. Six geographic areas, each with its own management philosophy, are described. The description includes management zones for each area in which various levels of development and types of activities would be permitted. The plan focuses on eight critical issues and alternatives for addressing those issues. Preferred alternatives and a rationale for their selection are included. An array of information about the park resources that could be affected by the various alternatives is included, as is an analysis of the possible impacts (both positive and negative) of the alternatives.

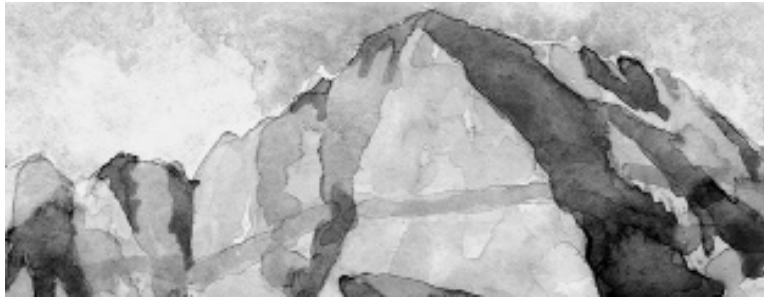
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Summary



Glacier National Park, which is part of Waterton-Glacier International Peace Park, and a unit of the national park system, sits at the apex of the three oceans that bound the North American continent (a triple divide) in northwestern Montana and encompasses 1,013,572 acres of breathtaking mountain scenery. Its jagged peaks and crystalline lakes are remnants of extensive glaciation in the last ice age, and nearly 40 glaciers still remain in the park. Glacier's high country is accessible to visitors who drive the spectacular Going-to-the-Sun Road from early summer through the fall. The road winds 52 miles up and over the divide through Logan Pass. Each year the park attracts almost 2 million visitors to northwestern Montana, which (it is said) generates over \$1 million each day to the local economy during the summer.

Glacier includes expanses of wild land that are accessible only by foot or horseback. The park functions as a relatively undisturbed core of a large ecosystem that supports a tremendous variety of plants and animals. Glacier is one of the few places in the world where all the original native predators and most of their prey survive in the wild. The federally listed endangered gray wolf (*Canis lupus*) and threatened grizzly bear (*Ursus arctos*), bald eagle (*Haliaeetus leucocephalus*), and bull trout (*Salvelinus confluentus*) live in the park.

Glacier has become an increasingly popular destination for visitors with a wide range of abilities and expectations. Visitors are able to enjoy the park in their own vehicles and drive the famous Going-to-the-Sun Road or other scenic roads. They can choose such recreational activities as horseback riding, canoeing, fishing, or commercial boat tours and can stay in historic hotels or campgrounds. Visitors hike on the 735 miles of trails into the backcountry where primitive sites are available for overnight camping.

Conditions have changed significantly in Glacier over the years, and new challenges face the park. Glacier's most recent *Master Plan* was approved in 1977. For the first time in over two decades, the public has had an opportunity to review and comment on a new *Draft General Management Plan* that included a comprehensive management strategy for Glacier National Park. The Plan also addressed eight critical issues facing the park. There has been a great deal of public interest in the preparation of this plan, and public comments have been influential in the development of this final plan. Ongoing cooperation with park neighbors has been emphasized. During the planning process, people who wrote, called, or attended public meetings to comment on the management of Glacier National Park said that park managers should do the following:

- Continue current access and visitor uses.
- Manage the park to protect resources while allowing visitor use.
- Continue to manage the park's backcountry as wilderness.
- Preserve wildlife habitat.
- Coordinate management with owners of adjacent property to protect resources and emphasize the retention of facilities in the park.

The following issues are addressed by the alternatives in this plan:

- visitor use of the Going-to-the-Sun Road
- preservation of the Going-to-the-Sun Road
- preservation of the historic hotels and visitor services
- scenic air tours
- personal watercraft
- winter use
- Divide Creek flood hazard
- west side discovery center and museum

Public comments on the *Draft General Management Plan* generally were very supportive of the management framework and preferred alternatives for each of the eight critical issues. Fourteen public open houses and 12 public hearings were held in September and October 1998 throughout Montana and in Denver, Seattle, St. Paul, Spokane and Canada. Comments were accepted until November 30, 1998. A total of 2,709 comments were received in the form of letters from individuals, testimony, form letters, and petitions. There was overwhelming public support for banning scenic air tours and personal watercraft from Glacier National Park. However, concerns and questions were raised about the preferred alternatives for both preservation of and visitor use on the Going-to-the Sun Road. Changes to the preferred alternatives for these two issues have been made.

The public also raised concerns about the relationship of management zoning to the proposed wilderness lands in Glacier. There was also concern about winter use and about constructing a west side discovery center and museum inside the park. Minor changes have been made in the plan to better explain the National Park Service's reasons and rationales. Some commenters also expressed a concern that the plan merely provides for additional development in the park and does not focus on preserving the resources. In response to this, some changes have been made in this final plan to address these concerns.

This *Final General Management Plan and Environmental Impact Statement* is intended to guide management of Glacier National Park for the next 20 or more years. It will serve managers in resolving new issues, as well as those addressed in this plan.

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Introduction



Glacier National Park is a legacy to the American people and to the world. It allows rare glimpses of the natural world and holds superb examples of western cultural history.

This park means different things to different people. For some, its importance is based in its nearly intact complement of native plants and animals. For others, it is a reminder of the human story, beginning before written record and continuing through this country's westward expansion. People have stood for thousands of years beneath these peaks; many nations include them in their cultural legacy. American Indians still revere the mountains that are the spiritual backbone of their world.

Glacier National Park exemplified the value of wilderness long before wilderness became rare. As visitors hike its rugged trails and sleep in its grand lodges and backcountry chalets, they gain more than memories — they take away a dramatic appreciation of the wild, a reverence for its beauty, and a sense of peace in time. Glacier, along with Waterton Lakes National Park, is part of the world's heritage and an example for those who strive to preserve and enjoy the world's special places. Visitors from many nations can learn how special this place is, and in so doing, they may be able to take some small measure of peace away with them. People from places torn by strife can be inspired by this place where two countries, sharing the world's longest undefended boundary, chose to celebrate peace and goodwill.

Glacier National Park is at the apex of three oceans (a triple divide) in northwestern Montana and encompasses 1,013,572.42 acres of breathtaking mountain scenery (see the Vicinity map). Its sculptured peaks and crystalline lakes are remnants of the extensive glaciation of the last ice age, and nearly 40 active glaciers remain in the park. Glacier's high country is accessible in the summer to visitors who drive the spectacular Going-to-the-Sun Road. The road winds 52 miles up and over the Continental Divide across Logan Pass. The unsurpassed scenery of Glacier National Park attracts almost 2 million visitors each year to northwestern Montana and, it is said, generates over \$1 million a day to the local economy during the summer.

Glacier National Park is an investment in the heritage of America. Our primary mission is the preservation of world class natural and cultural resources, allowing us to ensure that current and future generations have the opportunity to experience, enjoy, and understand the legacy of Waterton-Glacier International Peace Park.

*Glacier National Park
Government Performance and
Results Act Mission Statement*



THE NATIONAL PARK SERVICE

“ . . . purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations. . . .” (16 USC 1; 1916)

“ . . . these areas, though distinct in character, are united through their inter-related purposes and resources into one national park system as cumulative expressions of a single national heritage; that, individually and collectively, these areas derive increased national dignity and recognition of their superb environmental quality through their inclusion jointly with each other in one national park system preserved and managed for the benefit and inspiration of all the people of the United States” (16 USC 1a-1; 1970)

“The authorization of activities shall be construed and the protection, management, and administration of these areas shall be conducted in light of the high value and integrity of the National Park System and shall not be exercised in derogation of the values and purposes for which these various areas have been established, except as may have been or shall be directly and specifically provided by Congress.” (16 USC 1a-1; 1978)

Glacier includes large expanses of wild land accessible only by foot or horseback and functions as a relatively undisturbed core of a large ecosystem. It supports an extraordinary variety of plants and animals. Arctic, Great Basin, Great Plains, Rocky Mountain, and Pacific Northwest vegetation are all found in the park. On the east side, grasslands dominate lower mountain slopes, and valleys throughout the rest of the park are forested with pine, fir, larch, and cedar. An exquisite array of wildflowers greets summer visitors to the high country, where alpine vegetation eventually gives way to rock and icefields on peaks rising to nearly 10,500 feet.

Visitors are likely to see a variety of wildlife, including deer, elk, moose, and a variety of birds. Lucky viewers may sight grizzly or black bears, gray wolves, and mountain lions, for Glacier is one of the few places in the world where all native predators from the time of the park’s establishment and most of their historic prey survive in the wild. Some of these species are federally listed as endangered (gray wolf and peregrine falcon) or threatened (grizzly bear, bald eagle, and bull trout).

Glacier has become an increasingly popular destination for people with a wide range of abilities and expectations. The Blackfeet and Salish-Kootenai tribes first used Glacier for hunting and gathering and for religious and spiritual ceremonies. The tribes still consider Glacier to be a spiritual place. It first attracted visitors in the 19th century, and in the early 20th century several grand hotels and high country chalets and other facilities were built. Many of these are now historic structures and still function as accommodations, along with many campgrounds that were constructed later. Visitors to Glacier may enjoy the park in their own vehicles and drive the famous Going-to-the-Sun Road or other scenic roads. They may choose among such activities as snowshoeing, cross-country skiing, horseback riding, canoeing, fishing, or commercial boat or vehicle tours. Visitors may hike on 735 miles of trails throughout the park, where primitive campsites are available.

WHY A GENERAL MANAGEMENT PLAN MUST BE PREPARED

Conditions have Changed Significantly

Although the rise in visitation has slowed recently, the trend since the 1977 *Master Plan* was written has been toward increased visitation, which could affect the quality of visitor experiences and the ability to preserve park resources. Scientific research and operational experience in the park have increased what is known about the natural and cultural resources and visitor use. More and more, Glacier is seen as part of a broader and more complicated ecosystem. Land uses adjacent to the park boundary have changed in the last two decades, and a cooperative spirit is necessary for managing shared resources. A number of critical issues currently face the park that have not yet been addressed in a comprehensive, strategic manner.

An Updated Plan is Required

The National Parks and Recreation Act of 1978 (Public Law 95-625) requires that all units in the national park system have a current general management plan. Glacier's *Master Plan*, which was approved in 1977, is not in accordance with current NPS policy and has not been updated. This *Final General Management Plan and Environmental Impact Statement* provides the public with an opportunity to review and comment on a comprehensive management strategy for Glacier National Park.

After the *General Management Plan* becomes final, it will serve as a management "umbrella." Plans already prepared for specific areas will be reviewed to determine if they are consistent with the *General Management Plan*. If they are not, they will be revised.

PUBLIC INVOLVEMENT BEFORE THE RELEASE OF THE DRAFT PLAN AND EIS

Glacier National Park began seeking outside input (scoping) in March 1995 with both a letter to the public and a notice in the *Federal Register*, announcing that a new general management plan would be prepared. Initially, two newsletters went out to the public about the general management plan and nine open houses were held regionally. There were consultation meetings in accordance with section 106 of the National Historic Preservation Act. Consultation meetings were held with the Blackfeet Tribal Business Council, the Salish-Kootenai Tribal Council, and the Salish and Kootenai culture committees. Waterton Lakes National Park and the Flathead and Lewis and Clark National Forests (among others) also were consulted. Over 2,300 comments were received. Although a range of comments was included, the general tone of most of those first observations favored limited growth in the park and even removing facilities to enhance wilderness values. Some encouraged park management to move development out of the park and to

WHAT A GENERAL MANAGEMENT PLAN IS

The general management plan is the first phase of tiered planning and decision making in the park. Before specific management actions are taken, a site-specific examination and analysis of that action would be completed as required to comply with the National Environmental Policy Act and section 106 of the National Historic Preservation Act.

The general management plan provides the basis for future actions that would identify visitor carrying capacities of the park, which is required by law. The management area / management zone strategy outlines qualitatively the objectives for visitor use and resource conditions throughout the park. A future implementation strategy will outline resource and social indicators and quantitative standards for various management areas and zones to determine acceptable levels of use.

WHAT A GENERAL MANAGEMENT PLAN IS NOT

A general management plan is not a static document or cast in stone. Shifting politics, technologies, new scientific findings, human values, and economics may demand amendments or even new priorities.

A general management plan is not a guarantee of funding. The publication does not ensure that funding will be approved for park projects that result from management philosophies outlined in the plan. Actions identified will be implemented as funding and other park requirements allow.

The general management plan is not intended to be a highly detailed road map, complete unto itself, for each major issue or management zone. When a complex concern such as rehabilitating the Going-to-the-Sun Road is addressed in the future, regardless of the alternative eventually selected, sections of the road would be examined in detail and site-specific recommendations and plans would be made.

restrict the number of visitors to prevent overcrowding. Many stated that Glacier is a distinctive wild area that must be preserved.

Newsletter 3 was released in July 1996. Guided by the public sentiment expressed after the initial publications and open houses, this third document offered three preliminary draft alternatives for managing Glacier National Park. Twelve public meetings were held in Montana and Canada, all of which attracted many concerned local residents and considerable media attention. Most participants had not commented earlier but now were eager to offer their thoughts on the future of Glacier. Approximately 1,600 letters were received and comments were recorded at the public meetings. Most of the comments were generally quite different from what had been heard during scoping, and the majority disagreed with many of the ideas in *Newsletter 3*.

After the two initial rounds of public input and the controversy generated by *Newsletter 3*, park management has now heard from a broad spectrum of concerned citizens.

Public involvement is a welcome and desirable step in the National Environmental Policy Act process and is critical for addressing unforeseen issues, offering possible alternative solutions, and gauging general interest in management actions. However, public involvement is not a voting process and is not used for the election of popular actions or ideas. Policy, law, science, competing pressures, and numerous other factors enter into decision making for the complex future of Glacier National Park.

The *Draft General Management Plan and Environmental Impact Statement* and its accompanying managerial direction were far stronger and more discerning due to the in-depth feedback from the public, which included the following concerns:

Continue Current Access and Visitor Uses

An overwhelming majority of comments objected to the possibility of losing public access and visitor opportunities and strongly expressed a desire to keep the park “as it is”. Most people want visitor facilities to be retained, including the Going-to-the-Sun Road, the Logan Pass Visitor Center and parking lot, the grand hotels and other lodging, and campgrounds. The majority said they would like other traditional uses of Glacier National Park to continue, including boat tours, the horseback riding concession, and the red buses. Most respondents favored continuation or expansion of a shuttle system on the Going-to-the-Sun Road, while retaining private vehicle use.

Many people said they wished the park was less crowded and that the staff would do a better job of dispersing visitors without limiting use. Many expressed concern that reducing visitor opportunities would discourage travel to the area and would negatively impact the economy of northwest Montana.

Manage the Park to Protect Resources, While Allowing Visitor Use

Most who commented about natural and cultural resources asserted that the park's paramount priority should be to protect these invaluable assets and lessen the impact of visitation whenever possible. They went on to say that human use consistent with preserving these resources must continue, that people are now part of Glacier's ecosystem, and that habitat can be protected without keeping people out.

Continue to Manage the Park's Backcountry as a Wild Area

The majority of people commenting about wilderness asked that the park continue to manage the backcountry for these values and provide continuity with adjacent wild lands, including essential wildlife corridors.

Preserve Wildlife Habitat and Coordinate Management with Adjacent Landowners

Most respondents said they believe that wildlife is central to a true Glacier National Park experience and that habitat should be preserved. Those who commented about wildlife also stressed the need to minimize interactions between animals and people. Most of the commenters said they believed that Glacier National Park has a pivotal role in the region and that park staff should coordinate management with surrounding lands.

Emphasize the Retention of Facilities in the Park

Commenters said that removing facilities from inside the park and replacing them outside the park would result in a loss of a valued traditional visitor experience. The public generally did not favor moving facilities outside the park.

PUBLIC INVOLVEMENT AFTER RELEASE OF THE DRAFT PLAN AND EIS

The *Draft General Management Plan and Environmental Impact Statement* was released to the public in August 1998 for a 90-day review period that ended November 30, 1998. Public open houses were held in September 1998 in Montana at Kalispell, West Glacier, Missoula, Great Falls, Billings, Browning, and Helena. In addition, there were open houses in Alberta, Canada, at Waterton Townsite and Lethbridge. Combined open houses and hearings were held in Seattle and Spokane, Washington; St. Paul, Minnesota, and Denver, Colorado. There were public hearings in October in Great Falls, Kalispell, West Glacier, Helena, Bozeman, and Missoula, Montana and in Lethbridge, Alberta. Approximately 525 people attended the open houses and hearings. Approximately 117 persons testified at the hearings.

By the end of the comment period, Glacier National Park had received 2,709 written comments, including transcripts of the testimony from the hearings, comments made at the open houses, five petitions, and four different form letters. Each comment was numbered, and information from the letters was recorded.

This system helped NPS personnel analyze the comments and compose the responses. Every letter, transcribed testimony, and petition was read by many members of the park staff. We have responded to comments from over 700 of your letters in Volume 2 of this final document.

Most people who commented have been very supportive of the plan and the park's preferred alternatives. Most of the letters and comments received spoke well of the work that had been done after *Newsletter 3*. Many of you thanked us for listening to your concerns and changing the direction of the planning effort.

Specifically, most commenters supported the park's preferred alternatives to construct additional pullouts and to provide an improved transportation system on the Going-to-the-Sun Road. Most supported reconstructing the road in 4-6 years, despite the concerns raised before the release of the plan, and most supported preserving the historic hotels and visitor services. Commenters said Congress should be asked to fund the purchase and rehabilitation of the hotels, and that other funding alternatives should be explored, as well. The majority of commenters also overwhelmingly supported the park's preferred alternative to ban scenic air tours and personal watercraft from Glacier National Park. And most supported relocating the facilities from the St. Mary area.

On the other hand, most commenters were not in favor of constructing a new west side discovery center and museum inside the park and instead urged us to reconsider and place it outside the park. Most also urged the park to reconsider the winter use issue and to select the no-action alternative instead.

Specifically, the public expressed concern about four main subjects.

- Before the *Draft General Management Plan and Environmental Impact Statement* was released, U.S. Rep. Rick Hill held a field hearing to discuss the reconstruction of the Going-to-the-Sun Road, both the issue and alternatives. There was extensive discussion between Congressman Hill and Superintendent Dave Mihalic, Carol Jacoby of the Federal Highway Administration, and members of the public regarding the economic analysis that Bioeconomics had conducted for the National Park Service (under contract). Earlier in the spring, the area Chambers of Commerce had worked with the Institute for Tourism and Recreation Research of the University of Montana School of Forestry to conduct a separate economic analysis. That analysis, which was issued in June 1998, came to a similar conclusion to that earlier reached by Bioeconomics. Simply, the conclusion was that the longer the work would take, the worse would be the economic pain.

The analyses conducted by Bioeconomics and the University of Montana have continued to be doubted by many people, and a great deal of concern has been expressed about how this reconstruction might lead to closure of businesses and a decreased number of tourists coming to Montana. Because Congressman Hill redirected existing funding, Glacier National Park has agreed to conduct further study on this issue. The preferred alternative has

changed and is described below, as well as in more detail in the “Preservation of the Going-to-the-Sun Road” section of this document.

- Another concern that many people mentioned was a belief that the preferred alternatives simply meant a general move by the National Park Service (NPS) toward additional construction and development inside the park. Many commenters concluded this because of the park’s preferred alternatives for visitor use on the Going-to-the-Sun Road, preservation of hotels and visitor services, winter use, and the proposed zoning system, which formalized visitor service zones. Although this is not the park’s intent, a few changes have been made to the preferred alternatives for these critical issues.
- Many groups and individuals expressed fear of and disagreement with the new zoning system and how it relates to the proposed wilderness lands in the park. Changes have been made to the text to address these concerns.
- Most of the commenters on winter use urged the park to change its preference to alternative C, the no-action alternative. Many members of the public perceived the park’s preferred alternative to be simply inviting more winter use of the park. Although the preferred alternative has not changed; the discussion of this in the section “Winter Use: Alternative A” has been clarified to more clearly state that these are the actions that Glacier National Park would take if and when winter use increased. The preferred alternative also states that additional winter use would only be accommodated within the existing facilities and infrastructure. No new development would occur to accommodate increasing use. We continue to believe that it is more important for us to prepare for potential increases and plan how the park will respond, rather than wait and hope that use will not increase. Although we have no guarantee that winter use will increase, there is evidence to suggest that it is very likely.

The National Park Service received 1,513 postcards that resulted from a survey conducted by Glacier Park, Inc., which had sent the cards to visitors who had stayed at the company’s facilities in the park during July and August for the last two seasons. The postcards asked a series of questions about whether visitors wanted additional services provided at these facilities and if they supported taxpayer funding of the purchase and rehabilitation of the hotels or whether they supported exploring other alternatives for funding the rehabilitation. As the park began receiving the postcards, we discovered that many of these visitors had not seen the draft document and so were new to the process and this issue. Nevertheless, the comments were split about half and half supporting either taxpayer funding or other funding alternatives, including private investment, although slightly more were in favor of finding other funding alternatives. Most commenters on these cards also supported making basic improvements to the infrastructure

such as improving the heating system, soundproofing, access for visitors with disabilities, and insulation, as well as adding elevators and “windows that work” and eliminating bat infestations. A much smaller number supported creating family suites and larger bathrooms. Very few supported hostel accommodations, TV/VCR in the rooms, or swimming pools. Only a handful of comments were received that wanted health club facilities and computer access.

Members of the park staff read all the letters and the transcribed hearing testimony. All comments have been considered carefully in developing this *Final General Management Plan and Environmental Impact Statement*. The National Park Service greatly appreciates all the time and hard work that each of you has spent to help us develop a plan that will take Glacier into the year 2010 and beyond. We are encouraged by the debates and concern expressed by all of you during this monumental effort, and we hope that as we proceed with implementation all of you will continue to be involved and express your support as well as help us to address your concerns. In response to your comments and further consideration by the National Park Service of the critical issues facing the park, major changes have been made to the preferred alternatives for the following two critical issues.

Preservation of the Going-to-the-Sun Road.

The preferred alternative has been rewritten to reflect that the Going-to-the-Sun Road is deteriorating and in need of major repair and reconstruction, and that available funding is not enough to address the problem before the road would fail. However, further engineering and economic analysis would be done to identify the best way to accomplish this. An Advisory Commission would also be established to advise the Park Service on the best way to reconstruct the road.

Visitor Use on the Going-to-the Sun Road

The preferred alternative has been rewritten to address the need to prepare a comprehensive use plan for the Going-to-the-Sun Road. The plan would look at a variety of methods to deal with increasing use, ranging from replacing and or constructing additional pullouts and visitor opportunities, to exploring incentives for visitors to ride public transportation, to managing the number of visitors allowed on the road at any one time. Many people criticized the National Park Service for not considering placing visitor use limits on the road. However, the preferred alternative also continues to ensure that the road would remain open to private vehicles and that visitors would continue to have the option of choosing the way they might travel on the road.

RESPONSES TO SUBSTANTIVE COMMENTS

We have responded to substantive comments offered by the public during the 90-day comment period on the *Draft General Management Plan and Environmental Impact Statement*. Substantive comments, as defined by the National Environmental Policy Act, are those that question either the range of alternatives or the accuracy

of the information in the document. Comments are also considered substantive if they offer new alternatives and issues that were not addressed in the draft plan of if they correct misinformation.

Volume 2 of this *Final General Management Plan and Environmental Impact Statement* contains letters from federal agencies, elected officials, state agencies, local governments, and special interest groups. Time and expense prevent the printing of the approximately 700 substantive letters and testimony that were received. Therefore, volume 2 of this document contains a summary of substantive comments received from individuals with responses to the comments.

All the letters are available for public inspection at park headquarters.

Please note that although some of the letters and comments reproduced in this document are critical of the plan and do not indicate support for it, these letters do not represent the majority of the letters and comments we received. We want to thank all of you who responded with overall support for the plan and our preferred alternatives.

REVISION OF OTHER PLANS

After the *General Management Plan* becomes final, it will serve as a management “umbrella.” Plans already prepared for specific areas will be reviewed to determine if they are consistent with the *General Management Plan*. If they are not, they will have to be revised.

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Guiding Principles for Glacier National Park

The *Final General Management Plan and Environmental Impact Statement* (GMP/EIS) provides a management strategy for park staff to use to address issues and make decisions for the next 20 or more years. The management strategy includes the purpose, significance, and guiding principles for management of the park. This guidance is consistent with legislation that established Glacier National Park, National Park Service policies, and other laws and directives that form the basis for NPS decision making (see appendix A).

The *Final General Management Plan and Environmental Impact Statement* for Glacier National Park states the purposes of the park as outlined in the legislation that established it. Purpose statements clarify the reasons that Glacier National Park was established. Significance statements explain Glacier's importance relative to its natural and cultural heritage. Significance statements describe the park's distinctive qualities and place them in their regional national and international contexts.

GLACIER'S PURPOSE

- 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).
- Celebrate the ongoing 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

Significance statements explain Glacier's importance relative to its natural and cultural heritage. Significance statements describe the park's distinctive qualities and place them in their regional, national, and international contexts.

- Glacier's scenery dramatically illustrates an exceptionally long geologic history and the many geological processes associated with mountain building, and glaciation.
 - Glacier has the finest assemblage of ice age alpine glacial features in the contiguous 48 states, and it has relatively accessible, small-scale active glaciers.
 - Glacier provides an opportunity to see evidence of one of the largest and most visible overthrust faults in North America, exposing well-preserved Precambrian sedimentary rock formations.
 - Glacier is at an apex of the continent and one of the few places in the world that has a triple divide. Water flows to the Atlantic, Pacific, and Arctic Oceans.
- Glacier offers relatively accessible spectacular scenery and increasingly rare primitive wilderness experiences.
 - The Going-to-the-Sun Road, one of the most scenic roads in North America, is a national historic landmark.
 - Glacier offers a challenging primitive wilderness experience and opportunities to listen to natural sounds.
- 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.
 - Due to wide variations in elevation, climate, and soil, five distinct vegetation zones overlap in Glacier and have produced strikingly diverse habitats that sustain plant and animal populations, including threatened and endangered, rare, and sensitive species.
 - Glacier is one of the few places in the contiguous 48 states that continue to support natural populations of all indigenous carnivores and most of their prey species.
 - Glacier provides an outstanding opportunity for ecological management and research in one of the largest areas where natural processes predominate. As a result, the park has been designated as a biosphere reserve and Waterton-Glacier International Peace Park has been designated as a world heritage site.
- Glacier's cultural resources chronicle the history of human activities (prehistoric people, American Indians, early explorers, railroad development, and modern use and visitation) that show that people have long placed high value on the area's natural features.
 - American Indians had a strong spiritual connection with the area long before its designation as a national park. From prehistoric times to the present, American Indians have identified places in the area as important to their heritage.
 - The park's roads, chalets, and hotels symbolize early 20th century western park experiences. These historic structures are still in use today.
 - The majestic landscape has a spiritual value for all human beings — a place to nurture, replenish, and restore themselves.
- Waterton-Glacier is the world's first international peace park.
 - People of the world can be inspired by the cooperative management of natural and cultural resources that is shared by Canada and the United States.
 - Glacier National Park and Waterton Lakes National Park offer an opportunity for both countries to cooperate peacefully to resolve controversial natural resource issues that transcend international boundaries.

WATERTON-GLACIER INTERNATIONAL PEACE PARK

Glacier National Park and Waterton Lakes National Park together comprise the world's first international peace park. In 1932, largely through the work of the Rotary Clubs of Alberta and Montana Rotary International, the Canadian Parliament and the United States Congress designated Waterton Lakes and Glacier National Parks as units of Waterton-Glacier International Peace Park. The designation was established to foster the long relationship of peace and goodwill between Canada and the United States. The peace park today also illustrates the need for cooperation in a world of scarce but shared resources. It is a symbol of the peace shared by two great nations and serves as an example for other countries whose borders straddle the world's special wild places.

We support the efforts of Parks Canada and Alberta to educate visitors and residents about the values of the international peace park, the world heritage site, and the biosphere reserve program. Glacier will continue to cooperate in these initiatives where common goals are shared and will work to achieve them where possible within each country's laws and policies.

The two national parks, their international designations and recognition, and the magnificent natural and heritage resources shared by the peace park region offer an opportunity for the two countries to promote and encourage environmental stewardship as these resources become more prized and attractive to their citizens. By encouraging employees' and visitors' greater understanding of each country's national park mission and heritage values and the common purpose of both countries, the international peace park can be an example to all nations that share scarce natural resources or the heritage of humankind across their boundaries. And by doing so peacefully, Glacier and Waterton Lakes together can model behavior that may help secure for future generations the bounty and promise of the remaining wild places on earth to all peoples.

WORLD HERITAGE SITE

In 1995 the Waterton-Glacier International Peace Park was designated as a world heritage site by the Convention Concerning the Protection of the World Cultural and Natural Heritage, part of the United Nation's Educational, Scientific and Cultural Organization. Waterton-Glacier met all criteria established for natural area nominations, and its designation as a world heritage site recognizes Waterton-Glacier as an area of outstanding universal value to people throughout the world.

The designation of Waterton-Glacier provides greater protection for resources because Canada and the United States have agreed through the ratification of the World Heritage treaty to refrain from taking actions that might damage the values of the other country's world heritage site. They have also each agreed to take the measures necessary within their own laws to protect their own sites. Resource impacts that may become issues for both parks include management of endangered species and wildlife, natural fire management, mineral development, air quality, use of water resources, logging near the parks, and increasing levels of visitor use.

BIOSPHERE RESERVE

In 1976 Glacier National Park was designated as a biosphere reserve under the Man and Biosphere Programme of the United Nations Educational, Scientific, and Cultural Organization. The designation says, in part, that a reason for the park's biosphere reserve status is "to conserve for present and future human use the diversity and integrity of biotic communities and to safeguard the genetic diversity of species" and to "provide areas for ecological research, including baseline studies both within and adjacent to Glacier." This language lends greater depth and support to park themes of preservation, research, education, and human use. Waterton Lakes National Park was designated three years later. The two main tenets of the Man and Biosphere Programme are the preservation of the core natural values and encouraging a sustainable area economy that will protect those values. Glacier will continue to work and cooperate with park neighbors and owners of adjacent lands to carry out the tenets of these programs.

PROPOSED WILDERNESS

A wilderness study for Glacier was conducted, and findings were presented to Congress in 1974. Approximately 95 percent of the park is now identified as suitable for inclusion in the national wilderness preservation system (see Wilderness map). However, Congress has not formally designated any land in Glacier as wilderness. NPS policy requires that the proposed wilderness land in Glacier be managed as wilderness until such time as Congress either formally designates the land as wilderness or rejects the designation.

[Proposed wilderness areas] shall be administered for the use of the American people in such manner as will leave them unimpaired for future use and enjoyment as wilderness areas, so as to provide for the preservation of their wilderness character, and

. . . park visitors must accept wilderness largely on its own terms, without modern facilities provided for their comfort or convenience. Users must also accept certain risks, including possible dangers arising from wildlife, weather conditions, physical features, and other natural phenomena that are inherent in the various elements and conditions that comprise a wilderness experience and primitive methods of travel (NPS Management Policies 1988)

INTERPRETIVE, EDUCATIONAL, AND OUTREACH PROGRAMS

One goal of the National Park Service is to connect parks to people by offering the highest quality services possible. These programs and interpretive media for visitors and for local, national, and international communities provide understanding and support for preservation and facilitates thoughtful, safe, and minimal-impact use of the park and, when successful, develop public understanding of and support for the park's significant cultural, natural, and recreational values.

The interpretive message is conveyed through walks, talks, hikes, campfire programs, visitor centers, wayside exhibits, and brochures. The media and the Internet are also used. As new communication technology becomes available, it will be developed for use in educating the public.

None of this can be accomplished without the help of others. Educational partners include Waterton Lakes National Park, Glacier Natural History Association, Crown of the Continent Environmental Education Consortium, the U.S. Forest Service, local school districts, colleges and universities, the tourism industry, chambers of commerce, civic groups, clubs, and organizations. There is an ongoing formal relationship between Glacier National Park and the Glacier Institute, which is a private, nonprofit educational organization based in Kalispell, Montana.

PRESERVATION OF NATURAL RESOURCES

Glacier National Park was set aside in 1910 largely because of its scenic, wild ruggedness and intrinsic natural values. We now better understand the significance of the park in the context of a “world class” ecosystem and the role this ecosystem plays in attracting visitors to the park and providing enjoyment and understanding of natural processes. Some specific natural resource concerns are identified in this document (personal watercraft, scenic air tours). Overall natural resource strategies are addressed to varying degrees under “Critical Issues and Alternatives” and “General Philosophy for Managing Glacier.”

Additional plans (such as the *Resource Management Plan* (NPS 1993b), regulations, and laws exist to direct and guide the management of natural resources throughout the park; therefore, they are not specifically addressed in this *General Management Plan*. Nationally and at Glacier, the need for professional management of resources has been identified. In addition to servicewide efforts, this deficiency is the subject of a separate and encompassing efforts to develop a parkwide staffing plan. Appendix G contains a GMP staffing plan that includes at least six natural resource positions.

Natural resources are managed in accordance with NPS policy “to understand natural processes and human-induced effects; mitigate potential and realized effects; monitor ongoing and future trends; protect existing natural organisms, species populations, communities, systems, and processes; and interpret these organisms, systems, and processes to the park visitor” (NPS 1991g). Natural resource management programs will be conducted in a cooperative spirit with other agencies and landowners and will include inventory and research, mitigation, monitoring, and protection (see Wildlife Considerations map).

PRESERVATION OF CULTURAL RESOURCES

Glacier National Park is the steward of many of America’s most important cultural resources. In accordance with the Organic Act of 1916, which established the National Park Service, the agency, and subsequently the staff of Glacier National

Park, are charged to preserve the park's cultural resources unimpaired for the enjoyment of present and future generations. If these resources are degraded or lost, so is part of the essence of Glacier National Park.

Cultural resources are managed in accordance with NPS guidelines by conducting research, planning, and stewardship. Research identifies, evaluates, documents, registers, and establishes other basic information about cultural resources. Planning ensures that this information is well integrated into management processes for making decisions and setting priorities. Stewardship is carried out by planning decisions, ensuring that resources including museum collections are preserved, protected, and interpreted to the public.

AMERICAN INDIAN RELATIONS

Glacier, like many national parks, was recognized as a special place long before it was formally designated as part of the natural heritage of the United States. The park has many prehistoric sites, some dating to 2,000 years ago. Glacier has long served the hunting, gathering, and spiritual needs of native people. More recently, the Salish, Kootenai, and Pikuni (Blackfeet) people, among others, used the park for their livelihood and to fulfill spiritual needs. The mountain passes provided travel corridors to the Great Plains for seasonal buffalo hunts for people west of the Continental Divide and as trade routes for people east of the divide.

American Indians revere Glacier and did so long before contact with European people. The park is filled with sites that are sacred to nearby tribes. Chief Mountain, a spectacular geologic feature, has long been a spiritual focus for the Plains tribes. The Two Medicine Valley takes its name from two medicine lodges that once were erected there. The Kootenai and Salish tribes still have sacred sites in Glacier National Park.

The first formal treaties between these tribes and the United States were in 1855. While these treaties had many purposes, they resulted in the cession of land to the United States and the reservation of land for the tribes.

The U.S. government approached the Blackfeet in 1895 with an offer to purchase a portion of their reservation just east of the Continental Divide. What is known today as the "ceded strip" comprises the eastern half of the park and the Badger-Two Medicine portion of Lewis and Clark National Forest. Along with the land cession, the Blackfeet reserved the right of entry, fishing and hunting (under Montana law), and the cutting of timber. With the establishment of Glacier National Park, most of these rights ended, although some do not agree with this interpretation. Regardless, tribal members still consider this to be a special place. The Department of the Interior reopened treaty negotiations with the Blackfeet in 1999. The right of free entry has been agreed upon for Blackfeet as well as Kootenai and Salish tribal members.

Some of the land reserved in 1855 remains as reservations today. Native sovereignty is recognized on that land. The Department of the Interior has a special trust relationship with these "dependent domestic nations," which is grounded in a long history in law. National park policies govern how the park and the National

Park Service relate to and deal with Indian tribes. For example, consultation with tribal governments on actions of mutual concern, the various historic preservation policies, the repatriation of funerary objects and human remains, and access for practice of American Indian religions are well established, as are other laws and policies in working with tribal governments. The *General Management Plan* must comply with these laws and policies.

The National Park Service appreciates the significant cultural and historical ties that the Salish-Kootenai and Blackfeet have to the area. The park staff appreciates the emotional kinship that these tribes feel for the area. Through the *General Management Plan*, the park will continue to work to enhance its relationship with the three tribes. The park's social, economic, and religious character to American Indians is a park value, and park management will continue to honor it. The obligations of the treaties of the past as well as the congressional acts establishing Glacier, the National Park Service, and the international peace park will continue to protect and respect the traditional tribal and heritage values of the park.

Park management will continue to work with the Confederated Salish and Kootenai Tribes to protect traditional values. Where contemporary goals are mutual, an effort will be made to use the authorities granted the tribes under their self-governance status. The park will continue to work with the Blackfeet Tribal Business Council to recognize tribal rights and to work toward the resolution of issues on which there has not been complete agreement. In addition, the park will continue to work proactively with tribal governments on economic development in cases where such activities will serve national park objectives and needs.

MANAGING IN AN ECOSYSTEM ENVIRONMENT

The resource goals at Glacier cannot be achieved without the cooperation of park neighbors, and the park staff must not forget that park actions have effects beyond park boundaries. The National Park Service is committed to cooperating with other governments and agencies, as well as with owners of adjacent property, to avoid adverse impacts on both park resources and visitor experience from adjacent land use activities.

FIRE MANAGEMENT

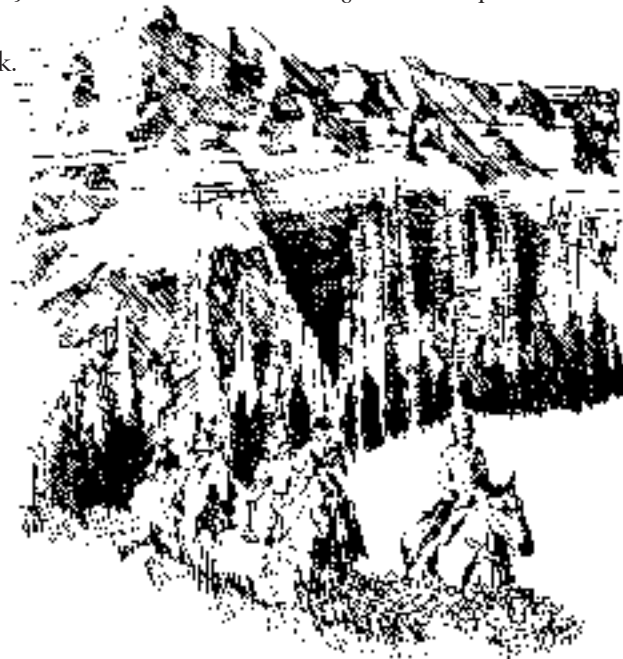
Throughout the 20th century, fire management policy has evolved in response to land and resource management needs, the growing knowledge of the natural role of fire, and the increased effectiveness of fire suppression. As knowledge, understanding, and experience expanded, it became increasingly obvious that complete fire exclusion did not support a balanced resource management program. Fires in Glacier National Park are managed to achieve a balance between suppression to protect life, property, and resources and fire use to achieve and maintain healthy ecosystems. Glacier uses the full range of appropriate fire management responses from aggressive suppression to management-ignited fires with very specific weather and fuels prescriptions to achieve goals and resource objectives.

Wildland and prescribed fires are means to an end. They represent planning and implementation actions carried out to facilitate protection and resource management objectives described in fire management plans. These objectives are a direct link to decisions and management goals stated in the *Resource Management Plan* and the *General Management Plan*. Human-caused fires will be managed through a suppression response derived from an analysis of the local situation, values to be protected, management objectives, and external concerns.

RESEARCH

An important goal of research in Glacier National Park is to provide a sound basis for management decisions. Glacier also provides a nearly pristine location for scientists to improve human understanding of physical, biological, and cultural resources. Whenever possible, sound research and science in Glacier should contribute to the general body of knowledge. The National Park Service places particular research emphasis on conserving biodiversity and genetic resources, on detecting ecosystem change, and on research that could be applicable to biosphere reserves in other regions of the world.

Research in the park must comply with NPS policy and should help achieve Glacier's scientific and resource management goals. It cannot harm park resources. In most instances research cannot be overly intrusive on wildlife or destructive to vegetation, it should not be easily visible to visitors, and it must not conflict with the goals of other park projects. Glacier's *Resource Management Plan* provides more detailed direction for research needs in the park.



General Philosophy for Managing Glacier

The overwhelming majority of the people who commented during the development of this *General Management Plan* have indicated that they would like to “keep Glacier the way it is.”

Put simply, Glacier National Park would be managed to retain its classic western national park character. This does not mean “frozen in time.” The park would retain its classic character within the context of changing resource, social, and economic conditions while continuing traditional visitor service, and facilities. A management strategy has been developed that would guide management decisions over the next two decades. This strategy recognizes the distinctive character of individual geographical areas in the park and the suitability of various zones in these areas to provide for a range of visitor experiences. For example, some areas of the park are better suited for intensive visitor uses (such as the Going-to-the-Sun Road corridor), while other areas are more suited to backcountry experiences (such as the Middle Fork).

Retaining the distinctive characteristics of individual areas is dynamic and must be managed within the context of changing resource, social, and economic conditions while traditional visitor services and facilities are continued in areas of the park that historically have supported those services and facilities.

The park has been divided into six well-known geographic areas, each with its own management philosophy: Many Glacier, Goat Haunt-Belly River, the Going-to-the-Sun Road corridor, Two Medicine, Middle Fork, and North Fork (see Geographic Area map).

The six geographic areas are each divided into four management zones: the visitor service zone, the day use zone, the rustic zone, and the backcountry zone. Each of the four management zones has a different set of desired resource conditions, visitor experiences, types of management activities, and development.

MANAGEMENT ZONES — GENERAL DESCRIPTIONS

These management zones and the following descriptions for each geographic area are common to all action alternatives.

The maps showing the zones are intended to be a conceptual representation of these zones and how they appear on the ground. A revised backcountry manage-

The overall guiding philosophy is to manage most of the park for its wild character and for the integrity of Glacier’s unique natural heritage, while traditional visitor services and facilities would remain. Visitors would be able to enjoy the park from many vantage points. Visitor use would be managed to preserve resources, but a broad range of opportunities would be provided for people to experience, understand, study, and enjoy the park. Cooperation with park neighbors would be emphasized in managing use and resources.

ment plan and a new comprehensive use plan for the Going-to-the-Sun Road would further delineate these zones and place them more specifically on the ground. Subzoning could be implemented in some cases. Measurable indicators would be selected to help the park determine if the desired resource and visitor experience conditions were being met. Standards would then be developed.

The following zone descriptions replace those described in the park's 1977 *Master Plan*. The new zone descriptions are in accordance with NPS management policies for managing proposed wilderness and with *Director's Order No. 2: Park Planning* orders for the National Park Service. The latter was formally adopted on May 27, 1998.

Visitor Service Zone

The **visitor service zone** would include developed areas, paved roads, and campgrounds with potable water and sanitation facilities. Natural resources would be managed to protect visitor health and safety, promote enjoyment of the setting, and mitigate the effects on surrounding areas. Natural resources along road corridors would be managed to allow safe travel and a high quality experience, recognizing that park roads bisect critical biological habitats and wildlife travel corridors. In this zone a range of services and facilities would continue to be provided to support the visitor's ability to experience the park. Visitors would find a social, relatively safe, comfortable atmosphere. The park would provide educational and interpretive opportunities. Lakes in the visitor service zone are characterized by having one or more of the following attributes: accessibility by paved roads, tour boats, formal docking facilities, no limits on motorboat horsepower, or impoundment structures. Lakes in this zone would be managed to tolerate a high level of use, including large tour boats and motorized craft. Most facilities would be fully accessible. Cultural resources would be managed to preserve historic districts, landmarks, and national register properties and the elements that contribute to their designations. Visitors could expect congested conditions.

Day Use Zone

The **day use zone** would include selected areas generally with specific destinations that visitors could reach easily within a day from visitor use zones. Natural resources would be managed to ensure a high degree of resource integrity, enhanced by the proper location and design of trails and facilities. Natural processes would be allowed to proceed unimpaired to the extent possible with relatively high levels of use. Resource degradation would not be allowed outside the trail corridor. Some parts of this zone would be in the park's proposed wilderness, where natural sounds predominate. Travel could be by boat, foot, or horseback. Trails could be developed for visitors with disabilities where appropriate, and the standards of trail maintenance would be high. Wider travel surfaces and tread improvements would accommodate a higher level of use and present a lower level of difficulty while protecting resources. Visitors could expect to meet more people

in this zone than in the backcountry. Lakes in the day use zone might have tour boats and launch facilities, and there would be limits on motorboat horsepower where motors were permitted. Docks would be provided on selected lakes. Conflicts between visitors and wildlife would be managed by exploring a range of strategies from education to closure; the goals are to protect wildlife and provide for visitor safety. Activities that would connect visitors to Glacier's values would be emphasized. Interpretive hikes and other educational interpretation would be encouraged. Concentrated use of trail corridors and destinations would be expected. Cultural resources would be preserved and protected.

Rustic Zone

The **rustic zone** would include primitive facilities and campgrounds representative of early western national park development and traditional visitor experiences in them. Modest impacts on natural resources would be tolerated, mostly near campgrounds and facilities. Travel along road corridors is intended to be slow; there would be only limited improvement to surfaces and corridors. This would enhance wildlife security, particularly in the North Fork, where roads are extensively used by many species. The facilities also serve as staging areas for use of the surrounding backcountry zone. While modest in scale, this zone would allow visitors to understand and appreciate the human and the natural histories of the park. Most facilities in this zone would be fully accessible. Visitors would experience a slow-paced atmosphere and less formal visitor programs. Natural quiet would predominate. Fewer visitors would be encountered than in the visitor service zone. Cultural resources would be managed to preserve historic values. Conflicts between visitors and wildlife would be managed by strategies ranging from relocation and aversive conditioning (causing wildlife to want to avoid an area) to closure. No concession facilities would be permitted.

Backcountry Zone

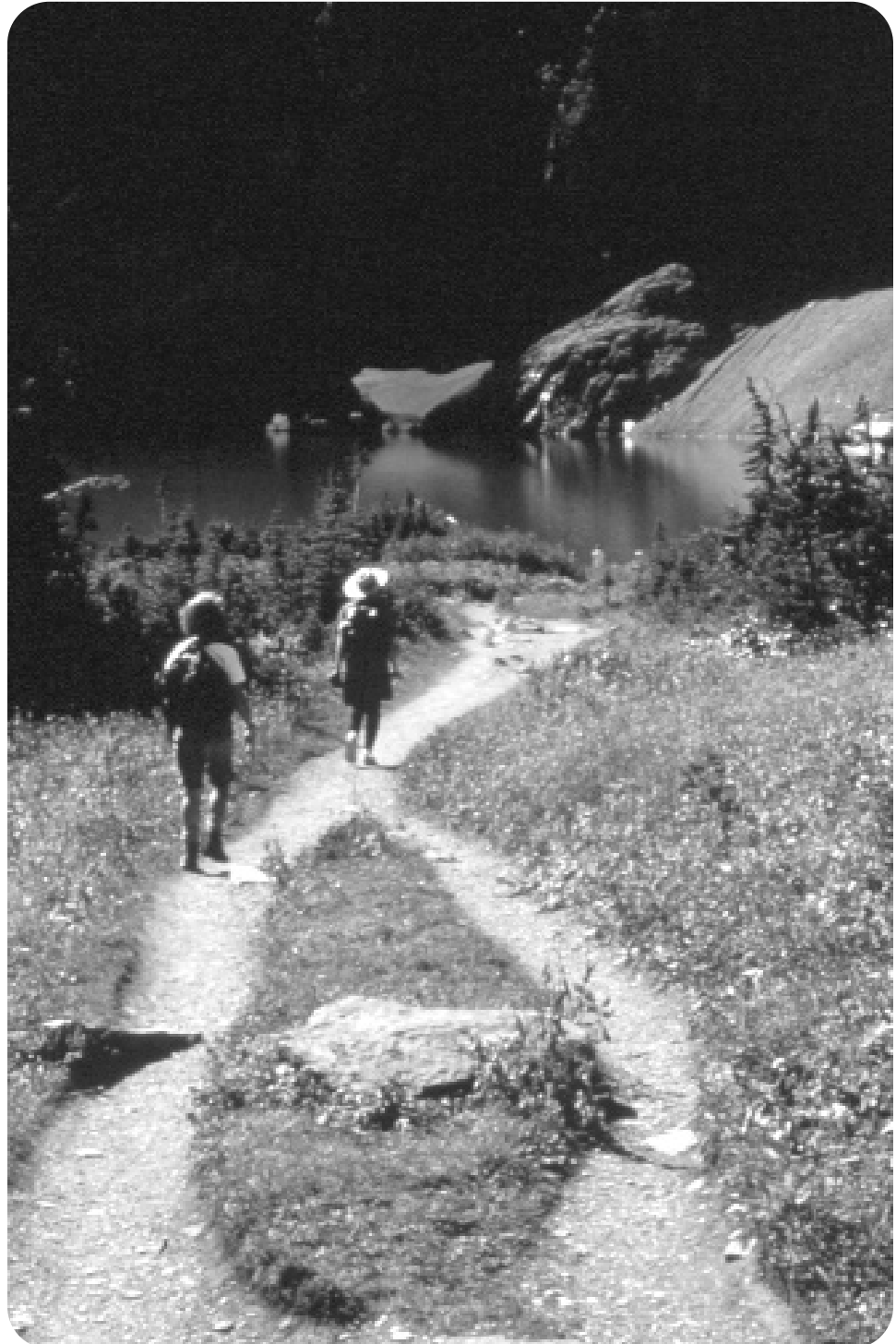
Management of natural resources in the backcountry zone would focus on protection and (when necessary) restoration of resources and natural processes. Information about the nature, status, and trends of natural resources in this zone would be emphasized. The visitor experience in the majority of the backcountry would be characterized by predominantly pristine natural conditions. There would be some primitive facilities such as trails, bridges, and campsites. It would offer outstanding opportunities for visitors seeking solitude. Natural quiet would predominate. The expectations of visitors would be for few encounters with other visitors most of the time and to have a variety of hiking, horseback riding, and climbing experiences. Impacts on natural resources would be confined to trail corridors and designated camping areas. Cultural resources would be preserved and protected in accordance with the law and NPS policy. Formal interpretive and educational opportunities would be minimal and in keeping with the qualities desired for this zone. Conflicts between visitors and animals in this zone would be managed to

A high encounter rate means that the NPS would tolerate high levels of use in a particular area, if use increased. However, it does not mean that a second-rate experience would be provided, nor that the National Park Service would take steps to increase use of particular areas.

Measurable indicators would be selected for monitoring key aspects of the visitor experience and resource health at Glacier. Standards would be identified that represent the points at which visitor experience or resource conditions become unacceptable in each zone and require management action.

Management area philosophies and management zoning are based on the park's purpose and significance and on the overall guiding philosophy, which describes the range of visitor experiences and resource conditions that park managers intend to provide.

minimize disturbance to wildlife, yet still provide for visitor safety. In most cases, areas would be closed to visitors when dangers arose. Natural processes would prevail. Animals would rarely be removed from the area. No commercial activity would be allowed off trail. Most of the proposed wilderness lands are zoned as backcountry and would need to be managed in accordance with NPS policy on proposed wilderness areas.





PHILOSOPHY. The Many Glacier area would be managed to preserve its wild character while providing visitors with opportunities to experience such activities as observing wildlife, hiking, camping, and sightseeing. Nationally significant historic resources would be preserved and managed to maintain the grand hotel and family lodge traditions.

Many Glacier

How this area would be managed:

- Resources would be managed to prevent degradation of the high quality wildlife habitat, including winter range, and to minimize conflicts with visitor use.
- Two separate developed areas (Swiftcurrent and the Many Glacier Hotel) would be maintained and managed to provide traditional visitor services as well as support services for NPS and concession operations.
- Some of the area would be managed to accommodate high levels of day use, while the rest would provide greater solitude and fewer visitor encounters.
- The Many Glacier area would be divided into a visitor service zone, a day use zone, and a backcountry zone.

The **visitor service zone** would include the roads and Lake Sherburne, as well as two separate developed areas (see the Many Glacier map). These areas would be managed to continue to provide a range of services and facilities, including ranger stations, employee housing, food services, gift shops, campstores, and overnight accommodations. Significant cultural resources would be managed to preserve historic structures and their traditional uses. A range of developments would continue in this zone from hotels and associated facilities needed to serve the visitor to administrative structures for park and concession management. New or replacement development could occur. This area would be managed to retain its character and to accommodate current levels and types of uses. Some increases in use could occur subject to analysis of resource impacts, infrastructure capacities, relationships to services provided outside the park, and other factors necessary to maintain the park's character.

The **day use zone** would include Swiftcurrent Lake and trails, Josephine Lake and trail, and destinations such as Apikuni and Red Rock Falls, Grinnell Lake, and Iceberg Lake. It would be managed for traditional recreational experiences such as hiking, boat tours, and horseback rides. Conflicts between hikers and horse users would be minimized where possible. Interpretive services such as guided hikes and exhibits would be available. Development would be limited to trails, signs, waysides, bridges, boardwalks, overlooks, and sanitation facilities.

The **backcountry zone** would encompass the rest of the Many Glacier area. It would be managed to understand and maintain natural processes. Visitor use would consist mostly of hiking and backcountry camping, with "leave no trace" skills and ethics encouraged. Development would be restricted to trails, signs, campsites, sanitation facilities, and other low-impact developments. Historic structures would be managed according to NPS policy.



Goat Haunt-Belly River

PHILOSOPHY. The area would be managed for its international importance to park visitors, for its wild character and wildlife, and for the shared natural and cultural resources of adjoining nations. As in other areas of the park, management actions would emphasize cooperation and coordination in the spirit of the international peace park, world heritage site, and man and the biosphere designations.

How this area would be managed:

- Resources would be managed to protect the pristine character of the area and the integrity of biologic communities.
- No overnight accommodations or food services would be provided.
- Visitor services would be supported by the full range of services at Waterton Townsite. Boat landings, visitor orientation, information and interpretation services, backcountry access, and administrative facilities would be available at Waterton Townsite, at Goat Haunt, and along the Chief Mountain Highway.
- The international peace park and world heritage site values would be emphasized as primary interpretive themes.
- Goat Haunt-Belly River area would be divided into a visitor service zone, a day use zone, and a backcountry zone.



The **visitor service zone** at Goat Haunt and along the Chief Mountain Highway would be managed as staging areas for access to the surrounding backcountry (see the Goat Haunt-Belly River map). Waterton Lake is also included in this zone. Services would be limited to providing information and interpretation as well as customs and immigration. Development would be limited to that necessary to support those functions but could include contact and customs stations, boat docks, corrals, campsites, sanitation facilities, administrative facilities, and employee housing. Interpretive needs would be met with kiosks, exhibits, and personal services.

The **day use zone** in the Goat Haunt-Belly River area would include the lakeshore trail and the trail to Rainbow Falls. It would be managed to continue the traditional boat tours and guided hikes. Developments would be limited to trails, bridges, overlooks, and sanitation facilities. Cultural resources would be protected.

The **backcountry zone** would encompass the remainder of the Goat Haunt-Belly River area. It would be managed to maintain natural processes. Visitor uses would include hiking, horseback riding, and backcountry camping. “Leave no trace” skills and ethics would be encouraged. Developments would include trails, campsites, primitive signs, sanitation facilities, and patrol cabins. Historic structures would be maintained.

Going-to-the-Sun Road Corridor



PHILOSOPHY. The Going-to-the-Sun Road corridor would be managed to provide all visitors with an opportunity to experience the scenic majesty and historic character of the park through a wide range of visitor activities, services, and facilities. The cultural significance and traditional use of the Going-to-the-Sun Road would be emphasized.

How this area would be managed:

- The tremendous biological diversity found in this corridor, which encompasses all park ecoregions, would be protected to ensure its overall integrity.
- A full range of visitor services would be provided at Apgar Village, Lake McDonald Lodge, Rising Sun, and in the vicinity of St. Mary.
- Sperry and Granite Park Chalets would provide traditional accommodations for backcountry visitors.
- As a national historic landmark, the Going-to-the-Sun Road would be managed to retain its historic character and to allow opportunities for visitors to experience the park's magnificent scenery and historic character.
- The Going-to-the-Sun Road corridor would be divided into a visitor service zone, a rustic zone, a day use zone, and a backcountry zone.

The **visitor service zone** would include the Going-to-the-Sun Road, developed areas along the road, Lake McDonald, St. Mary Lake, and administrative facilities (see the Going-to-the-Sun Road map). They would be managed to provide the traditional recreational opportuni-



ties for which the road was designed. Driving the Going-to-the-Sun Road would remain the principal visitor experience. The corridor would continue to accommodate interpretive opportunities, overnight use, food services, boat tours, hiking, and horseback riding. Interpretive activities would include orientation to the park at the two primary entrances as well as exhibits designed to emphasize park values. The road and Lake McDonald Lodge would be managed as historic resources in keeping with their national landmark status. Other properties would be managed to preserve their historic values. Development, where permitted, would serve a broad range of visitor, concession, and park administrative needs. New or



“The Going-to-the-Sun Road possesses extraordinary integrity to the period of its construction. Other than the first two miles of the road (which have had various alignments during the park’s history and are not included in the NHL district), Going-to-the-Sun Road provides nearly the same experience for visitors that it did during the historic period. The original alignment of the road remains true to the locations that Thomas Vint suggested and which Frank Kittredge, W. G. Peters, and A.V. Emery finalized.”

From page 4 of the National Historic Landmark Nomination for the Going-to-the-Sun Road, September, 1996.

replacement development could occur. This area would be managed to retain its character and to accommodate current levels and types of uses. Use could increase, subject to analysis of resource impacts, infrastructure capacities, relationships to services provided outside the park, and other factors necessary to maintain the park's character.

After the housing, maintenance, and administration were moved from Divide Creek (see the "Divide Creek Flood Hazard" section, below), the area from which those facilities were removed would be zoned for day use and/or backcountry. Overnight use would be discontinued in that area.

The **day use zone** would include such popular trails as the Highline Trail, trails to Avalanche and Hidden Lakes, McDonald and St. Mary Falls, and others. The chalets would be managed in keeping with their national landmark status. Recreational opportunities such as hiking and horseback rides would be available. Conflicts between hikers and horse users would be minimized where possible. Interpretation would consist of guided walks and modest exhibits. This zone would be managed to serve large numbers of visitors. Management of natural resources would seek to achieve nearly pristine conditions. Development would be limited to interpretive waysides, directional signs, trails, boardwalks, bridges, and sanitation facilities.

The **rustic zone** in the Going-to-the-Sun Road area would include areas such as the Apgar Lookout Road, the Quarter-Circle Bridge, Packer's Roost, and the 1913 Ranger Station. Management would concentrate on adaptive use of historic structures. There would be minimal interpretive services and exhibits. Development would be limited to sanitation facilities, administrative facilities, small parking lots, trails and trailheads, and unpaved roads.

The **backcountry zone** would be managed to maintain natural processes. Visitor use would consist primarily of hiking and backcountry camping, and visitors would be encouraged to practice "leave no trace" skills and ethics. Development would be limited to trails, campsites, primitive signs, and sanitation facilities.

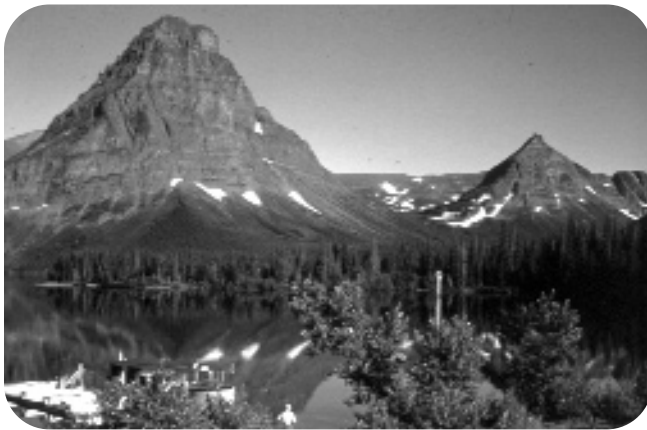


Two Medicine

PHILOSOPHY. The area would be managed to preserve its culturally significant resources, wild character, and important wildlife habitat. Frontcountry and backcountry camping would continue. Traditional visitor services would be available in the Two Medicine Valley.

How this area would be managed:

- Resources would be managed to protect the wild character of the area, particularly the area of transition between the plains and the mountains.
- While Two Medicine is a developed area, it would be small and would not provide all services.
- The Two Medicine area would be divided into visitor service, day use, rustic, and backcountry zones.



The **visitor service zone** would include the entrance road, picnic area and campground, ranger station, concession facilities, Lower Two Medicine Lake, and administrative facilities at Two Medicine Lake (see Two Medicine map). This area would continue to provide traditional recreational and visitor services, including camping. Adaptive use of the national historic landmark could include overnight lodging. Changes in use of existing facilities could occur subject to resource impacts, infrastructure capabilities, relationship to services provided outside the park, and other factors necessary to maintain the park character. Historic structures would continue to be preserved.

The **day use zone** would include Two Medicine Lake and its associated trails. It also includes Paradise Point, the trail to Upper Two Medicine Lake, and Rockwell and Running Eagle Falls. The area would be managed to provide for traditional uses such as hiking and commercial boat tours. Interpretive services such as guided hikes would continue. Development would be limited to interpretive exhibits, waysides, signs, overlooks, trails, boardwalks, bridges, and toilets.

The **rustic zone** includes the Cut Bank Ranger Station and campground. Like the North Fork, the Cut Bank area is among the least visited yet most beautiful places in the park. It is reminiscent of early park development, and park managers would prefer to keep it as it is. This zone would be managed to provide interpretive services and exhibits that describe early use of the area. Historic resources and traditional uses would be preserved. Development would be limited to primitive campgrounds, sanitation facilities, administrative offices, NPS employee housing, small parking lots, trails and trailheads, and unpaved roads.

The **backcountry zone** would be managed to maintain natural processes and ensure that visitors could understand them. Visitor use would primarily consist of hiking and backcountry camping, and visitors would be encouraged to practice “leave no trace” skills and ethics. Development would be limited to trails, campsites, sanitation facilities, and primitive signs.





Middle Fork

PHILOSOPHY. The area would be managed to preserve its remote and wild character through a range of primitive visitor experiences. Visitor and administrative facilities would occur only along U.S. Highway 2.

How this area would be managed:

- Resources would be managed to preserve their remote and pristine character; visitor access and trail facilities would be limited and challenging in most of the area.
- Trails, sanitation facilities, hitching posts, primitive signs, patrol cabins, and campsites would be the only development allowed in the backcountry.
- Key wildlife areas and travel corridors would be protected and interpreted through cooperation with others (such as Burlington Northern Environmental Stewardship Area) where appropriate.
- The Walton Ranger Station would serve the management and visitor needs of the area.
- A portion of the backcountry would be managed to allow for camping in undesignated areas and to provide more opportunities for off-trail travel.
- The Middle Fork area would be divided into a visitor service zone, and a backcountry zone.



The **visitor service zone** would include the U.S. Highway 2 corridor, the Goat Lick, and Walton Ranger Station (see Middle Fork map). It would be managed to provide information and interpretive services. Development would include the highway, signs, trails, trailheads, waysides, sanitation facilities, parking lots, pullouts, picnic areas, exhibits, and staging areas.

The **backcountry zone**, all of which is in proposed wilderness, would constitute the majority of the Middle Fork area and would be managed to achieve a wild character and maintain natural processes. Visitor use would consist primarily of hiking, horseback riding, and backcountry camping, and visitors would be encouraged to practice “leave no trace” skills and ethics. Development would include trails, sanitation facilities, and campsites. A portion of the backcountry would be managed to allow camping in undesignated areas.

North Fork

PHILOSOPHY. The North Fork would be preserved to contribute to the integrity and primitive character of the transboundary watershed. Management actions would reflect the importance of inter-agency and international cooperation. Visitor facilities would be rustic and would preserve a national park quality and style of development that has become increasingly rare. Management actions would preserve that primitive character.

How this area would be managed:

- Resources would be managed to preserve the wild character of the area and the important linkage to the entire North Fork Valley, including the Canadian portion, for wildlife conservation.
- Commercial development or new commercial activities would not be permitted.
- Small primitive auto campgrounds would continue at Kintla Lake, Quartz Creek, Bowman Lake, and Logging Creek.
- The inside North Fork Road would remain narrow and unpaved.
- The North Fork would be divided into a visitor service zone, a rustic zone, and a backcountry zone.

The **visitor service zone** would encompass the service area at Polebridge and the corridor of the Camas Road (see North Fork map). It would be managed to provide information, camping, and interpretive and similar basic services. Developments would include paved roads, pullouts, trails, entrance stations, exhibits, and parking lots.

The **rustic zone** would encompass the road corridor of the inside North Fork Road and roads to Bowman and Kintla Lakes. It would be managed to provide basic informational and interpretive services such as exhibits and waysides. Cultural resources would be preserved. The inside North Fork Road would be managed as an unpaved road accessible to vehicles, bicycles, and foot traffic. The narrow road width and the current approximate alignment would be maintained. Development would include informational and interpretive signs, employee housing, ranger stations, campgrounds, sanitation facilities, small parking lots, trails and trailheads, small boat launching facilities and paved and unpaved roads.

The **backcountry zone** would encompass most of the North Fork area. It would be managed to maintain natural processes. Visitor use would consist primarily of hiking and backcountry camping. Visitors would be encouraged to practice “leave no trace” skills and ethics. Development would include trails, primitive signs, campsites, primitive administrative facilities, and sanitation facilities.



CRITICAL ISSUES

- Visitor use on the Going-to-the-Sun Road
- Preservation of the Going-to-the-Sun Road
- Preservation of historic hotels and visitor services
 - Scenic air tours
 - Personal watercraft
 - Winter use
- Divide Creek flood hazards
- West side discovery center and museum

Issues raised by the public and discussed in *Newsletters 1 and 2* were considered during the development of this *General Management Plan*.

Some issues were determined to be largely operational issues. Others were rejected for other reasons. Upon further analysis, the list of issues that this plan would address was narrowed down to the eight critical issues listed above. All issues raised but not addressed in this plan are discussed in the section "Alternatives, Ideas, and Strategies Considered but Rejected."

Critical Issues and Alternatives

A number of issues and concerns were identified by the public, other agencies, Indian tribes, special interest groups, and National Park Service staff during public meetings held in Montana, Alberta, and British Columbia in 1995-96. These are the most critical and pressing issues (see box).

The preferred alternative for each issue, favored by the National Park Service at this time, and the rationale for its proposed adoption is identified at the end of each alternative discussion. The no-action or "status quo" alternative for each issue, which is required by the National Environmental Policy Act, is also presented. This alternative describes what the National Park Service would continue to do without a new general management plan. The no-action alternative for each issue provides a baseline for evaluating the changes and related environmental impacts proposed under the action alternatives.

The management strategy previously described applies to each of the action alternatives.

Numerous challenges face park managers now and for the future, and the resolution of many issues is critical for the protection and perpetuation of the natural and cultural resources in Glacier. Some of these are the result of stresses external as well as internal to the park. Some major ecosystem concerns are the preservation of our air and water quality, the protection of wildlife habitat and travel corridors, and the recovery of threatened and endangered species. A major internal challenge is preserving the integrity and diversity of the park's plant communities through restoration and weed eradication, as are protecting habitat and perpetuating natural fire regimes to maintain habitat. The specific goals, objectives and strategies from inventories and needed research to monitoring are contained in the park's *Resource Management Plan* and other operational plans.

The critical issues that we have selected to address in the *General Management Plan* have widely varied and possibly controversial alternative solutions—that were specifically identified by the public and others during scoping, along with chosen preferred solutions. The selection of these critical issues was not intended to dismiss or diminish the importance of other critical issues. Having the scientific knowledge to make informed decisions, a sufficient and knowledgeable management staff, and the partnership of a supportive and informed public are critical to addressing these issues and others that are yet unknown.

Visitor Use on the Going-to-the-Sun Road

BACKGROUND

Experiencing Glacier along the Going-to-the-Sun Road has become the premier park experience for over 80 percent of the visitors to Glacier National Park. It was not always so. Visitors first traveled through Glacier on foot and horseback. The early chalet system and high-country tent camps supported early visitors' exploration of the park's backcountry. The hotels were located nearer the park's perimeter along the early roads. Visiting Glacier was not easy and required a major investment in time and money.

As the automobile became more affordable and common, so did the desire to make Glacier a more affordable park. With the idea of a "trans-park" road to allow visitors to see the spectacular vistas and scenic beauty of the interior of the park came the idea to make Glacier available to all. The Going-to-the-Sun Road democratized Glacier. The road was completed in 1932, and despite the Great Depression, visitation quickly doubled and has been increasing ever since (see appendix B). In 1983 the road was placed on the National Register of Historic Places. In 1985 it was declared a national historic civil engineering landmark. In 1997 it was designated as a national historic landmark. Its width, scenic vistas, and classic stone walls all contribute to that designation. The character of the road is part of a spectacular park experience that should be preserved.

The Going-to-the-Sun Road is the only route through the park that directly links the east and west sides, and its value is unparalleled. Each year hundreds of thousands of visitors are drawn to the area and drive this scenic route. Local and regional economies have become dependent upon the visitors drawn to Glacier. Any change in use that might alter visitor patterns would have direct and indirect effects on these economies.

Because the road is the park's primary automotive route, it defines the circulation pattern. The road accesses principal points of interest and offers many stunning views. Use has increased from fewer than 40,000 cars in 1933 to over 660,000 cars annually. Increased traffic volume causes crowding at pullouts and parking areas along the road. Visitors who are frustrated by the lack of parking and

who want to stop to experience the park, pull off and park in undesignated areas, causing resource damage and safety problems.

ISSUE

In July and August the Going-to-the-Sun Road approaches its peak capacity. Traffic is congested, and the demand for parking and pullouts often exceeds available spaces. In 1994 a visitor use study showed that 43 percent of summer visitors felt that traffic congestion and parking shortages detracted from their visits, and many felt that this was unacceptable (Univ. of Montana 1994).

Public transportation has been available in the park since the first hotels were built. Glacier was one of the many western parks that used fleets of touring cars. This culminated in the historic red bus fleet in the 1930s. There are national parks in the west that still have a token historic bus in use or on display, but Glacier is the only park where many are still in use. Today, park visitors can still ride “the reds” just as visitors did decades ago.

Public transportation provides a service to visitors who arrive without vehicles, have overlength vehicles, or who simply do not want to drive. In 1992 a shuttle service was initiated to meet the needs of hikers, but the demand is low. Some people believe that the shuttle system has not been effective because of high cost to users, limited capacity, and a limited schedule. Others think that the shuttle system works well, but they would like to see it expanded to increase its usefulness. The current transportation system is not subsidized. The management challenge is to continue private vehicle use, as desired by the public, while ensuring an effective transportation system.

Increasing numbers of bicycles and automobiles have also presented a safety concern. All these visitor uses must be managed while maintaining both the traditional driving experience and the historic character of the road.

ALTERNATIVE A1 — ENHANCE VISITOR OPPORTUNITIES ALONG THE GOING-TO-THE-SUN ROAD (PREFERRED ALTERNATIVE)

The National Park Service would continue to manage the Going-to-the-Sun Road as the premier visitor experience for Glacier National Park. The road would be managed as a motor nature trail typified by low speed limits and interpretive opportunities. Focus would remain on maintaining the historic character of the road, as well as on the experience offered by easy access to the park’s interior. Visitors would continue to have the freedom to drive personal vehicles and stop at viewpoints along the road.

For visitors who required or would prefer to use public transportation, that option would continue. An efficient and convenient public system would be provided. A federal government subsidy might be necessary. Transportation systems would require facilities to accommodate hundreds of vehicles. These facilities could be intrusive on park values, but they could be developed according to the management goals for the Going-to-the-Sun corridor.

To help address congestion at such places as Logan Pass, the Loop, Sunrift Gorge, Avalanche, and other popular spots, a comprehensive use plan would be developed for the Going-to-the-Sun Road. The plan would identify and analyze alternatives to manage visitors' use of the road while maintaining a high-quality, slow-paced experience for people choosing to travel the road either in private vehicles or by a transportation system. Alternatives considered could include adding more pullouts, offering interpretive and short hiking opportunities along the road, incentives (not requirements) for visitors to use a transportation system, and limits on the number of visitors allowed on the road at any one time or place. The road would be protected as a national historic landmark regardless of the alternative or alternatives chosen from this additional study. The study would not reexamine the issue of closing the road to private vehicle traffic.

The opportunity and choice to drive the Going-to-the-Sun Road in one's own private automobile would be ensured for all visitors.

The following actions would be taken under this alternative:

- Assess an expanded transportation system as discussed in the 1990 *Transportation Plan* (NPS 1990d).
- Develop a comprehensive use plan for the Going-to-the-Sun Road that would include consideration of a variety of alternatives that would maintain a high-quality, slow-paced experience for visitors in the face of increasing visitation on the road and road corridor. Develop standards and indicators as part of this plan to determine when and if the road was at capacity and what type of management action should be taken, and when. Alternatives to be considered would include building pullouts to replace those that have been removed, with the new ones in more appropriate locations; providing additional interpretive and short hiking opportunities along the road; and placing limits on the number of visitors allowed on the road at any one time or place.
- Retain tour services on the Going-to-the-Sun Road.
- Continue to restrict bicycle use during peak use periods.
- Continue restrictions on vehicle length and width.

ALTERNATIVE A — EXPAND VISITOR OPPORTUNITIES ALONG THE GOING-TO-THE-SUN ROAD

The National Park Service would continue to manage the Going-to-the-Sun Road as the premier visitor experience for Glacier National Park. The road would be managed as a motor nature trail. Focus would remain on maintaining the historic character of the road, as well as on the experience offered by easy access to the park's interior. Visitors would continue to have the freedom to drive personal vehicles and stop at will at various viewpoints along the road.

For visitors who required or would prefer to use public transportation, that option would continue. An efficient and convenient public system would be provided. A federal government subsidy might be necessary. Transportation systems

would require facilities to accommodate hundreds of vehicles. These facilities could be intrusive on park values, but they could be developed according to the management goals for the Going-to-the-Sun corridor.

To help alleviate crowding at such places as Logan Pass, the Loop, Sunrift Gorge, Avalanche, and other popular spots, use would be dispersed along the entire length of the road. More opportunities for visitors to pull off the road, park, picnic, and take short walks in a variety of locations would be provided. Protection of the road as a national historic landmark would be ensured. Additional interpretive waysides and sanitation facilities would be developed. If a variety of small efforts were made to make more opportunities available, congestion could be reduced at popular sites along the road.

Actions to be taken include:

- Assess an expanded transportation system.
- Identify and assess modifying existing pullouts and/or adding pullouts, picnic areas, and short trails (consider resource values, visitor experience, dispersal of use, and objectives for the corridor); areas that would be considered include along Lake McDonald, the Logan maintenance pit, Road Camp, Sun Point, Moose Country, Lunch Creek, and Sunrift Gorge.
- Retain tour services on the Going-to-the-Sun Road
- Restrict bicycle use during peak periods.
- Continue vehicle length and width restrictions.

ALTERNATIVE B — EXPAND LOGAN PASS PARKING LOT

Logan Pass is arguably the park's most popular location. The natural resources and alpine vistas are a primary attraction, but it is also one of the few spots along the road where visitors can rest, experience the park in a direct manner, and receive visitor information. The reconfiguration of the lot in 1996-97 added 64 automobile parking spaces and seven oversized vehicle parking spaces, but the lot is still crowded. One means of alleviating crowding at extremely popular sites in Glacier is to develop additional parking and services to meet the demand. The issue of increasing use and congestion at Logan Pass would be addressed by constructing additional parking either underground or aboveground. The amount of parking could be increased on the surface or by adding tiered surface or subsurface parking.

Actions to be taken:

- Expand Logan Pass parking area.
- Retain shuttle service.
- Retain tour services on the Going-to-the-Sun Road.
- Retain bicycle restrictions on the Going-to-the-Sun Road during peak use periods.
- Retain vehicle length and width restrictions.
- Expand Logan Pass utilities systems to accommodate increased use.

- Continue roadwork to correct safety problems and reduce or eliminate the size and number of pullouts and turnoffs according to the *Transportation Plan* (NPS 1990d).

After further consideration of public comments and analyses, the National Park Service has modified the preferred alternative from the one that appeared in the *Draft General Management Plan and Environmental Impact Statement*. The preferred alternative is A1 because this alternative offers the best way to manage increasing use while protecting resources, and it would maintain the historic visitor experience along the road.

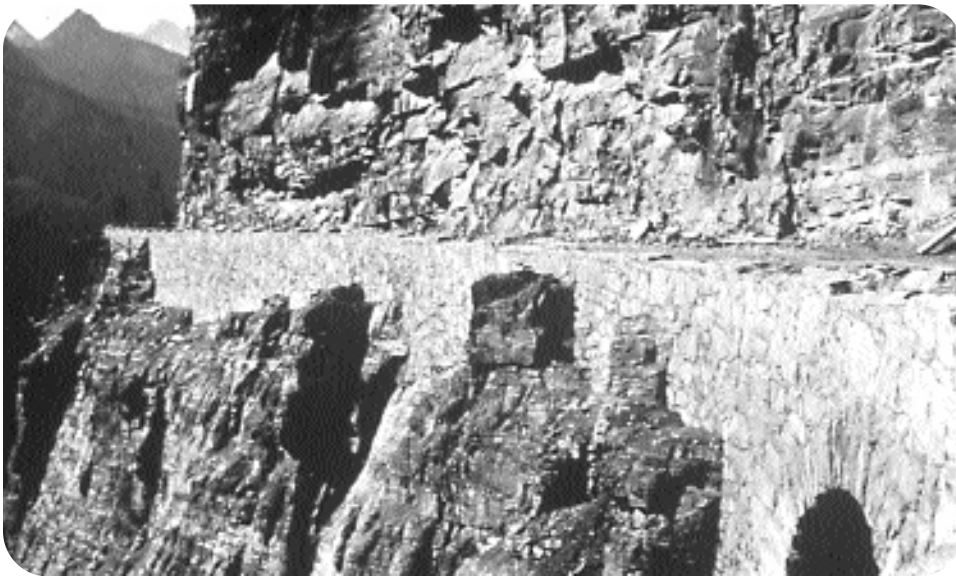
ALTERNATIVE C — NO ACTION / STATUS QUO

The National Park Service would continue to manage the Going-to-the-Sun Road as the principal place where visitors would experience Glacier National Park's varied resources. Private vehicle use would continue as it currently exists. No change in road capacity, design character, or day use opportunities would be made in the corridor except for those identified in the *Transportation Plan* (NPS 1990d). Actions outlined in the 1977 *Master Plan* would continue.

Actions to be taken:

- Continue to work with the Federal Highway Administration to correct safety problems and reduce or eliminate the size and number of pullouts and turnoffs according to the *Transportation Plan*.
- Continue the shuttle service.
- Retain tour services on the Going-to-the-Sun Road.
- Retain bicycle restrictions on the Going-to-the-Sun Road during peak use periods.
- Retain vehicle length and width restrictions.
- Retain the Logan Pass parking lot as it is.

Preservation of the Going-to-the-Sun Road



BACKGROUND

Conservative economic models project that approximately \$145 million and 2,100 jobs are generated annually in Montana by Glacier National Park (see appendix C). These figures were revised from the *Draft General Management Plan and Environmental Impact Statement* to reflect a new analysis that was conducted in 1997. It is believed that the drop in numbers was due to a decrease in visitation. Much of this economic activity takes place during the

4-5 month period that the Logan Pass section of the Going-to-the-Sun Road is open. Clearing the road and opening it each spring is a major feat; clearing begins in April and opening usually is in early June. Since the road was completed in 1932, the upper reaches have not been substantially repaired or rehabilitated. Today, that section of the road is in need of major rehabilitation. The Going-to-the-Sun Road was designated a national historic landmark in 1997. The road's width was one of the contributing elements to its designation.

Before 1982 funding for road repairs was minimal and came entirely from the park's annual operating budget. In 1982 Congress passed the Surface Transportation Assistance Act, which included funding for federal road reconstruction projects. In partnership with the Federal Highway Administration (FHWA), the National Park Service established a road improvement program. Since then seven projects have been funded in Glacier. Approximately \$18 million has been spent to reconstruct 20 miles of the road. The completed 20 miles have been mostly in lower sections of the road; less than 1 mile of the high-mountain section has been completed (Oberlin Bend 1995-97).

ISSUE

At the heart of the issue is the fact that road construction can only be done in the summer and fall, which is also the time that most visitors can experience the alpine section of the Going-to-the-Sun Road.

After the Logan Pass-Oberlin Bend reconstruction project, the Federal Highway Administration and the National Park Service determined that present funding levels were inadequate to ensure long-term use of the Going-to-the-Sun Road. During 1995-96 visitors experienced long and frustrating delays, and contractors had difficulty repairing the road and maintaining traffic flow. The experience at Logan Pass led engineers and planners to conclude that approximately 50 years would be needed to finish repairing the road if the current approach was used. It is likely that some segments of the road would fail during that time, closing the road and necessitating unplanned emergency repairs.

The National Park Service and the Federal Highway Administration have jointly developed alternatives for a road reconstruction program based on the following criteria:

- Preserve the historic character and significance of the Going-to-the-Sun Road, including its width.
- Minimize impacts on visitors.
- Minimize impacts on the local economy.
- Perform critical repairs before the road fails catastrophically.
- Minimize the cost of the reconstruction.
- Minimize impacts on natural resources.

There are approximately 30 miles of the road that still must be reconstructed. An 11-mile critical section was identified between the west side tunnel and Siyeh Bend and studied as the controlling reconstruction element in any long-range program to repair the road. This alpine section is the most spectacular part of the road. The reconstruction of this section has the greatest potential to impact both visitors and the local economy. Because it is in some places seemingly carved out of the side of the mountain, it is the most difficult portion of the road to work on because of the very narrow width and the limited room available to perform repairs. There are many historically significant stone masonry features, including retaining walls and guardwalls. The narrow road corridor, the short construction season, and extreme and unpredictable weather conditions affect both the integrity of the road and the reconstruction effort. Avalanches, snow creep, and repeated freezing and thawing continually deteriorate road features and jeopardize public safety.

One of the major work elements is the work of repairing the historically significant stone retaining walls along the Going-to-the-Sun Road. The 1997 *Retaining Wall Inventory* (FHWA 1997) was referred to in the draft document as the source of detailed analysis of the condition of these retaining walls. Although that information was accurate at the time, the Federal Highway Administration continues to update it as ongoing annual inspections are carried out under what is

termed the Glacier Wall Management Program. This program was started in response to the recognition that the walls continue to deteriorate with time and new repair needs must be identified.

The 1998 *Retaining Wall Inventory Update* (FHWA 1998) listed structural problems at 76 of the 126 walls inventoried and examined on the Going-to-the-Sun Road. Some of these walls exceed 30 feet in height. Repair needs were identified and listed by priorities 1, 2, and 3. A total of 24 of the 76 walls were identified as priority 1 or 2. The recommended repairs on these walls should be completed as soon as possible, including 6 walls that require major structural work. If these are not done within this timeframe, the risks for catastrophic failure would substantially increase. Fifty-two walls are rated priority 3, and the repairs could be deferred for a short time. These 52 walls will become priority 1 or 2 if the work is not done in 3-8 years (FHWA 1998).

However, even though the 1998 retaining wall inventory and other evaluations have not identified major problems with the rest of the walls, at some point those walls will require reconstruction. Funding (\$2.7 million) has been secured for some stone wall repair during fiscal year 1999 (FY99 and 2000). Work will concentrate on the most serious structural problems. The alpine section has approximately 2 miles of stone masonry guardwalls that are in need of reconstruction as of 1999.

Engineering studies have defined 11 major work elements as needing to be performed to rehabilitate the Going-to-the-Sun Road. Only one of these work elements is the repair of the historic retaining walls. Other major work elements are the repair of stone masonry guardwalls, removable guardwalls in avalanche areas, outside lane deficiencies (slumping), drainage improvements, upgrading of turnouts, and providing a new pavement structure.

ALTERNATIVE A1 — RECONSTRUCTION OF THE GOING-TO-THE-SUN ROAD (PREFERRED ALTERNATIVE)

Initially the preferred alternative for the reconstruction of the Going-to-the-Sun Road was to undertake a fast-track reconstruction effort. In that scenario, engineering analysis projected that four to six years would be needed for completion. The road would have been closed for up to two years on the west side and up to two years on the east side. The cost would have been between \$70 and \$80 million.

Because of public concern on the preferred alternative, a new preferred alternative has been developed. Under the new one, the National Park Service would reconstruct the Going-to-the-Sun Road to preserve its historic character and significance, complete the needed repairs before the road could fail, minimize impacts on natural resources, visitors, and the local economy; and minimize the reconstruction costs.

In the 1999 Department of Transportation Appropriations Act, \$1 million of existing funds was redirected to be spent on additional engineering and economic studies. As specified in the act, these studies would be completed in consultation with a federal advisory committee. The public would also participate in this process. Appropriate levels of environmental documentation would be completed to analyze the impacts. Alternatives would determine how long reconstruction would take, how traffic would be managed during reconstruction, and what mitigation would be used to preserve resources and minimize adverse effects on the economy. The National Park Service would continue to consider scheduling reconstruction around the state of Montana's Lewis and Clark bicentennial celebration.

Until additional studies can be completed, the National Park Service will continue its current program to perform critical road reconstruction actions as necessary and within available funding to preserve the road and address safety concerns. Additional environmental analysis would be completed for actions not addressed in the 1990 *Transportation Plan and Environmental Assessment* (NPS 1990d). The accompanying environmental impact statement for the general management plan does not address these actions.

ALTERNATIVE A — FAST-TRACK RECONSTRUCTION (4-6 YEARS)

A 4-6 year reconstruction scenario would be necessary to rehabilitate the road and repair or rebuild historic stone retaining walls and guardwalls. During this period, Logan Pass would remain accessible from one side or the other, but there would be no through traffic. For 2-3 years the road from Avalanche to Logan Pass would be closed for repair, then would be reopened while the section between Logan Pass and Rising Sun would be closed for about 2-3 years. Large contracts would be let for the reconstruction work.

A west side staging area (Logan maintenance pit) and an east side staging area (Sun Point with no visitor use) would be required for the contractors' operations and storage of construction materials and advance production and stockpiling of cut stone. Resources would be protected by avoidance, or mitigating measures would be developed to protect park values.

The estimated total cost of this alternative is \$70-\$85 million. Glacier presently receives an average of \$2 million per year for road reconstruction. This alternative would take less time than any other alternative because of the large construction contracts and because there would be no vehicle traffic to interfere with work. Construction with total road closure would probably start no earlier than 2004. This would allow for time to complete engineering design, prepare early contracts for material production and stockpiling, and schedule around the state's Lewis and Clark Bicentennial celebration. It would also allow local businesses to have time to develop contingency plans for the reconstruction period of the road. Critical road reconstruction actions necessary to preserve the road would continue.

ALTERNATIVE B — ACCELERATED RECONSTRUCTION (10± YEARS)

About 10 years would be required to complete all the repair work. A variety of road closures would be needed, including night closures for excavation and hauling large quantities of materials. There would be limited daytime closures and daytime delays due to one-lane traffic. Alternating one-way traffic across the Going-to-the-Sun Road would occur for an entire season. Full closure after Labor Day would also be required for some portion of that time. The road opening would be delayed each year to accommodate the staging for construction. The public could expect the road to be available for visitor use for only 6-8 weeks each summer.

There would be staging areas on both the west and east sides for construction operations and storage of materials. These staging areas would probably be at the Logan maintenance pit and at Sun Point. Sun Point would be closed to visitor use. Resources would be protected by avoidance or by mitigating measures designed to protect park values.

This alternative is estimated (class D; FHWA estimate) to cost approximately \$90-\$105 million during the 10 or more years of work on the road. Accelerated construction using the partial closures would probably start no earlier than 2004 due to the time required for the major engineering design, the early contracts for material production and stockpiling, and the need to schedule around the state's Lewis and Clark Bicentennial celebration.

The accelerated alternative would require that there be only one-way traffic from one side of the park to the other for several years at a time. New use patterns would emerge and some businesses could be impacted for a decade or longer.

ALTERNATIVE C — NO ACTION / STATUS QUO

The current level of road reconstruction would continue. Approximately \$2 million would be spent annually. It would take approximately 50 years and between \$195-\$210 million to complete the repair of the road. Visitor use of the Going-to-the-Sun Road would be retained during construction to the extent possible. There would be a series of small, site-specific construction projects spread out over time. Before all required improvements to the approximately 30 miles could be completed, the earlier sections would have deteriorated, and additional rehabilitation would be required. The result would be continual construction because the rate of deterioration would exceed the rate of improvement.

The National Park Service prefers an alternative that would preserve the historic character and significance of the Going-to-the-Sun Road; complete the needed repairs before the road failed; minimize impacts on natural resources, visitors, and the local economy; and minimize the cost of reconstruction. In consideration of public comments and concerns about the effects of reconstruction, the National Park Service has modified the preferred alternative described in the draft GMP and EIS. Information from additional studies developed with the public and a recommendation from a newly established federal advisory committee would be used to decide how the road would be reconstructed, how traffic would be managed, and what mitigation would be necessary. Until such time as the additional studies can be completed, the National Park Service will continue its current program to perform critical road reconstruction actions as necessary to preserve the road and address safety concerns.

Preservation of Historic Hotels and Visitor Services

BACKGROUND

Glacier has a long tradition of visitor service and hospitality. Early visitors came by train and horseback and then traveled by tour boat to Lake McDonald Lodge. They arrived first by stage and then by automobile at the Many Glacier Hotel. Early in the park's history the many chalets and tent camps allowed visitors to stay overnight in the backcountry. Later, lodging was provided at Swiftcurrent, Rising Sun, and Apgar. There were chalets at Gunsight Lake, Cut Bank, and Goat Haunt. There was a magnificent hotel at Sun Point. Smaller hotels, cabins, and chalets were at Many Glacier, St. Mary Lake, and Two Medicine.

People watched the sunsets from the porch at Gunsight Lake and the sunrise from the chalet at Many Glacier. They ate dinner at St. Mary and Two Medicine chalets and spent the night at Swiftcurrent, Goat Haunt, and Sun Point. The chalets at Sun Point, Many Glacier, and St. Mary each hosted between 100 and 150 guests per night. Two other grand hotels built during the same era were the

Glacier Park Lodge in East Glacier and the Prince of Wales Hotel in Waterton Townsite, Alberta. These two hotels lie outside the park's boundaries, but they are part of a system of lodging in the area.

During the 1930s and 1940s these classic structures deteriorated because of the economy, decreased visitation, and a world war. By the end of World War II most of these structures had been closed or had fallen into disuse. The choice was to rehabilitate them or tear them down. Most were



razed for economic reasons. Except for the lodging at Lake McDonald, Many Glacier, Sperry, and Granite Park, all the original chalets, cabins, and camps are gone. What remains is recognized as historically significant. Five of the remaining buildings — Many Glacier Hotel, Lake McDonald Lodge, Sperry and Granite Park Chalets, and Two Medicine Lodge (now a campstore) — have been designated national historic landmarks. These and over 350 other structures in the park are listed on the National Register of Historic Places.

ISSUE

About 100 historic structures are operated by the primary concessioner and provide lodging and food services. Although by law the fee title to the structure is vested with the United States, the primary concessioner has rights to compensation for its interest in most of the concessioner-operated facilities. For example, the Many Glacier Hotel was originally built and operated by the Great Northern Railroad. Compensable interest in this facility was sold to the succeeding concessioners and today is owned by Glacier Park, Inc. By law, compensation is due to concessioners that make capital improvements on the structures. All these structures require some level of rehabilitation to address deficiencies and to keep them functioning as visitor accommodations well into the next century. Some are not as historically significant as others in the park and could be replaced. Each year complaints are received from visitors who are dissatisfied with the conditions encountered at the facilities. The deficiencies must be addressed if the concessioner is to continue to provide services in a safe, healthy, and acceptable manner. With continued deterioration and visitor dissatisfaction, there would be little economic incentive for a concessioner to invest more money without an adequate return on the investment. Eventually this would result in the loss of historic structures.

Rehabilitating the structures will be expensive. Several solutions have been considered over the past 10 years, and cost estimates vary by study (depending on the approach taken to correct the problem). It has been estimated (NPS 1990a) that \$61 million (1992 dollars) would be necessary to rehabilitate all the concessioner facilities in the park. In 1996 a proposal (Glacier Park Incorporated 1996) was received from the concessioner that estimated that \$82 million would be necessary to rehabilitate and improve the facilities. Another study the same year (NPS 1996) estimated that \$85 million would be required to correct the problems, allow a modest increase in the number of lodging units, and make upgrades. If the estimates were updated for inflation, the cost could be more than \$100 million by the time rehabilitation could begin. Some of the studies did not include costs of infrastructure improvements such as sanitation systems, road access, or additional parking (also see appendixes D and E).

Investigations continue to determine which engineering and architectural solutions would be best.

Funding the preservation work at the hotel is at the heart of the matter. Private funding would require additional development to allow for a return on the investment. Additional development for these reasons is unacceptable in a national

park. All funding sources would be evaluated, but ownership must remain with the National Park Service, and any additional development would be considered only if necessary to serve visitor needs.

Lake McDonald Lodge is the oldest hotel in the park. It is a national historic landmark and provides 100 guest rooms of varying types, including some associated cabins. In the developed area there are two restaurants, a lounge, a campstore, a gift shop, and a small post office. The complex has a mix of concessioner-owned, government-owned, and privately owned structures. The lodge was partially renovated in the 1980s, but much remains to be done. Some facilities do not meet current fire and electrical codes, pose risks from asbestos, and are not accessible for people with disabilities. Parking is inadequate (NPS 1990d, 1991c). The 1960s-era restaurant is poorly located and architecturally inappropriate to the historic district. The support facilities and utility systems are not winterized. Many of the employee dormitories lie within the 100-year floodplain of Snyder Creek and are not adequate to meet current needs. Estimates for improvements are \$23-\$36 million.

The **Many Glacier Hotel** provides 211 guest rooms and a restaurant, lounge, a gift shop, and a snack bar. The hotel has been designated a national historic landmark. The facilities are concessioner-owned, but the title is vested with the National Park Service. There are extensive problems with the facilities, including electrical systems that do not meet modern fire codes; failing structural elements such as exterior balconies, walls, floors, and foundations; inadequate and inefficient heating systems; asbestos hazards and bat infestations; inadequate utility systems, poor pedestrian circulation; and limited access for people with disabilities. There are no operable elevators; rooms have undersized bathrooms and no soundproofing or insulation. Employee housing is inadequate. Improvements to address these concerns would cost \$35-\$48 million (NPS 1996, 1990a; GPI 1996).

Swiftcurrent Motor Inn developed area has 62 motel units, 26 cabins without bathrooms, a restaurant, a campstore, public showers, and a laundry. Many of the facilities, which are concessioner-owned, lie within the national historic district at Swiftcurrent and are on the National Register of Historic Places. Many of the structures have deteriorated beyond simple rehabilitation. Problems identified include asbestos hazards, inadequate public shower facilities, inadequate access for people with disabilities, and poor pedestrian circulation. The motel units, which were built in 1955, are not within the boundaries of the historic district. Most of the cabin units were rebuilt following a forest fire in 1936, but one circle of 12 cabins is original, and these are part of the historic district at Swiftcurrent. Redevelopment is a possibility. Improvements to address these concerns would cost \$3-\$8.3 million, depending on how they were restored.

Rising Sun Motor Inn developed area is largely a designated historic district. The cabin camp was built in 1941, and the area is listed on the national register as a historic district. The designation excludes the 1959 restaurant and motel units. The motor inn includes 37 motel rooms and 35 cabins, a restaurant, a campstore, and public showers. The facilities are concessioner owned. Problems

include the following: employee housing and visitor lodging are within the 100-year floodplain; there is inadequate access for visitors with disabilities; the public showers are inadequate; there is structural deterioration; and asbestos hazards are a concern.

This camp is one of the best remaining examples of a 1930s-era design automobile cabin camp. Estimates for improvements to the Rising Sun area are \$5-\$10 million, depending on the method of restoration.

Two Medicine Lodge is designated a national historic landmark and currently houses a campstore and a snack bar. The facilities are concessioner owned. Recognized problems include asbestos, accessibility, and structural problems. To correct these deficiencies would cost about \$600,000.

The Village Inn is a government-owned 36-room motel on the shore of Lake McDonald at the outlet of McDonald Creek. It is in Apgar Village near private lodging, restaurants, gift stores, and visitor facilities. Shoreline erosion threatens the integrity of the motel and presents hazards to guests due to its proximity to walkways and low room entrances. While it is an intrusion on Lake McDonald, its government-regulated rates moderate the rates of privately owned lodging nearby. It is not historically significant and has a modern architectural style.

ALTERNATIVE A — REHABILITATE NATIONAL LANDMARK AND OTHER HISTORIC VISITOR FACILITIES (PREFERRED ALTERNATIVE)

The National Park Service would pursue funding to undertake a comprehensive rehabilitation effort to preserve the national landmark properties and the other historic lodging in Glacier National Park. All work would be accomplished in accordance with the Secretary of the Interior's Standards and Guidelines for the Treatment of Historic Properties. This would ensure the preservation of a structure's essential elements that contributed to its designation as a national historic landmark and/or placed it on the National Register of Historic Places.

Historic visitor lodging experiences would continue to be available in Glacier, from camping cabins to the grand hotels, as appropriate to the geographic area and management zones. The overall mix of services to be offered would be determined through development of a commercial services plan. The type and level of these services would be guided by the management philosophy of the General Management Plan, to retain Glacier's classic Western park character. A minimum of approximately 500 rooms would be retained.

Actions to be taken:

- Conduct additional structural analysis where needed.
- Develop a commercial services plan that analyzes visitor needs, expectations, and demands; resource constraints and implications, and determine economic feasibility to establish the number of rooms and services that should be made available in the park.

- Revise and/or develop site-specific design plans for all five locations, including support services such as utility upgrades, concessioner employee housing, and infrastructure.
- Conduct feasibility analysis for funding rehabilitation, including the evaluation of a variety of funding methods (such as congressional appropriations, other forms of public monies, and private investment).
- Develop priorities and phasing plan for the rehabilitation.
- Pursue funding sources.
- Determine the value of the concessioner's possessory interest.
- Provide access for visitors with disabilities at all facilities.
- Study the Village Inn as part of an Apgar design plan, and consider razing the facility and replacing it with a new lodging facility away from the lakeshore that could also serve the residential needs of the Glacier Institute near the proposed Discovery Center and Museum.

ALTERNATIVE B — NO ACTION / STATUS QUO

The current course of action would continue. The concession contract would continue to require a minimum investment of 6 percent of the annual gross receipts in capital improvements to park facilities (roughly \$600,000 annually) and an equal amount in maintenance of the facilities. Repairs and piecemeal improvements would continue, and operations would proceed until visitor health or safety was compromised or the viability of the operations suffered. As the buildings aged and continued to deteriorate, capital improvements and general upkeep would fall farther behind. Guest satisfaction would further decline. The current concession contract with Glacier Park Incorporated will expire in 2005, and the park will be faced with decisions on how to entice a concessioner to take over the upkeep and maintenance of the facilities and possibly even their ownership (possessory interest), with limited possibilities of a return on the investment. At some point the capital and repair needs of the facilities will exceed the ability of a concessioner to make these investments and maintain a profitable operation. The buildings would then deteriorate to a point at which life safety issues would result in their closure. Visitor services in the park could be compromised, and the staff might be pressured to rush to a solution based on crisis management.

Actions that would be continued:

- Maintain historic facilities and make repairs to correct health, safety, and other deficiencies as funding allows.
- Retain visitor facilities and accommodations as long as possible.

The preferred alternative is A because it would provide for the preservation of these important elements of American history and would continue necessary visitor services. For a discussion of other funding methods, see appendix D. Funding methods considered but rejected are discussed in the section "Alternatives, Ideas, and Strategies Considered but Rejected."

Scenic Air Tours

For some park visitors, including those who have disabilities, flying over the park can be a wonderful way to experience the grandeur of Glacier's roadless interior. For others, aircraft are a noisy, unwelcome intrusion on their park experience. The Going-to-the-Sun Road was built to provide access to the interior of Glacier for those unable to hike or ride horseback. Before the road was built, Glacier was available only to people who had the time and physical and financial ability to see the park's interior. The building of the road changed that. It made the interior of Glacier National Park available to all. The Going-to-the-Sun Road offers a singular experience, comparable to seeing the park by air. The impressive heights and spectacular vistas along the Going-to-the-Sun Road have thrilled visitors for decades. Many other roads in and around the park also provide magnificent views (see scenic viewshed map). Most importantly, this experience is readily available to everyone, including the elderly or people unable to hike into the backcountry.

The millions of visitors to Glacier National Park concentrate mostly along the travel corridors or the finger lakes that dominate the valleys on each side of the park. Some 735 miles of trail provide access for those who wish to hike into the interior of the park. Often these visitors seek the peace and tranquillity and solitude that are increasingly hard to find as technology makes more places accessible.

The reason this issue, while an emotional one, has not yet been resolved is that the regulation of aviation activity is not within the authority of the National Park Service, even though it occurs over the park. The Federal Aviation Administration regulates aircraft use. Aircraft that fly over the park fall under the jurisdiction of the Federal Aviation Administration, not the National Park Service. Even if park managers determined that scenic air tours were inappropriate, or delineated where they could be appropriate, the National Park Service could not regulate where, when, or even if aircraft flew over the park. Park managers must request that the Federal Aviation Administration regulate scenic air tours.

The Federal Aviation Administration regulates aviation throughout the United States, including the airspace above national parks. However, rulemaking and legislative actions are ongoing that will determine how much influence the National Park Service and the laws and policies governing management of national parks will have on airspace management. That issue, and its integration with NPS management, must be reconciled at a national level before changes are likely to be seen in Glacier. These changes would also allow the National Park Service to work with the Federal Aviation Administration to develop a scenic air tour management plan for each park. Such plans would have to be in concert with each park's general management plan. While such regulations are not yet final, park management has determined that the general management plan should provide guidance.

Other uses of aircraft include commercial flights at high altitudes that only incidentally fly over the park, private aircraft that occasionally fly in or through the park, military flights, and the administrative use of aircraft (such as for fires, searches, maintenance of backcountry facilities, and research projects). In some of these, the park is only incidental to the purpose of the flight, but for others, the flight is dependent on the park and its resources, especially those involved with sightseeing.

Commercially operated scenic air tours began in the early 1980s in Glacier with one vendor. There have been as many as five or six vendors, primarily on the west side, that have advertised scenic air tours or have offered to fly visitors over the park. There are at least two vendors who presently provide such services on the outskirts of the park. The purpose of Glacier is unique among national parks. While Glacier's scenic values are what first attracted the idea of national park designation, the park's natural values were recognized by instructing the secretary of the interior to take special care of the wildlife resources and to regulate the park "so as to preserve it in a state of nature." The National Park Service has a responsibility to protect park resources beyond just determining how an activity might affect the enjoyment of park visitors. Often, the scenic air tour issue is characterized only by the effect of noise on visitor enjoyment.

In the congressional designation of Glacier National Park and Waterton Lakes as the world's first international peace park, Glacier's peacefulness and tranquillity were cited among the characteristics that lent the designation of "peace" to the area. Glacier's values for solitude and tranquillity are also recognized in its wilderness recommendation to Congress in 1974. Thus, while noise and its effects are important considerations, the impact of these kinds of visitor activities and their appropriate use must be decided in the context of the national park values and wilderness qualities that could be altered, including visual effects.

Scientific observations have demonstrated that airplanes and helicopters flown near the ground can disturb wildlife. Animals such as grizzly bears have been observed running from feeding areas (Kendall 1986). Birds have been observed leaving nesting areas. Specific research has not been done at Glacier to determine at what altitude aircraft might operate and not harm wildlife.

Of the public comments received on this issue, over 90 percent stated concerns about disturbance or the appropriateness of overflights. Many said that overflights diminished their experience in the park. Most of these comments referred specifically to commercial helicopter sightseeing tours. Much of the concern and comment related to both noise and whether or not such a use is appropriate in Glacier, given its purpose and significance. The following management alternatives can guide federal decisions on this issue and take into consideration that the National Park Service has no authority to take direct action at this time.

ALTERNATIVE A — NO COMMERCIAL SIGHTSEEING TOURS OVER GLACIER NATIONAL PARK (PREFERRED ALTERNATIVE)

Glacier's enabling legislation states the park is to be "for the benefit and enjoyment of the people" and should be regulated to provide "for the preservation

I've stood in some
mighty-mouthed hollow
That's plumb-full of
hush to the brim....

*Robert Service, "The Spell
of the Yukon"*

There is no area in America more replete with beauty of the highest order than that comprised within these two national parks. Tremendous mountains with carved cerfs in which the snows and glaciers of countless ages are encompassed, innumerable lakes, each a gem of its kind, canyons of that character described by Robert Service when he speaks of "canyons plumb full of hush"; these are the describable features of this region. But it has about it something indescribable. Perhaps the imminent presence which broods over it and which is universally felt may best be described as peace.

*From Senate Report 460,
1st Session of the 72nd
Congress
Establishment of Waterton-
Glacier International Peace
Park
March 23 (calendar day,
March 24), 1932
Report to accompany H.R.
4752*

of the park in a state of nature . . . and for the care and protection of the fish and game within" Although commercial sightseeing tours benefit some visitors, they reduce the enjoyment of others. This alternative provides actions to be taken to eliminate commercial scenic air tours over Glacier National Park. Concern by Glacier visitors and the public at large has focused on helicopter air tours. However, commercial air tours over Glacier are also available in fixed-wing aircraft, although to a lesser extent. The National Park Service does not distinguish between the two types of aircraft used in commercial scenic air tours because both offer a service that depends on the park and its resources; therefore, the two types of tours should be treated similarly. These air tours conflict with the park's responsibilities to preserve park resources or park values "in a state of nature" or to care for them properly.

The Federal Aviation Administration would be requested to prohibit all commercial scenic air tours over Glacier National Park. The Going-to-the-Sun Road would continue to provide access to interior portions of the park for all visitors, especially those unable to hike or ride horseback.

Actions to be taken:

- Request that the Federal Aviation Administration prohibit all new commercial scenic air tour operators who would operate over Glacier National Park.
- Develop a scenic air tour management plan with the Federal Aviation Administration and the public that would include a phaseout of commercial operators (existing as of 1997).

ALTERNATIVE B — ALLOW COMMERCIAL SIGHTSEEING TOURS ONLY IN CERTAIN PARTS OF THE PARK

In order to preserve Glacier "in a state of nature" and also to provide air tours for the public, scenic air tours would be available over some portions of the park. Such use might be more appropriate over the portion of the park that receives heavy visitation in order to preserve "a state of nature" in the wilder portions. The Federal Aviation Administration currently recommends, but does not require, that overflights remain higher than 2,000 feet above ground level. At that altitude noise and visual impacts are still very noticeable to park visitors, but direct impacts on wildlife are believed to be minimized.

Areas selected would protect the desires of visitors who seek solitude in the less visited parts of the park. For example, the Federal Aviation Administration might permit tours over the Going-to-the-Sun Road corridor and east of the Continental Divide over the Many Glacier valley. The National Park Service would request that the Federal Aviation Administration prohibit scenic air tours over the North Fork, Middle Fork, Two Medicine, and Belly River areas because of their wild character so that visitors could experience solitude in these park areas.

Actions to be taken:

- work with the Federal Aviation Administration to manage scenic air tours over parts of the park and prohibit them over others.
- develop a scenic air tour management plan.

ALTERNATIVE C — NO ACTION / STATUS QUO

Scenic air tours would continue to proliferate in Glacier National Park under the authority of the Federal Aviation Administration. Recommendations such as flying 2,000 feet above ground level would continue, as would the FAA emphasis on safety to protect the visitors using the tour services. The number of commercial operators would be determined by the marketplace as a result of supply and demand, not by park values. The National Park Service anticipates that scenic air tours would increase over Glacier, as they have over other NPS areas. The National Park Service would monitor impacts on park values and would request that the Federal Aviation Administration require measures that would mitigate (as opposed to prevent) the negative impact.

Actions that would continue to be taken:

- Continue informal monitoring of air tour activity throughout the park.
- Monitor impacts on park values and visitor experiences and work with the Federal Aviation Administration to mitigate negative effects.

GENERAL AVIATION; MILITARY AND OTHER AVIATION ACTIVITIES

General aviation includes airplanes used by small businesses, private pilots, flight training, and similar uses. Because of Glacier's terrain and related issues, these flights are not common and do not constitute a significant problem. The Federal Aviation Administration requests that these kinds of flights voluntarily maintain altitudes of at least 2,000 feet above the ground. Most training flights do not take place over Glacier, and other general aviation activity is ordinarily from point to point. The occasional instances of private pilots flying in and around the park for pleasure do not seem to be an issue. The park accepts this continued use when it is in compliance with FAA regulations and follows voluntary altitude requests.

In the past there have been high level military training routes for aerial refueling over Glacier. These have not impacted park resources. No low-level training routes exist, but they would negatively impact park resources if they were to take place over the park. The National Park Service and the military have a cooperative relationship. Military aircraft operating at low levels and high speeds over Glacier are not operating within the standard operating procedures of the military agencies. On those occasional instances when military aircraft have operated at low levels in the park, military authorities have investigated and have taken appropriate action.

Administrative flights (except those of an emergency nature) require a documented review and advance approval. Research flights undergo the same review process. The decision for each flight is made by the superintendent.

The preferred alternative is A, to prohibit all commercial sightseeing flights over the park. The visitor experience would be diminished by scenic air tours continuing to operate in backcountry areas where peace and solitude have high value for visitors. Glacier's peacefulness and tranquility were cited in the designation of "peace" in the area in 1932. The park's solitude and tranquility were also recognized in its 1974 wilderness recommendation to Congress. There are indications based on research elsewhere that wildlife populations could be directly or indirectly adversely affected by low level aircraft activity.

Personal Watercraft

BACKGROUND

Personal watercraft are marketed under brand names such as Jet-Ski, Waverunner, and Sea-Doo, and are small vessels that use inboard motors powering water jet pumps as the primary source of power. They are designed to be operated by sitting, standing, or kneeling on the vessel. Personal watercraft are high-performance vessels designed for speed and maneuverability and are often used to perform stunt maneuvers. Horsepower (hp) typically ranges from 50-100, and the craft are capable of traveling more than 60 mph.

Under park regulations, all boats with motors greater than 10 hp are prohibited on all but Lake McDonald, St. Mary Lake, Lake Sherburne, and the U.S. portion of Waterton Lake. Waterton Lakes National Park bans personal watercraft on the Canadian portion of Waterton Lake. NPS policy states that personal watercraft are banned in all NPS areas unless specifically allowed by the superintendent or enabling legislation.



ISSUE

Personal watercraft use has increased dramatically over the past five years in areas around the park. Personal watercraft are permitted on Flathead Lake, Hungry Horse Reservoir, Whitefish Lake, and many other lakes in the region. Glacier officials analyzed the potential impacts of personal watercraft use on the park environment and concluded that the craft could degrade park resources and the experiences of park visitors engaged in other recreational activities. This conclusion was reached after review of Congress' purpose in establishing the park and the international peace park, NPS guiding policy and regulations, and research done elsewhere on the effects of personal watercraft on natural resources. Consideration included the banning of personal watercraft by Waterton Lakes National Park and potential environmental and sociological impacts.

In 1996 Glacier's superintendent implemented a temporary prohibition on personal watercraft use in the park. This ban was intended only as an interim measure pending review of the issue as part of the general management plan process. Waterton Lakes National Park had banned personal watercraft in 1994 because residents, visitors, and park managers felt that they were inappropriate in the park and interfered with other boaters.

The National Park Service has the authority to regulate recreational use in Glacier National Park (Organic Act of 1916). The United States Code recognizes that boating in national parks falls under the jurisdiction of the National Park Service as long as NPS regulations complement those of the U.S. Coast Guard. As new types of recreational activities are proposed, the National Park Service must evaluate each activity individually to ensure that it is consistent with approved management direction. The National Park Service must ensure that natural and cultural resources are protected and that acceptable use levels are established. Activities that are inconsistent with the park purpose may be disallowed.

The use of personal watercraft is being considered in this *Draft General Management Plan and Environmental Impact Statement* because when the temporary ban was initiated in 1996, it included a commitment to conduct further public input and study of the issue before a permanent strategy was put into place.

ALTERNATIVE A — BAN PERSONAL WATERCRAFT ON ALL PARK WATERS (PREFERRED ALTERNATIVE)

This alternative would permanently ban personal watercraft from all waters in the park. This regulation would be placed in the Code of Federal Regulations. This alternative would preserve the natural quiet and opportunity for solitude on all park waters.

Actions to be taken:

- Make permanent the temporary ban on personal watercraft.

ALTERNATIVE B — NO ACTION / STATUS QUO

This alternative would lift the temporary ban on personal watercraft and would permit their use on portions of Lake McDonald, St. Mary Lake, and Lake Sherburne. Personal watercraft would be prohibited on the U.S. portion of Waterton Lake. Personal watercraft would be subject to the same regulations regarding safety and noise as boats on these lakes.

Actions to be taken:

- Lift temporary ban on personal watercraft.
- Prepare a regulation to allow use of personal watercraft on portions of Lake McDonald, Lake Sherburne, and St. Mary Lake that are open to other motorboats.

The preferred alternative is A, which would permanently ban personal watercraft from all park waters. The National Park Service considers the use of personal watercraft inconsistent with the purposes for which the park was established. The National Park Service is mandated by the Organic Act and other laws, regulations, and guidelines to ensure “the preservation of the park in a state of nature . . .” and to protect natural and cultural resources. The use of personal watercraft is contrary to preserving a state of nature and protecting resources. There are many locations outside the park, such as Flathead Lake, Hungry Horse Reservoir, and Whitefish Lake, that allow personal watercraft use.

Because of the nature of personal watercraft and the high speeds used in their operation, their use provides little or no appreciation of park settings or heritage themes. There is a conflict between personal watercraft users and park visitors, who enjoy activities such as picnicking, wildlife viewing, hiking, boating, and waterskiing. The impacts on wildlife, water quality, and wetlands are also factors that weigh strongly against allowing personal watercraft activity in the park.

Winter Use

BACKGROUND

Glacier National Park has long provided for visitor use in winter. Nonmotorized quiet recreational activities such as backcountry camping, cross-country skiing, snowshoeing, and hiking have long been part of the enjoyment of the park in winter. Winter overnight accommodations have not been provided, not because of policy, but because there has been no market for them, and current facilities are not winterized.

ISSUE

Northwestern Montana's winter tourism market is maturing. In the Flathead Valley there is one well-established downhill ski area, and a second opened in 1999. Snowmobiling is popular with local residents and visitors adjacent to Glacier. Increasing development and expanding populations in the area will probably result in more winter use of the park. The population of the Flathead Valley has grown by 21 percent, and Glacier County has grown 4.7 percent since 1990. Visitor use studies have documented that 80 percent of the winter visitation is by local residents (University of Idaho 1991). Increasing summer visitation has resulted in many more visits during fall, winter, and spring because of displacement (University of Montana 1994). During winter, parking at the head of Lake McDonald becomes congested on many days, making it difficult to plow snow. Parking at this point has also made it easier to access areas along the Going-to-the-Sun Road where there are avalanche hazards.

Winter visitor numbers are not high and voluntary winter day use registration has decreased since 1995; however, the National Park Service would prefer to plan for increased use rather than wait until problems arise. This General Management Plan and Environmental Impact Statement provides that opportunity.

ALTERNATIVE A — PREPARE FOR MORE WINTER DAY USE (PREFERRED ALTERNATIVE)

This alternative identifies actions that would be taken in response to an increase in winter visitor use. Nonmotorized recreational activities such as cross-country skiing, snowshoeing, backcountry camping, and hiking have long been a



part of the winter experience in Glacier. This alternative would perpetuate and provide for the continued enjoyment of those nonmotorized activities, should winter visitation increase. However, snowmobiles would continue to be prohibited from Glacier National Park. Overnight facilities would not be opened and groomed trails would not be provided. Resource impacts associated with winter use would continue to be monitored. If unacceptable impacts resulted from increased winter day use or the implementation of all or part of this alternative, immediate action would be taken to mitigate or eliminate the impacts.

Actions to be taken:

- Plow only to Lake McDonald Lodge and provide parking and restroom facilities.
- Plow the road to the 1913 Ranger Station and provide parking. Plow to the winter gate at the St. Mary Campground.
- Provide adequate parking and restrooms at the beginning of the Camas Road.
- Plow Many Glacier Road to the park boundary, and provide adequate parking and sanitation facilities.
- Proceed with caution in areas where there is winter wildlife activity and monitor wildlife impacts from increasing use. Take action if necessary.

[Note: The actions to open a campstore at Lake McDonald Lodge and plow the Two Medicine Road to the park boundary have been removed from this alternative.]

ALTERNATIVE B — EXPAND WINTER OPPORTUNITIES TO INCLUDE OVERNIGHT ACCOMMODATIONS

To prepare for increased winter use of the park and provide a winter experience rarely found elsewhere in the region, Glacier National Park would support certain day use activities. The park would also seek to diversify winter use by planning for overnight accommodations in some areas that could be opened when demand increased. Groomed trails would not be provided.

Actions to be taken:

- Evaluate the feasibility of opening Lake McDonald Lodge and/or the Village Inn year-round.
- Plow the road only to Lake McDonald Lodge and Rising Sun Motor Inn, where adequate parking already exists.
- Open campstores to provide snacks and possibly ski and snowshoe rentals.
- Plow parts of the Camas, Two Medicine, and Many Glacier Roads and provide parking and restrooms.

ALTERNATIVE C — NO ACTION / STATUS QUO

Glacier National Park would continue to offer a winter experience to day users and to visitors who wanted to go into the backcountry overnight. As use increased, the park would react as necessary to visitor needs or resource concerns.

Actions that would continue to be taken:

- Plow the road to head of Lake McDonald and to Rising Sun as weather and snow depth allow.
- Provide sanitation facilities and trailhead information.

The preferred alternative is A, which identifies actions that would be taken in response to an increase in winter visitation and use in Glacier National Park. Increased use would be accommodated as described in "Actions to be Taken." Overnight accommodations would not be opened because of the excessive cost of winterization, questionable economic viability, and possible impacts on wildlife. In addition, the National Park Service is concerned about future demands associated with opening these facilities in the winter, including requests for transportation such as snow coaches. Nonmotorized recreational activities would continue in Glacier. No motorized uses (such as snowmobiles) would be permitted. Impacts on wildlife and other resources associated with increased winter visitation and use would continue to be monitored, and action would be taken to mitigate or eliminate unacceptable impacts.

Divide Creek Flood Hazard

**Divide
Creek
map here**

BACKGROUND

At St. Mary the administrative and maintenance facilities and employee housing are in the flood hazard zone of Divide Creek and are subject to dangerous floods that risk life and property. There are 36 park employee housing units, one administrative building, and a maintenance facility that includes 24 buildings. Most of the buildings were built before the Floodplain Executive Order of 1977. Since 1991, Divide Creek has flooded three times, placing lives and government facilities at risk. Riparian areas (zones adjacent to rivers and lakes, usually in floodplains) are sensitive to high levels of visitor use and possible contamination from hazardous materials. The St. Mary Maintenance Area Historic District is on the National Register of Historic Places.

ISSUE

There are NPS facilities, including housing, in a flood hazard zone. To provide for their protection and safety, stream channels and related natural processes are being manipulated, which is not in accordance with NPS policy.

ALTERNATIVE A — RELOCATE STRUCTURES OUT OF FLOODPLAINS AND FLOOD HAZARD ZONE (PREFERRED ALTERNATIVE)

This alternative would relocate park employee housing and administrative and maintenance facilities. These structures and associated activities would be moved out of the flood hazard zone of Divide Creek in St. Mary to a site in or outside the park, or perhaps both. Sites that might be considered in the future are Rising Sun, Many Glacier, East Glacier, and Babb. Analysis of these sites is not included because at this point they are only ideas, and whether they would be carried out would be decided in the future. The National Park Service did assess one alternate location and the cost of moving the facilities (NPS 1985a, 1992b). This information would be considered. Housing and administrative facilities could be separately located from the maintenance facilities. The entrance road to the park would be managed to minimize hazards during flood periods, consistent with future comprehensive reconstruction and use plans for the Going-to-the-Sun Road. Stream crossing improvements necessary to accommodate streamflows would continue.

Actions to be taken:

- Conduct a value analysis to determine the minimal development necessary for park operations.
- Determine a safe location for the facilities that are now in the flood hazard zone of Divide Creek.
- Consider moving these facilities to separate areas inside and/or outside the park.
- If necessary, seek necessary legislative authority and acquire needed property if the selected location is outside the park.
- Design and construct replacement housing and administrative and maintenance facilities.
- Remove floodproofing and all structures and allow Divide Creek to follow its natural channel to St. Mary Lake.

ALTERNATIVE B — CHANNELIZE DIVIDE CREEK

An engineering solution to stabilize Divide Creek and reduce the flood hazard would be sought. This would protect development against future floods to the extent possible. This action would be contrary to allowing natural processes to prevail in a national park.

Actions to be taken:

- Obtain necessary permits from the Blackfeet Indian tribe and other agencies.
- Channelize the necessary section of Divide Creek.

ALTERNATIVE C — NO ACTION / STATUS QUO

The National Park Service would continue to maintain a monitoring program to ensure human safety and to protect park facilities at Divide Creek. However, no action would be taken to remove facilities from the flood hazard area.

Actions that would continue to be taken:

- Monitor for floods.
- Maintain the flood wall along Divide Creek.

The preferred alternative is A, which would offer the best protection of resources, visitors, and park staff, and would be in accordance with NPS policy. Furthermore, Divide Creek is extremely unpredictable and would require massive stabilization. Stabilization, particularly of this magnitude, is in direct conflict with NPS policy on resource management. The safety of park employees, their families, and any visitors in this area could not be adequately ensured. Moving these facilities also provides the National Park Service with the opportunity to relocate operations to more convenient areas. Maintenance, housing, and administration facilities do not have to be all in one place.

West Side Discovery Center and Museum

BACKGROUND

About 60 percent of visitors to Glacier enter the park through the west entrance. The Apgar Visitor Center (probably more appropriately called a contact station) is a converted two-bedroom house that attracts about 190,000 people annually. Park visitation in recent years has been over 1.7 million. The Apgar facility is small and frequently crowded. Only a few exhibits are on display. The value of Glacier's resources and the park's important stories cannot be adequately described. For nearly 20 years the National Park Service has evaluated a variety of locations, inside and outside the park, for a new, larger interpretive center and museum. The needed facility has not been built because of disagreements on location and waning support for partnering, along with lack of construction funds.

The park's museum collection contains around 20,000 natural and cultural objects. These items, which are critical for educating visitors and for research, are stored in two buildings and three garages near park headquarters. The collection is growing, and space that meets professional museum standards is lacking. The objects are irreplaceable, and very few pieces from the collection are on public display because of lack of space and appropriate conditions to protect them.

When visitors come to the park, we believe they expect an educational experience. The Apgar facility is woefully inadequate to meet the basic park functions of providing orientation, safety, protection, and interpretive and educational messages. A new center and museum on the west side of the park has been a recognized visitor need for many years.

ISSUE

Glacier is a special place to many people. It is a national park, an international peace park, a biosphere reserve, and a world heritage site. No other place in America has those four designations, yet there is no place in Glacier that tells the story of the park's importance. A west side discovery center and museum would "connect people to the park" (an NPS goal for interpretation) and serve the year-round educational needs of visitors and students. It would be a focus for summer

visitors and for classes throughout the school year. Its exhibits would trace history from the earth's first lifeforms, represented in Glacier's oldest rocks, to modern-day events. Items from the park's collection of museum objects (from historic vehicles to prehistoric artifacts) would help visitors better understand Glacier's place in American heritage. A discovery center would also serve people who wanted to learn about the international peace park and world heritage values in order to apply those principles elsewhere in the world.

The need for a discovery center and interpretive museum on the west side of the park has long been recognized. The current visitor contact station is difficult to locate, lacks adequate parking, is too small to serve many more visitors, lacks adequate interpretive and museum exhibit space, and has limited facilities for school groups and their educational programs. The facility was meant to serve an interim solution by adaptively using a small house as a contact station. Many visitors miss the contact station and arrive at Logan Pass before they encounter a ranger-staffed facility. This may contribute to longer stays and more congestion at the pass. Visitors need to receive important messages about resource protection, safety, educational and orientation messages upon entry to the park, not halfway through their visits.

ALTERNATIVE A — CONSTRUCT A WEST SIDE DISCOVERY CENTER AND MUSEUM INSIDE THE PARK (PREFERRED ALTERNATIVE)

Visitor service, education, and exhibition of museum objects would be provided with a discovery center and museum inside the park (see Discovery Center Preferred Location Map). A facility would be built north of the Going-to-the-Sun and Camas Roads T-intersection, in the Apgar area. Many more visitors would be attracted to a facility at this location than any other since it would be conveniently located for visitors entering from either direction along Highway 2 or the Camas Road. This would be especially important in the future if, as many believe, the North Fork Road was paved from Columbia Falls at least as far as the Camas Road junction.

Important resource protection messages would be conveyed to visitors at the center, which would encourage safer visits and better preservation of the park's resources. The facility would improve the exhibition of many more of the park's museum items, meet professional curatorial standards, and increase public access to the collection(s).

The new center would replace the interim contact station at Apgar. The future use of that facility has not been determined. The new center would be a full-service, accessible, year-round facility that would offer information services, interpretive and educational programs, innovative exhibits, and environmental education space. The needs of the Glacier Institute's year-round outdoor education and student programming could also be addressed at the facility. Highlighting the International Peace Park, it would offer resources for groups seeking solutions for critical issues and conflicts facing the world.

The NPS recommendation to place the west side discovery center and museum within the park is based on the premise that the best place to “connect visitors to the park” and its resources, prepare visitors for an appropriate experience, and provide the highest level of visitor service would be a center built in the park. The mission of the National Park Service is dual: to protect park resources and to provide for visitor enjoyment. A well-designed educational facility strategically located at the T-intersection near Apgar could accomplish the service's mandate most effectively for these added reasons:

- The T-intersection is strategic in that it is the point past which all visitors who enter the park on the west side will drive. The T-intersection is the first location in the park where visitors entering from all three directions on the west side of the park converge. No location outside the park is so strategically located that it would be convenient for visitors to pull into a center and receive critical park messages. If the county or the state paved the North Fork Road as far as the Camas Road, more visitors would enter from this direction.
- A center inside the park would allow for easy access by all west side visitors, encourage repeat visits to the center during a stay in the park (hence offering a greater learning opportunity), allow for pedestrian access from Apgar, and allow for school and visitor programs to begin at the center and proceed directly into the park. Based on experience in other parks, we know that visitors are more willing to seek out educational messages once they are inside the park than before they enter. The nature of visitors' questions can be different at a center outside the park than inside the park. Hence, the discovery center would become a place to “connect with the park” and not just a stopping point before entry.
- Locations for a visitor center outside the park were intensively studied in 1989. Several of the most favored locations have now been developed by others (Alberta Visitor Center and Minuteman Helicopter). Only less desirable locations remain available.
- Building a federal facility outside the park would mean either buying the necessary land (loss of property tax dollars) or working through the General Services Administration to have a building constructed and leased for use as a visitor center. Either option would be more expensive than building within the park on land the government already owns.
- Some of the needed utility systems, including sewer lines and a treatment plant (both of which are slated for improvements), already exist within the park. A new discovery center and museum could be added into the existing system at less cost than developing a method to handle sewage for a new facility outside the park, where no sewage plant now exists. For instance, constructing a sewerline from outside the park, across the Flathead River, and into the park's treatment facility would be extremely expensive.
- The T-intersection area that will be studied further is a lodgepole pine forest. The proposed site is north of the T-intersection and flanked by existing

development on three sides. Wildlife migration routes exist in the area, but they are primarily between the intersection and park headquarters. The suggested site north of the intersection was purposely suggested to minimize impacts on flora and fauna while serving the greatest number of park visitors. Flora and fauna surveys would be conducted before the facility was sited.

- A key use of the new center would be to offer educational programming for youth. Nearly 5,000 students attend educational programs, many based out of the existing, but cramped, Apgar visitor center (a converted two-bedroom house) and/or the environmental education cabin (converted small cabin) in Apgar. Winter snowshoe walks are among the most popular programs. A new center in the park would allow us to serve them better, with improved classroom space, and then they could continue the educational opportunity by snowshoeing right out the back door into the park. Locating a new center outside the park would not have the same effectiveness and would mean students would start their educational experience in the center, reboard the school bus for a trip to Apgar, and reboard the bus again to return to the center. Thus, it would be more difficult to “connect the students to the park” and its resources. Students come to Glacier to experience the park, and having the new center in the park would allow the greatest opportunity for that to occur.
- Around 20 years of planning has gone into trying to pick a suitable location, find a suitable partner or partners with whom to develop a center, and in the end nothing has been built to better serve the needs of visitors to Glacier National Park in the “crown of the continent” ecosystem. No other organization has urged a combined facility during this planning process. Visitors to the park deserve and desire a well-designed, effective learning center, and a center in the park can best meet the objective of providing the highest level of visitor service.
- Developing an effective center in the park with adequate space for the sale of interpretive and educational materials would allow for the reduction or elimination of that activity at Logan Pass Visitor Center, which now serves as the west side visitor center for many visitors because they miss the existing Apgar Visitor Center.
- Building a center inside the park to “tell the park story” and “connect people to the park” and its resources would not prohibit another joint venture outside the park at some future date with other organizations or agencies. The two centers would complement each other and provide complimentary messages and information.

Actions to be taken:

- Complete a comprehensive design plan and environmental analysis for the Apgar area that includes the new center and determines the related visitor uses, needs, and services that should be incorporated into the new center.

- Based on that analysis and planning, construct a west side discovery center and museum with related infrastructure north of the T-intersection near Apgar.
- Modify the T-intersection to improve traffic flow.

ALTERNATIVE B — LOCATE DISCOVERY CENTER AND MUSEUM OUTSIDE THE PARK

A discovery center and museum would be located in a convenient area outside the west entrance. There might be an opportunity to pursue a joint project with other agencies or to use an existing facility. If needed, legislation would be sought to allow for the purchase of property outside the park and for the authority to expend federal funds on the project.

Actions to be taken:

- Evaluate locations outside the park or adaptively use an existing facility.
- Consider partnerships with others.

ALTERNATIVE C — NO ACTION/STATUS QUO

Information center functions would remain at Apgar. The issues associated with this facility would continue. It is too small, the associated parking is inadequate, and it is difficult for visitors to locate. Eventually, the structure will deteriorate and no longer serve its purpose and will have to be replaced.

Actions to be taken:

- Retain information and visitor contact station functions at Apgar.
- Retain curatorial storage in three different locations in the park.

The preferred alternative is A. The exact location north of the T-intersection near Apgar would be selected as funding became available.

A west side discovery center and museum is needed to provide information and education for the visitors who enter the park on the west side. Because it is not along the Going-to-the-Sun Road, the Apgar contact station does not adequately serve the public.

A new discovery center and museum would be most effective if located near the main park road, where a majority of visitors entering through the west or Camas entrances would have easy access to the facility. The area between Apgar Village and the T-intersection is the favored location. It is adjacent to development and utilities. This site would minimize impacts on wildlife corridors compared to other locations along the entrance road. Having innovative exhibits and museum objects on display in the park would heighten visitor understanding and appreciation of the park's resources.

Regional Cooperation

While Glacier cannot achieve its resource goals without cooperation of its neighbors, neither can it forget that it has an impact beyond park boundaries. Glacier National Park's resources are not static or isolated but are linked to regional ecosystems and the ways that those ecosystems are managed. The future of resources such as the park's air quality, its elk and grizzly bear populations, and its quiet depend as much on the activities of external landowners and agencies as they do on park management.

Although agencies such as Parks Canada, the U.S. Forest Service, and the Blackfeet Tribal Business Council have different management responsibilities, it is desirable for park managers and managers of external land to agree on the values to be protected in the ecosystem and then also agree on a strategy for protecting those values. Glacier National Park has practiced aspects of ecosystem management for a number of years. For example, park officials are active participants in such forums as the Flathead Basin Commission, the Interagency Grizzly Bear Committee, and the Montana Bald Eagle Working Group. Each of these interagency committees seeks to resolve specific issues that do not stop at administrative boundaries. Other examples of ecosystem management efforts in which the park is involved are the *Northern Continental Divide Grizzly Bear Ecosystem Management Plan*, the *Montana Smoke Management Plan*, and specific plans by stream drainage to control the spread of noxious weeds. Park management is actively involved in the planning processes of other resource management agencies. Other agencies also assist with planning in the park.

FLATHEAD NATIONAL FOREST

Management prescriptions in the *Flathead National Forest Plan* (1984) and subsequent resource management planning efforts would maintain viewsheds adjacent to the park and meet the habitat needs of wildlife moving between the park and the Flathead National Forest. Also, the Forest Service would build very few new roads for timber sales adjacent to the park. Most national forest land in the Middle and South Fork Flathead River drainages has been leased for oil and gas; however, all these leases are currently suspended pending the resolution of legal challenges. There could be a conflict between the preservation of park values and the need to produce commodities if oil and gas exploration took place on portions of these leases. National forest land in the North Fork Flathead River drainage is also

managed with a strong emphasis on maintaining a healthy ecosystem and protecting the resources of Glacier National Park. The *Flathead National Forest Plan* provides for a special grizzly bear management area between Trail Creek and the Canadian border. The plan also prohibits commercial activities such as snowmobile tours or guided hunts and is consistent with the park's policy of not allowing commercial development in the North Fork.

LEWIS AND CLARK NATIONAL FOREST

The portion of the Lewis and Clark National Forest that lies directly to the south of the park on the east side of the Continental Divide is referred to as the Badger-Two Medicine area. In accordance with the *Lewis and Clark National Forest Plan* (1986), the Badger-Two Medicine area is managed for multiple use, including grazing, recreation, and mineral exploration. Because of the rocky terrain, there has been only limited timber harvesting in this area. Management prescriptions in the *Lewis and Clark National Forest Plan* seek to maintain viewsheds adjacent to the park and meet the specific habitat needs of wildlife species that move through park and U.S. Forest Service land.

Most land in the Badger-Two Medicine area is leased for oil and gas exploration, and in recent years two applications to drill have been processed by the Forest Service. Drilling has not begun on either of these leases. Legal challenges and current management direction indicate that it is unlikely that drilling would begin in the near future.

As with portions of the eastern half of Glacier National Park, the Badger-Two Medicine area is a part of the Blackfeet ceded strip and retains special importance to the Blackfeet people. The National Park Service and the Lewis and Clark National Forest have similar obligations to protect the cultural and ethnographic values of the land.

BLACKFEET INDIAN RESERVATION

Glacier National Park and tribal officials cooperate on a number of challenging issues involving tribal and park land. These include the joint management of cultural landmarks (such as Chief Mountain), livestock trespass, and wildlife management. We have also been invited to participate in environmental analyses for timber harvest and for gas and oil leasing. The tribes' timber harvest plan provides for wildlife movement between the park and tribal land and protects viewsheds, especially from Montana Highway 89. In recent years tribal leaders have indicated a willingness to expand cooperation where values are shared.

Much of the eastern half of Glacier National Park was once part of the Blackfeet Indian Reservation. These lands were ceded to the United States in 1895, and in 1910 they became part of Glacier National Park. The secretary of the interior recently decided to reopen discussion with the Blackfeet regarding the treaty of 1895. These discussions could potentially lead to changes in the management of the eastern half of the park.

WATERTON LAKES NATIONAL PARK

Parks Canada and the National Park Service share common values and similar missions. Both parks are bound together by legislation that recognizes these shared values. Managers at Waterton Lakes National Park emphasize the protection of resources and ecosystem integrity. Commercial development in the park is mostly limited to the Waterton Townsite. Waterton Lakes and Glacier National Parks cooperate on a wide variety of planning efforts, including resource management, law enforcement, and visitor safety. Waterton Lakes is a biosphere reserve and a world heritage site.

BRITISH COLUMBIA

The North Fork of the Flathead River in British Columbia has important ecological links to Glacier National Park and to other federal, state, and private land south of the border. These links were underscored by the International Joint Commission in its 1988 report on the transboundary impacts of an open pit coal mine proposed in the Canadian portion of the drainage.

The recovery effort for two endangered federally listed species in the United States is tied to Canada's portion of the North Fork. Grizzly bear numbers in Glacier and on adjacent land in British Columbia are among the densest ever recorded for an inland population in North America. Wolves from British Columbia recolonized Glacier in the early 1980s. Human habitation in the British Columbia portion of the Flathead drainage is extremely low.

British Columbia recently completed a comprehensive regional land use plan. The *Kootenay-Boundary Regional Land Use Plan* (1995) specifically provides for the three separate management zones in British Columbia's portion of the Flathead drainage near Glacier National Park:

- ***Integrated resource management*** — This zone includes high-elevation areas in the Flathead drainage where a broad range of activities is allowed, including mining, timber harvesting, road construction, and recreation.
- ***Special resource management*** — This zone includes much of the lower valley and emphasizes the protection of riparian areas and wildlife habitat while allowing timber harvesting and other compatible commodity extraction.
- ***Protected*** — Akamina-Kishinena Provincial Park, a 10,900 hectare (about 26,900 acres) area in the extreme southeastern corner of British Columbia was recently upgraded from a provincial recreation area to a provincial park, a designation that includes the prohibition of mineral exploration and timber harvesting.

The upgrade of Akamina-Kishinena to a provincial park provides protection similar to Canada's national parks. It complements both Glacier National Park's and the Flathead National Forest's plans for the North Fork Flathead River drainage. Habitat security for the endangered gray wolf and threatened grizzly bear should improve because much of the Akamina-Kishinena Provincial Park will be managed as wilderness.

COAL CREEK STATE FOREST

Coal Creek State Forest is adjacent to Glacier National Park in the North Fork Flathead River drainage. It is administered by the Montana Department of Natural Resources and Conservation, which has worked closely with Glacier National Park officials to minimize damage to park viewsheds and to meet the needs of wildlife that use both park and state forest land. An example of such cooperation was the joint development of a management plan for the bald eagles that nest at Cyclone Lake on the state forest and feed in portions of the park.

FLATHEAD WILD AND SCENIC RIVER

In 1976, Congress designated the three forks of the Flathead River as part of the national scenic river system. The North Fork of the Flathead River is designated as “scenic” from the international boundary downstream to Camas Creek and “recreational” from Camas Creek to the confluence with the Middle Fork. The Middle Fork is designated as “recreational” for the entire length bordering Glacier National Park. Congress directed that the U.S. Forest Service would be the primary management agency for the Flathead Wild and Scenic River and that the National Park Service would have secondary responsibility. This designation and subsequent USFS management direction for these rivers is consistent with Glacier National Park’s planning efforts. Management of the North and Middle Forks as wild and scenic rivers helps to protect the natural, cultural, scenic, and recreational values of the park in a broader regional setting.

ADJACENT PLANNING EFFORTS

The Canyon and North Fork land use plans complement the park’s internal planning by discouraging development in sensitive areas and by directing where development should occur. This plan does not propose any actions that would affect private land outside the park. The planning authorities for private land are at the state, county, or tribal levels. The park will continue to cooperate with adjacent entities on cooperative planning on request.

BURLINGTON NORTHERN ENVIRONMENTAL STEWARDSHIP AREA

A partnership was established in 1992 to create an operationally and environmentally safe and compatible rail corridor along the southern boundary of the park. Glacier National Park is one of the several land management agencies and private entities involved in the partnership. This management effort complements park planning by helping to protect resources (particularly grizzly bears) in the region. Other partners include the U.S. Forest Service, Burlington Northern—Santa Fe Railroad, and the state of Montana.

FLATHEAD BASIN COMMISSION

The Flathead Basin Commission (FBC) is a regional water protection organization with a broad mandate to study and report on the quality of the Flathead Basin's natural resources. Members include federal, state, local, and tribal managers, a public utility, private citizens, and a representative of British Columbia. The FBC efforts to protect water in a regional context are consistent with water quality protection goals for the park. Glacier National Park plays a key role in maintaining the water quality of Flathead Lake because of its location in the upper reaches of the basin and because most of the park is managed as a wild area. The park's headwater lakes contain some of the last natural aquatic communities in the Columbia River Basin and are critical to the basin's water quality future. The Flathead Basin Commission has adopted a total maximum daily load strategy that should reduce nutrient loading to Flathead Lake from a variety of sources. By statute, the superintendent of Glacier National Park sits on the commission's board of directors.



Alternatives, Ideas, and Strategies Considered but Rejected

A variety of concepts and specific ideas for the future of the park were examined throughout the planning process, but they were dropped from further detailed analysis in this document. These ideas arose from comments received during scoping. *Newsletter 3* was developed using those ideas and was presented to the public in July 1996. It presented three alternatives for managing the park.

ALTERNATIVES

Alternative 1

In response to current and anticipated activities in the region, the necessary protection of natural and cultural resources, ecosystem issues and concerns, and the desire to provide quality visitor experiences, this alternative would have provided a broad range of visitor experiences inside the park in addition to those provided elsewhere in the region. To achieve this concept, the park would have been managed to achieve the following results:

- Provide a broad range of appropriate visitor experiences in the park.
- Provide for an expanded visitor season.
- Encourage/sustain the development of visitor services outside the park on the east and west.

This alternative was dropped because there was no need to duplicate opportunities elsewhere. The National Park Service has no authority outside park boundaries and could not ensure that local businesses could be sustained. The alternative included many ideas that were not consistent with park purpose and significance, were not fiscally sound, and did not respond to issues raised.

Alternative 2

In response to current and anticipated activities in the region, the necessary protection of natural and cultural resources, ecosystem issues and concerns, and

the desire to provide quality visitor experiences, this alternative would have emphasized the park's place as the core of the Crown of the Continent ecosystem. Fewer development-dependent experiences would have been provided inside the park compared to the other two alternatives and existing conditions. To achieve this concept, the park would have been managed to achieve the following results:

- Enhance the continuity of wilderness in the region.
- Preserve large blocks of undeveloped land.
- Accommodate day use visitors along the Going-to-the-Sun Road corridor.
- Relocate access to the park and adjacent land along the periphery.

This alternative was dropped because of the potential adverse affect on the local economy, the high cost of relocating access, and change in traditional uses.

Alternative 3

In response to current and anticipated activities in the region, the necessary protection of natural and cultural resources, ecosystem issues and concerns, and the desire to provide quality visitor experiences, this alternative would have provided easier access to backcountry wilderness than other areas (such as the Bob Marshall Wilderness Area). To achieve the objectives of this concept, the park would have been managed to achieve the following results:

- Limit access along the Going-to-the-Sun Road to transit system only and create a pedestrian-oriented experience along the road corridor.
- Shift visitor services to the periphery.
- Create opportunities for new visitor experiences by cooperating with neighbors and dispersing regional visitor use to adjacent land.

This alternative was dropped because of the concession contract agreement, economic impacts, experiential impacts, and unacceptable natural resource impacts. Also, cooperating agencies did not want use to be dispersed.

IDEAS

Build Another Road in the Park

The idea of building another road in the park was considered but rejected for a number of reasons. It is unlikely that funds would be available to build a new road and maintain it. Furthermore, with a few exceptions, the National Park Service is not building new roads, particularly in parks like Glacier, where the resource impacts would be extensive.

Make the Going-to-the-Sun Road One-way

The concept of making the Going-to-the-Sun Road a one-way road was considered and rejected. One-way use of the road would not have allowed visitors the freedom of traveling to and from a particular destination on the road in the most efficient manner, and it would have precluded backtracking, even for a short distance, if a visitor had missed a particular turnout or trailhead.

Turning the Going-to-the-Sun Road into a Light Rail or Cog Rail System

The idea of turning the Going-to-the-Sun Road into a light rail or cog rail system was considered but rejected. The tracks and cables associated with these systems would have been incompatible with the historic appearance of the road, and it would have precluded private automobile use, which is historic and valued by visitors. The road was built in the 1930s to open up the interior of the park to the general population, not just those with means. Automobiles were becoming (and are now) the most common type of travel in the United States and Canada, even for people with limited incomes. Furthermore, there is no efficient and economical public transportation system to Glacier National Park other than Amtrak; therefore, most visitors would have continued to drive their own vehicles to arrive at the park. Then each motorist would have had to find a place to leave the vehicle in order to travel the Going-to-the-Sun Road by cog rail.

The idea of using light rail or cog rail in areas adjacent to the Going-to-the-Sun Road also was considered, as was the idea of using alternate routes such as the Logan Creek Valley between Logan Creek and Logan Pass. These ideas were also rejected because they would have required the intrusion of substantial development into natural areas of the park that have not been disturbed and are now proposed for wilderness designation.

Convert Sprague Creek Campground to Day Use Only

The National Park Service suggested this idea in *Newsletter 3* as a component of alternative 2, which focused on day use only in the Going-to-the-Sun Road corridor as a way to emphasize remote wilderness experiences throughout the park.

This idea was dropped because Sprague Creek's frontcountry camping (without trailers) offers an unusual experience in the park that should be retained in an effort to provide a variety of visitor services. Because campgrounds are usually full throughout the summer, reducing the number of sites would increase demand.

Remove Picnicking from Sprague Creek

This idea was rejected because there are not many formal picnic areas in the park.

Convert Avalanche Campground to Day Use Only or Overnight Use Only

The National Park Service suggested these ideas in *Newsletter 3* as ways to reduce congestion at this popular destination. It currently provides trailhead parking, restrooms, picnic tables, a boardwalk hiking trail, and overnight camping. Congestion and confusion are common during the height of the summer season. These ideas were dropped from further consideration because it would have resulted in a reduction in the level of visitor services in the park, for which there is already a demand, and because the area provides a traditional use. A future study and EIS will address and analyze the Avalanche developed area.

Remove Lodging at Rising Sun

The National Park Service suggested these ideas in *Newsletter 3* as potential components of alternative 2, which emphasized day use only along the Going-to-the-Sun Road corridor. This alternative was dropped from further study because lodging at Rising Sun is part of Glacier's traditional visitor services and removing this facility would result in few, if any, resource benefits. There would be a loss of historic resources and a failure to complete contract obligations.

Remove Lodging in the Swiftcurrent Area.

The National Park Service suggested this in all alternatives of *Newsletter 3* as a way to reduce visitor impacts on resources (particularly wildlife) in this area. The facility is deteriorating. This idea involved removing the Swiftcurrent Motor Inn (all alternatives) and removing the Many Glacier campground (alternatives 2 and 3). The Many Glacier Hotel would have been retained in all alternatives. This idea was dropped from further study because the Swiftcurrent Motor Inn and Many Glacier Campground are part of Glacier's traditional visitor opportunities. Contractual obligations exist, some of the facilities are historic, and there is a demand for the available lodging. Should unacceptable resource impacts be indicated in the future, an analysis would be conducted and the buildings would be considered for removal. This would require an amendment to the *General Management Plan*.

Remove Tour Boats on Lake Josephine and Swiftcurrent Lake

Alternatives 2 and 3 of *Newsletter 3* suggested removing tour boats from these lakes. This was suggested as a way to offer a range of visitor experiences, because almost all the large lakes in the park do have tour boats operating. This idea was dropped from further consideration because tour boats are a traditional use of the park, and they provide access for people of all ages and physical conditions to see backcountry and wildlife. There are also contractual obligations.

Relocate Administrative and/or Visitor Facilities from Goat Haunt Out of the Park

Alternative 2 in *Newsletter 3* suggested removing facilities from Goat Haunt (except the patrol cabin) and replacing them with facilities at Waterton Townsite. It also suggested retaining the tour boat on Waterton Lake but not dropping visitors at Goat Haunt. This idea was dropped from further consideration because of the desirability of boat service to Goat Haunt. Boat service makes the area accessible to hikers, and this area emphasizes the park's international peace park designation. This idea was also dropped because removing these facilities would result in negligible resource improvement would eliminate a necessary service, and would require funding that should be used elsewhere in the park.

Relocate Administrative and/or Visitor Facilities from the Cut Bank Valley Area Out of the Park.

Alternative 2 of *Newsletter 3* suggested removing the campground in the Cut Bank Valley and its access road to enhance wilderness values by moving visitor facilities outside the park. This idea was dropped from further study because removing this facility and the road would be inconsistent with retaining traditional visitor uses in the park. Also, it was concluded that removing these facilities would result in a negligible resource improvement and would require funding better used elsewhere in the park.

Remove Commercial Services from Two Medicine

Alternatives 1 and 2 of *Newsletter 3* suggested removing commercial services from the Two Medicine area and using the structures to provide additional visitor information. This was suggested as a way to encourage visitor services in areas outside the park and to reduce resource impacts in the Two Medicine area. This idea was dropped from further consideration because this area of the park provides an alternative to the heavily used Going-to-the-Sun Road corridor and because it provides basic visitor services, yet has the feel of a wilderness experience. There are also contractual obligations.

Close the Inside North Fork Road or Convert it to a Hiking or Biking Trail Between Apgar and Logging Creek

Alternatives 1 and 2 of *Newsletter 3* suggested these ideas as ways to provide a broader range of visitor experiences (biking-hiking trail, alternative 1) or to enhance remote wilderness experiences (close road to vehicles and bicycles, alternative 2). This idea is no longer being considered because retaining vehicle use on this road is consistent with the philosophy of retaining traditional visitor uses in the park. The inside North Fork Road is already open to bicycle use, and no more trails are needed.

Remove the Camas Road or Allow Bicycles Only

These ideas arose from alternatives 2 and 3 of *Newsletter 3* as ways to emphasize wilderness values (alternative 2) and to provide easier access to backcountry experiences (alternative 3). This idea was dropped from further consideration because the Camas Road provides direct access between the North Fork and the Apgar area. Removal of this road would reroute traffic as far away as Columbia Falls and would not improve resource conditions enough to warrant the inconvenience to park visitors. Also, removing the asphalt surface of this relatively new road, which was recently improved, would require funds that could be better used elsewhere in the park.

Relocate Administrative and/or Visitor Facilities from Walton to Outside the Park

Alternative 2 of *Newsletter 3* suggested this idea as a way to enhance wilderness values in the area. The idea was dropped from further consideration because removal of these facilities would result in a negligible resource improvement in the area, would require funding needed elsewhere in the park, and would remove historic structures and traditional visitor service facilities.

Expand the Campground at Apgar

Alternative 2 of *Newsletter 3* suggested expanding the Apgar Campground as a way to increase overnight use at either end of the Going-to-the-Sun Road while designating the road corridor as day use only.

After further consideration, it was determined that the public strongly supports retaining current visitor uses along the Going-to-the-Sun Road corridor. Expanding the campground is too site-specific for this plan and will be addressed later if necessary.

Reduce Size and Density of Fish Creek Campground and Provide Tent-Only Camping at Sun Point

Alternative 3 of *Newsletter 3* suggested these ideas as ways to offer a range of camping experiences in the frontcountry.

These ideas were dropped from further consideration because the *General Management Plan and Environmental Impact Statement* will provide an overall management philosophy and strategy, but it will not include such specific proposals as reducing the size and density of a particular campground. These types of specific actions will be considered on a site-by-site basis after the plan is finalized. The National Park Service acknowledges strong interest in maintaining campgrounds in the park and not reducing their size and density.

Build a New Boat Launch at St. Mary Lake

This idea was suggested in alternative 3 of *Newsletter 3* as a way to increase access to the lake. The idea was dropped from further consideration because such site-specific proposals could be addressed on an as-needed basis after the *General Management Plan* is approved. Furthermore, the south side of St. Mary Lake is within proposed wilderness, and no permanent structures are allowed in wilderness areas.

Build a Pedestrian Bridge across the Middle Fork

This idea was rejected from further consideration because the Middle Fork is a wild and scenic river. Building such a bridge would have required agreement with the U.S. Forest Service, and it would have violated the management philosophy for the Middle Fork geographic area.

Reduce NPS Housing in the Park

This was suggested as part of alternative 3 in *Newsletter 3* as a way to shift development outside the park to enhance the backcountry wilderness experience the park provides. The National Park Service recently required all parks to assess government housing. The assessment indicated a housing shortage in Many Glacier and excess housing in the West Glacier headquarters area. In accordance with NPS policy, excess housing must either be removed or converted to other uses. Employees not required to occupy government housing would relocate outside the park.

Construct a Joint Customs Facility for the United States and Canada

This idea was suggested in *Newsletter 3*. It was dropped from further consideration because it is too site-specific to be considered further in this plan. It will be addressed later on an as-needed basis after this plan is approved.

Provide, Expand, or Reopen Campgrounds at Polebridge, North Fork, Quartz Creek, and Logging Creek

Alternatives in *Newsletter 3* suggested constructing campgrounds along the North Fork of the Flathead River for floaters and as reopening campgrounds at Quartz and Logging Creeks. Quartz and Logging Creek Campgrounds reopened in 1997. Opening the other campgrounds is not being considered at this time but has not been eliminated as a possible future action. This *Final General Management Plan and Environmental Impact Statement* provides an overall management philosophy and framework; it does not include such specific proposals as developing new campgrounds in the park. Specific actions will be considered individually after the plan is approved. The Park Service acknowledges strong public support for reopening and expanding campgrounds in the park.

Provide Campgrounds and Picnic Areas in the Middle Fork Area

Alternative 1 in *Newsletter 3* suggested constructing a winter campground and a summer picnic facility in the Middle Fork area. These specific ideas were dropped from further analysis but have not been eliminated as possible future actions. This plan would provide an overall management philosophy and framework; it does not include such specific proposals as developing new campgrounds in the park. These specific actions could be considered individually after this plan is approved.

Prohibit Private Motorboats or Reduce Maximum Allowable Horsepower of Private Motorboats on Lake McDonald and St. Mary Lake

These ideas were suggested in *Newsletter 3* in response to public comments. Currently, private motorboats are allowed on Lake McDonald, St. Mary Lake, Waterton Lake, and Lake Sherburne without a maximum horsepower limit. Motorboats of up to 10 hp are permitted on Bowman and Two Medicine Lakes. No motorboats are permitted on other lakes in the park. A range of comments on private motorboats were received. Some people favor banning all motorboats in the park; some wanted to reduce maximum allowable horsepower on some lakes.

These ideas were dropped from further consideration because the current private motorboat policy already allows for a range of motorboat use in the park. Motorboats may be used with no horsepower restrictions on Lake McDonald, St. Mary, Waterton, and Sherburne Lakes, which are located in or adjacent to the proposed visitor zone, which has more visitor use than other zones. Use of private motorboats with no horsepower restrictions is consistent with this zone.

Bowman and Two Medicine Lakes have a maximum 10 hp restriction, which is consistent with the philosophy for their geographic areas and zones. Low-horsepower boats on Bowman and Middle Two Medicine Lakes provide important visitor access to the backcountry at the head of the lake and do not significantly impact resources or visitor experiences in this area.

Change Policies on Bicycling and Ice Fishing

During the public involvement period, the Park Service received comments proposing various policy changes regarding bicycles in the park and ice fishing in frontcountry and backcountry lakes. Bicycles are allowed on roads that are open to motorized vehicles; only the Going-to-the-Sun Road has restrictions that prohibit bicycles during the middle of the day when traffic is heaviest. Public opinion on bicycle use in the park varied. Some people wanted more mountain bike trails and paths. Others wanted only bicycles (no cars) on the Going-to-the-Sun Road. Some people said that bicycles should not be allowed in the park at all for safety reasons. The current bicycle policy offers a range of visitor experiences while keeping bicycles out of the 95 percent of the park that has been proposed for wilderness, as the Wilderness Act dictates.

Permitting ice fishing is not considered in this *Final General Management Plan and Environmental Impact Statement* because it is too specific for this document.

However, a change in policy to permit ice fishing is consistent with the management philosophy presented in this plan. The current ice fishing policy is being reevaluated.

FUNDING STRATEGIES FOR REHABILITATING HISTORIC HOTELS AND VISITOR SERVICES

A variety of methods were examined for funding the rehabilitation of historic visitor service structures in the park. The following methods were rejected because they either would have required the National Park Service to give up ownership of the facilities or would have necessitated new development to generate revenue. For funding methods that were not rejected, see appendix D. More detailed discussions follow.

Establish a Resort Tax on Purchases in the Park to Fund Such Projects as Restoration of Historic Visitor Service Structures

This strategy was considered because of the financial benefits to Glacier. The state of Montana allows areas of the state frequented by tourists to levy a resort tax of up to 3 percent on luxury items, which includes accommodations. By law, all money collected from the tax would be spent in the resort tax area. A committee of residents in the park, including NPS employees living in government housing, would have voted on how to use the money. They could have voted to spend it on such projects as restoring of historic buildings or upgrading sewage treatment or utilities.

The National Park Service had concerns about the appearance of a group of federal employees living in the park levying taxes. The small number of employees living in the area would not generate enough money to make the area a viable district. Because of these concerns, the resort tax was dropped from further consideration in this document.

Use of Private Investment as a Funding Source

Rehabilitation would be funded from concessioner investments of their own capital, borrowed capital, or revenue resulting from increased rates or services. A variation considered was a real estate investment trust in which capital for improvements would be raised by selling ownership of the facilities and stock shares to the public. Dividends to those shareholders would be generated from operations revenue. This method would require an adequate return on the investment of capital. The return would have to be sufficient to persuade a concessioner or other investors to fund the renovations. To guarantee this return, revenue would have to be generated from charging higher rates, extending the operating season, and/or developing more revenue opportunities in the park.

Higher Rates. Raising room rates to fund an adequate return on an investment of \$80 million dollars would require increases of approximately \$150 per night to individual room rates for 30 years. Many Glacier Hotel and Lake

McDonald Lodge would charge \$270 or more for a room, Swiftcurrent Motor Inn rooms would cost about \$230, and cabins would be about \$180; the Rising Sun Motor Inn rooms might be \$230 and cabins \$220, and Village Inn rooms would be minimum of \$250. These rates would also be adjusted annually for inflation.

Extending the Operating Season of the Hotels. The season for overnight lodging extends from May to October. Extending the season into the early spring, late fall, and winter could generate additional income to concessioners that could be used to fund rehabilitation of structures in the park. Extending the seasons would increase park operating costs for law enforcement, fire protection, snow-plowing, and utility systems operation.

Increasing the Number of Accommodations in the Park would provide additional cash flow to allow for some return on the investment of capital. The concessioner in the park has proposed additional developments that include a 90-room lodge at the Many Glacier Hotel (in the parking lot with underground parking), conversion of dormitories at Many Glacier and Lake McDonald Lodge to visitor accommodations ranging from executive suites to low-cost hostels, a 100-room building at the Lake McDonald Lodge, additional cabin units at Rising Sun and Swiftcurrent, reconstructing the Sun Point development (formerly the Going-to-the Sun Chalet), additional lodging at Apgar, and development of 24 housekeeping units at Two Medicine. Some of the proposals have included additional restaurant and retail space or meeting room space to make the extended or year-round operation of the facilities marketable.

The idea of using private investment as a funding source was dropped for several reasons, primarily because the National Park Service does not develop new facilities to generate revenue. Public law requires that development be limited to what is necessary to allow for public use and enjoyment and appropriate to the park and resources. To increase revenue for concessioners is not a valid reason for additional development, extended seasons, or higher fees even if some of the income could fund rehabilitation of historic structures. Other reasons include:

- Increasing room rates to levels necessary to provide an adequate return on investment would make it difficult for the average family to afford overnight accommodations in the park.
- Extending the season for most of the historic structures is not feasible. The season for Lake McDonald Lodge and the Village Inn could be extended into fall or spring or even year-round if the facilities were modified. However, it would not be possible to extend the visitor season for the Many Glacier Hotel, Swiftcurrent Motor Inn, and the Rising Sun Motor Inn beyond May through October. Financial viability would be unlikely due to harsh winter conditions, the expense of operating and winterizing, access in snow, the type of accommodations, and reduced winter travel to the area. Extending the operating season of lodges could increase the number of encounters between visitors and such wildlife species as bears, bighorn sheep, and elk. The result would be more habituation, displacement into lesser quality habitat, or animal removal.

- There is no demonstrated demand for year-round accommodations in the park. Although rooms fill to capacity during most of July and August, there is no demonstrated demand for additional lodging most of the year. Extending the season where possible could provide a marginal source of additional revenue but would not provide the necessary return on the investment to fund this approach. NPS policy is to locate development outside the park if possible, and other lodging options are available outside the park.
- The current primary concessioner indicated that a 30-year concession contract term would be necessary to make private funding feasible. Current federal law limits contract terms to 20 years or less.

Use Historic Structures for Purposes Other Than Lodging

Use of the historic lodges for purposes other than overnight visitor accommodations was rejected because the current use of the historic lodges generates income, a portion of which is used to finance their maintenance. Without this income, operating and maintenance funds would have had to come out of Park Service operating funds, which are needed for basic park operations. The best means of protecting historic structures is to use them as they were intended. The lodges provide necessary and appropriate visitor services. If they had been converted to a different use, construction would have been required to provide overnight accommodations elsewhere in the park, or visitor experience and historic use patterns would have been impacted.

Purchase and Operation of Historic Lodges by a Nonprofit Organization

This alternative was considered as a way to fund renovation of deteriorating park lodges and other historic structures because nonprofit groups are able to seek donations, grants, bonds, and low-interest loans that are unavailable to the government or a for-profit company. This was dropped from further consideration because many of the funding sources require that the federal government not own the property. Fee title to the park's facilities is vested with the United States; legislation would have been required to transfer ownership to another entity. Also, control over the historic facilities and operations would have been reduced if the National Park Service had no longer owned these structures.

Private Donations and Grants

This strategy would have involved seeking private donations or grants to fund all the rehabilitation of the historic properties. While there are programs for rehabilitation work, most are funded at a level well below the millions of dollars that the park projects would entail. Additionally, ownership by the government or by a for-profit company renders the park facilities ineligible for many of these donations or grants. The park's experience with private fund raising is limited and those projects that have been undertaken (such as the partnership with the Save the Chalets for raising \$1.2 million for the Granite Park Chalet) have had marginal success.

Issues Outside the Scope of this General Management Plan

During the public involvement period, the public raised a number of issues that are outside the scope of the *General Management Plan and Environmental Impact Statement* and will not be addressed in this document. This section explains why each issue is outside the scope of this analysis and states what other laws or direction apply to each issue.

Backcountry Reservation System

Public comment during scoping indicated that the backcountry registration system did not allow the flexibility many visitors need for planning backcountry itineraries. Because of the demand for backcountry use, the most popular campsites are often filled early, resulting in visitors having to choose other backcountry hiking routes at the last minute. The issue is too specific to be included in a broad-based general management plan, but the park has implemented a backcountry reservation system to allow visitors to reserve backcountry sites.

Discourage Livestock Trespass

Livestock trespass from adjacent land causes vegetation damage, soil erosion, and siltation of streams. Trespassing livestock also compete with elk and deer for grazing areas. Livestock trespass in the park is prohibited by law (36 CFR 2.60), and law enforcement is already charged with handling this problem.

Make Facilities Accessible to People with Disabilities

The Park Service is required by law and policy to provide access to programs and facilities to the maximum extent possible considering resource and visitor protection mandates. This includes providing maximum accessibility for Glacier National Park employees in the workplace. The policy is to integrate access for persons of all abilities rather than to provide separate facilities or programs for persons with disabilities.

In a broad fashion, the *General Management Plan and Environmental Impact Statement* addresses the issue of making park facilities accessible to visitors with disabilities. The specific ways in which this broad philosophy are implemented are outside the scope of this plan and will be addressed in future site-specific analyses.

Discourage Invasion of Nonnative Vegetation

Alien (exotic) vegetation, particularly noxious weeds, is becoming more prevalent in certain areas of Glacier. The spread of alien vegetation is reducing native plant populations and adversely impacting wildlife habitat throughout the park. The issue of nonnative plants has already been addressed in *NPS Management Policies*, which encourages parks to develop management strategies where such species threaten park resources or public health and when control is “prudent and feasible”. Methods of control are site-specific operational issues that are being addressed in cooperation and consultation with other agencies and landowners surrounding the park. An “Exotic Vegetation Management Plan” for Glacier National Park was implemented in 1991.

Regular Monitoring of Surface Water Sources Used for Campground Water Supplies

State laws and regulations require that when surface sources such as streams, lakes, and springs are used for drinking water, they must be regularly monitored and filtered for possible contaminants. The Park Service is required to conduct this monitoring to protect public health and safety; it need not be addressed in this plan.

Timber Management on Adjacent Land

Logging on land adjacent to the park boundary is visible as visitors approach the park. Logging can also cause erosion and siltation of streams and rivers and may have adverse effects on water quality and regional wildlife. However, state and federal regulations already address this issue. The *Final General Management Plan and Environmental Impact Statement* will not address this issue beyond expressing a desire to cooperate with park neighbors on resource issues of mutual concern.

Fee Collection

Park entrance fee issues, such as increasing fees, keeping them the same, or eliminating them, are not addressed in this plan. Fees are legislated by Congress and apply to the entire national park system, not just Glacier. Congress is giving the park fee issue a considerable amount of attention because of concern about the nation’s budget deficit and the need to increase operating budgets in national parks. In November 1996 phase I of the congressionally authorized fee demonstration program began. Glacier was included in this program, which authorizes federal land management agencies to increase and retain entrance and user fees. Revenues derived from this test program provide needed funds to begin repairing the badly deteriorated infrastructure of the aging park system and fund visitor education, recreation programs, and resource protection.

Vista Clearing

Some members of the public commented that historic vistas should be maintained and that others should be created along roads in the park. This would involve clearing trees to provide motorists with views. This plan does not address this issue because it is very site-specific, and Glacier already has a vista-clearing plan that guides this type of work. Vista clearing will continue to maintain and preserve the historic character of the Going-to-the-Sun Road and the traits that contributed to its designation as a national historic landmark.

Snowmobile Use in the Park

Some people have said that snowmobile use should be allowed in the park; others say that these machines are inconsistent with park purposes and negatively impact park resources and the experience of other visitors. This plan does not address the issue of allowing snowmobiles because they already have been found to be an incompatible use of the park (NPS 1975). Snowmobile use is prohibited in the park. There are many areas outside the park where snowmobiles are allowed.

Clearing of the International Boundary

As previously stated, the *Final General Management Plan and Environmental Impact Statement* supports cooperation among nations in the spirit of the international peace park and world heritage site designations. The National Park Service would like to discontinue clearing the international boundary because Waterton-Glacier is supposed to be one park, not separated by a cleared swath across the landscape. Implementation of this specific proposal is outside the scope of this plan. Both governments have signed accords to address this issue, and resolution will continue to be pursued by both governments.

Granite Park and Sperry Chalets

Some public comments suggested that the park eliminate the Granite Park and Sperry Chalets, close them down and just preserve the shell, or operate both chalets as hiker shelters without full services (meals and bedding). The park completed an environmental assessment on the rehabilitation of Granite Park and Sperry Chalets in 1993. Different operating options were considered in that environmental assessment. The public overwhelmingly supported reopening both chalets with full services. The full service option was selected as the preferred alternative after the National Park Service also determined that this would be the best way to preserve the chalets and to preserve traditional visitor services. A finding of no significant impact was signed. Public funding was sought and received for work on the chalets with this commitment to the public. Additional commitments have been made to the public that if private donations raise the remaining funding needed, Granite Park Chalet will be reopened with full services. Sperry Chalet will reopen with full services in the summer of 1999. This issue will not be revisited in this *General Management Plan*. The planning effort began with the assumption that the chalets would be reopened with full services.

Implementation Plans

The approval of the *General Management Plan* would represent but the first step in advancing the future of Glacier National Park. Much would remain to be done to implement the various proposals of the plan.

For the six geographic areas established by the plan, more detailed evaluation of the management zones applied to each would be undertaken. The challenge would be to develop a set of indicators and standards for each geographic area to ensure the long-term preservation of desired resource conditions and the appropriate types and levels of visitor use. These processes would include public involvement.

For each of the eight preferred alternatives described under “Critical Issues and Alternatives,” this plan has identified steps that would be necessary as implementation actions. These actions include a variety of additional studies, as well as more detailed design analyses where appropriate. In some instances, regulations would need to be promulgated before the action could be undertaken.

The following are actions that would be initiated after the *General Management Plan* is approved.

- Conduct additional engineering, economic, cultural resource, and environmental studies on the comprehensive reconstruction of the Going-to-the-Sun Road.
- Seek funding to prepare a commercial services plan to determine the type, level, and location of commercial visitor services for the park; also evaluate subzoning of the visitor services zone.
- Begin developing a comprehensive visitor use plan for the Going-to-the-Sun Road.
- Revise the Resource Management Plan, and include more detailed strategies for science in the park.
- Review existing park planning documents for consistency with the final General Management Plan, and identify necessary revisions.
- Formalize the boundaries of the park's proposed wilderness, provided a Glacier National Park wilderness bill is introduced into Congress.
- In partnership with the Federal Aviation Administration, begin the process of developing an air tour management plan for the park, provided the necessary enabling legislation and or rules are in place.
- Prepare program documents and investigate funding sources for the construction of the west side discovery center and museum, beginning with the funding of a comprehensive design plan and environmental analysis of the Apgar area.

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Natural Resources

ECOSYSTEM

The park is in the state of Montana in the Rocky Mountains and is bounded to the north by the Canadian provinces of Alberta and British Columbia. The North and Middle Forks of the Flathead River border the park on the west and south, and the park is bisected by the Continental Divide.

The magnificent peaks in what is now Glacier National Park prompted an early park advocate to call this area “The Crown of the Continent,” and the Crown of the Continent ecosystem remains one of the most ecologically intact areas in the temperate regions of the world. The park is surrounded mostly by publicly owned and Indian reservation land. Much of the land to the south and west is in the Flathead National Forest, while part of the Lewis and Clark National Forest (known as the Badger-Two Medicine area) adjoins the park on the east side of the Continental Divide. The 1.5 million-acre Blackfeet Indian Reservation lies along the park’s eastern boundary.

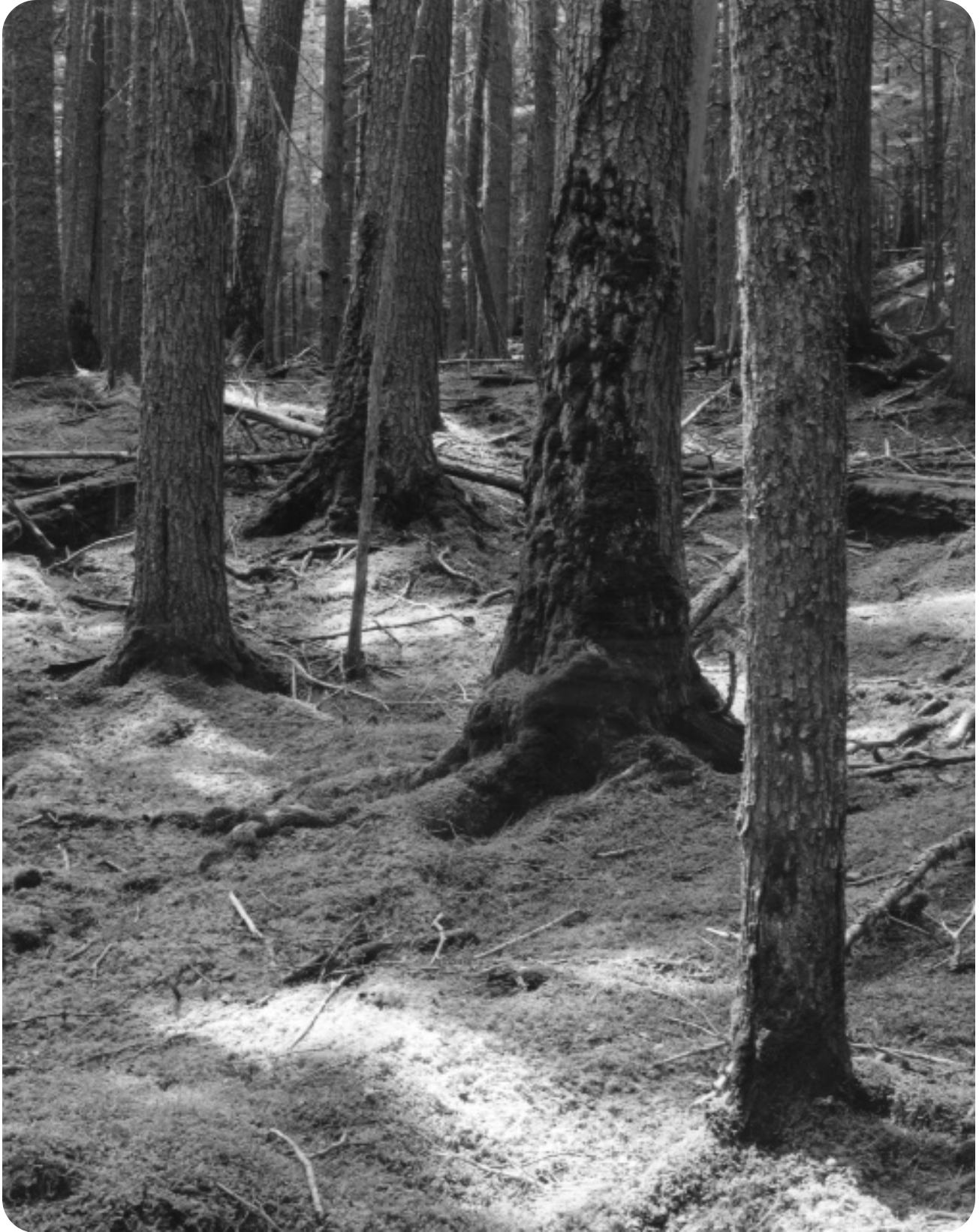
To the north of the international boundary and east of the Continental Divide lies Waterton Lakes National Park, Alberta, while to the north of the international boundary and west of the Continental Divide, land is managed by the province of British Columbia. The British Columbian land that borders the park is managed for multiple use or multiple use with emphasis on special resource values. An exception is the Akamina-Kishinena Provincial Park, which lies at the junction of Montana, Alberta, and British Columbia. This is one of the newest additions to the British Columbian park system.

There are narrow strips of privately owned land in the North Fork and Middle Fork River valleys along the park boundaries. U.S. Highway 2 follows the park’s southern boundary as does the northern route of the Burlington Northern–Santa Fe Railroad. A small unit of state-owned forest is in the North Fork Valley adjacent to the park.

National and state forest land near the park is mountainous with moderate to steep slopes and narrow valleys. Dense coniferous forests are the predominant vegetative cover. Several peaks on national forest land near the park exceed 8,000 feet in elevation.

Most of the Blackfeet Indian Reservation is characterized by gently sloping plains with deeply incised stream channels. Both coniferous forest and aspen parkland are found at the juncture of the reservation with park.

Waterton Lake and the broad Waterton Valley are at the core of Waterton Lakes National Park. Adjacent slopes are very steep. A considerable part of Glacier’s sister park is characterized by the convergence of prairie and mountain ecosystems.



The North Fork of the Flathead River drainage in British Columbia is densely forested at lower elevations with upper slopes along the Continental Divide extending above treeline.

In a broad regional context, Glacier is near the center of a string of mountainous protected areas that stretch from the Yellowstone-Teton area of Wyoming to the Banff-Jasper-Yoho-Kootenai area of Alberta and British Columbia. Forest Service land to the south of Glacier includes the Bob Marshall Wilderness complex, totaling 1,545,352 acres (National Wilderness Preservation System map, January 1987). Forest Service land on both the western and southern borders of the park has been proposed in the past for addition to the wilderness system.

National and state forest land in the region produces timber products and provides many outdoor recreational opportunities, including world-class hunting and fishing. The mountains adjacent to the park are a source of water for millions of people living in the Missouri, Saskatchewan, and Columbia River watersheds.

Privately owned land in the North Fork and Middle Fork River valleys is used for homesites, tourist-oriented businesses, timber production, and (to a very limited degree) grazing.

The Blackfeet Indian Reservation is used for grazing and other agricultural needs. Along the Glacier boundary, tribal land is also managed for timber. The reservation has a few small oil and gas fields as well as ongoing mineral exploration.

To the south of the park is the Flathead Valley, an area that is dominated by agricultural production and by small, rapidly growing communities. In the northern portion of the Flathead Valley is Flathead Lake, which is the largest freshwater lake west of the Mississippi River and a very important recreational resource.

There is little understanding and documentation of the interrelationships and processes that support single species or entire ecosystems. Ecosystem-level processes and interactions are still poorly understood. However, a number of efforts are underway to increase that level of understanding. A cumulative effects model for grizzly bears has been under development for the last 10 years by the Forest Service, Glacier National Park, Montana Fish, Wildlife and Parks, the Montana Department of State Lands, and the Confederated Salish-Kootenai and the Blackfeet tribe. This model will eventually be used to understand, on a gross scale, the effects on grizzly bear throughout the area from development or changes in habitat that result in fragmentation or changes in use. The Grizzly Bear Recovery Plan provides direction and calls for coordination among all state, local, federal agencies and tribes in the management and protection of grizzly bears. A Wolf Recovery Plan does the same for wolves. In preparation of an upcoming forest plan amendment, the Flathead National Forest has been conducting large-scale assessments of each portion of the forest to provide better information about the resource and interactions between resources. An access management working group has been formed from state and federal agencies to assess roads on Forest Service land and develop a strategy that provides better protection for grizzly bears. The province of British Columbia has been developing a management zoning system to protect resources just north of the United States and Canadian bor-

der while also providing economic and recreational opportunities. These are just a few of the many efforts going on in the ecosystem.

BIOLOGICAL DIVERSITY

Glacier and Waterton Lakes National Parks are noted for the remarkable number and diversity of plant and animal species found inside their boundaries, the result of the parks' unusual geographic position and elevation. Five floristic provinces and three major watersheds converge in an area influenced by both maritime and continental climates. While predominantly associated with the northern Rocky Mountains, Waterton-Glacier is at the southern edge of arctic-boreal influences. Pacific Coast and Great Plains plant and animal associations reach their eastern and western limits in these parks. Past glaciation has isolated many plant and animal populations, and the steep terrain provides a broad range of climates for a wide variety of plant communities.

The geographic location, climate, and topographic gradients of Waterton-Glacier have fostered and sustained an ecology that includes the plants and animals of a much larger region. The parks support about 1,200 species of vascular plants, 675 bryophytes and lichens, 261 birds (including accidentals), 63 mammals, 23 fish, and at least 8 reptiles and amphibians. Invertebrate inventories are incomplete but show a few hundred species for lepidoptera (butterflies and moths), coleoptera (beetles), and hymenoptera (flies, ants, bees, and wasps) combined.

Five large ecoregions are found in Waterton-Glacier: alpine tundra, subalpine forest, montane forest, aspen parkland, and fescue grassland (Alberta Dept. of Energy 1981). These include extensive stands of lodgepole and mixed conifer forests, riparian vegetative zones, and intermediate alpine plant associations.

Waterton-Glacier is noted for its abundant wildlife. There is habitat for over 300 terrestrial wildlife species, including several endangered or threatened birds and mammals and many rare species. The Waterton-Glacier area offers an international sanctuary and a corridor for wildlife interaction, migration, and genetic exchange between the two countries. Due to the distinct ecological setting, a number of southern and prairie subspecies appear in this area.

The aquatic resources of the two parks have been examined in some detail. Many drainages where there were originally no fish were stocked at an early date, often with nonnative species. Native fish were probably restricted to the main drainages and those portions of tributary streams that lie below waterfalls and other migration barriers. Twenty-three species of fish have been documented in Waterton Lakes and Glacier. Glacier National Park provides one of the last strongholds for the native subspecies of westslope cutthroat trout.

Several hundred aquatic invertebrate species have been identified in the parks, and scientists believe that many undescribed plankton species are yet to be discovered. Researchers have recently discovered two amphipod species new to science, the first troglobites (aquatic cave dwelling insects) to be identified in Glacier National Park. The opossum shrimp (*Mysis relicta*) occurs naturally in Upper Waterton Lake. This shrimp is a relic species that exists in the park because of the

pattern of continental glaciers and the glacial lakes associated with them. As the southern margin of the ice retreated, the shrimp were left stranded in a series of lakes, and slight differences were fixed so that they are now known as separate species.

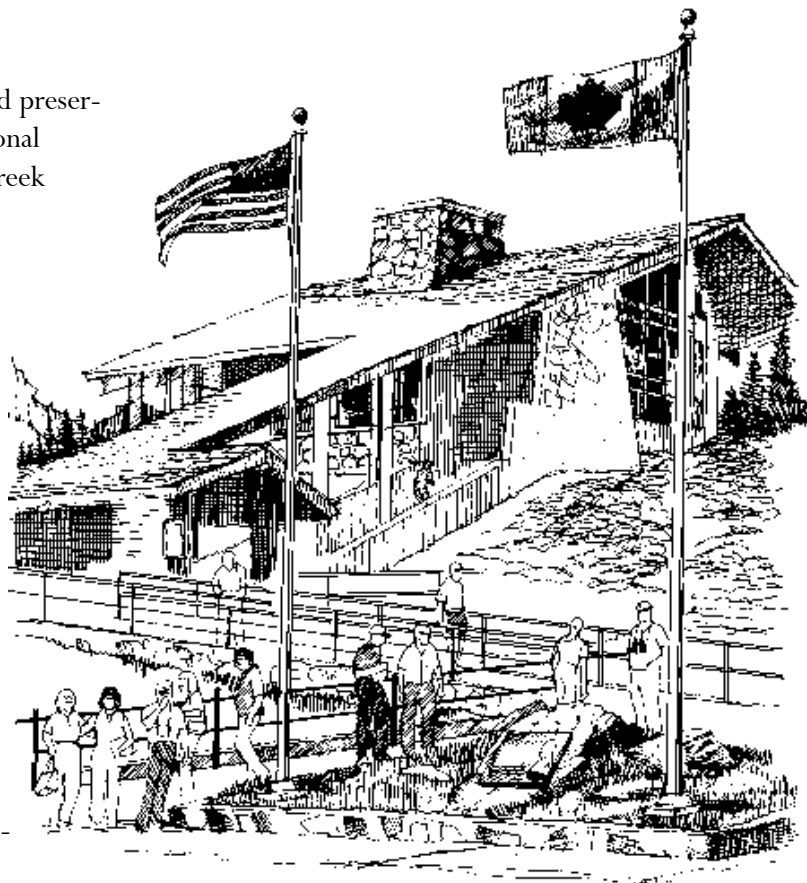
Exotic plant species such as spotted knapweed and common timothy grow in the park as the result of human activity, and the presence of such exotics reduces the diversity of plant communities. It is unlikely that future management actions would totally remove exotics from the park. At best their numbers would be contained. New populations of exotic species would be aggressively controlled through management actions.

WATERTON LAKES NATIONAL PARK

The first major step toward preservation of Waterton Lakes National Park was taken by a Pincher Creek rancher, F.W. Goodsal, who sent a proposal to the central government recommending that Waterton Lakes be set aside as a park. The superintendent of mines also made the government aware of the potential of the area for water and resource management purposes. In 1895 an area of 54 square miles that centered on the main lakes was set aside as Kootenay Lakes Forest Reserve. Scenic qualities and wildlife resources were not recognized until later.

In December 1909 the reserve was renamed Waterton Lakes Forest Park, and Kootenai Brown was appointed superintendent. By 1911 the area had gained national park status as Waterton Lakes Dominion Park. By 1914 Waterton Lakes had a boundary contiguous with Glacier National Park.

Kootenai Brown and Glacier ranger Albert Reynolds were probably the first proponents of the international peace park idea in the early 1900s. They felt that the lake and valley could not and should not be divided. The Rotary Clubs of



Montana and Alberta were responsible for promoting and ensuring that legislation was introduced into both Parliament and Congress, designating Waterton-Glacier as an international peace park.

The two nations agreed by acts proclaimed by the governments of Canada and the United States of America to “permanently commemorate the long existing relationship of peace and goodwill between the peoples and Governments of the United States of America and the Dominion of Canada.” The dedications for the international peace park were held on June 18, 1932, in Montana and in Waterton Park on July 4, 1936.

Originally the international peace park commemorated the peace and goodwill that exists along the world’s longest undefended border. The parks have also come to represent cooperation and stewardship in a world of shared resources, which is reflected in cooperation in park management and interpretation, a joint interpretation/information newspaper, and exhibits at Goat Haunt and Waterton. The two areas have also been recognized jointly in the United Nations Man and the Biosphere Programme and as a world heritage site.

Waterton Lakes visitation has been relatively stable since 1989. There are about 340,000 visitors per year; the peak was almost 350,000 in 1994 (Parks Canada 1997, 186).

Waterton Lakes offers a variety of activities. With 191 miles of trails, all kinds of hiking, including overnight backpacking trips, are possible. Waterton Lakes also allows bicycling and horseback riding on some trails. Water-based sports are popular, and Waterton Townsite offers services not always associated with national parks in the United States. Many visitors to Waterton Lakes National Park also visit Glacier.

Resources common to both parks include the exposure of the Lewis overthrust fault, where 1.6 billion-year-old rock lies on top of younger rock. This results in dramatic terrain, mountains lying directly on the plains.

PROPOSED WILDERNESS DESIGNATION

Glacier National Park completed a study and environmental impact statement in 1973 to comply with the 1964 Wilderness Act. That document, which was subject to public review, resulted in the recommendation that over 90 percent of the park should be designated as wilderness. President Nixon forwarded that recommendation to Congress on June 13, 1974. A bill was subsequently introduced to formally designate the land as wilderness. That bill was never enacted, but since that time it has been reaffirmed by every president. Amendments to the wilderness recommendation of 1974 were made in 1984 and 1994 that made minor adjustments to the original proposal and increased the amount of proposed wilderness to 95 percent. As a result of case law challenging management of proposed wilderness, it is NPS policy to manage proposed wilderness as wilderness until such time as the land is either formally designated or formally rejected by Congress, and until that time all the area identified as proposed wilderness will continue to be managed as wilderness.

WILDLIFE

Threatened and Endangered Species

There are five threatened or endangered wildlife species listed by the U.S. Fish and Wildlife Service in Glacier National Park. They are the threatened bald eagle (*Haliaeetus leucocephalus*), grizzly bear (*Ursus arctos*), and bull trout (*Salvelinus confluentus*) and the endangered gray wolf (*Canis lupus*) and peregrine falcon (*Falco peregrinus*).

Bald Eagle. There is bald eagle nesting habitat throughout the park, and there are 11 known bald eagle nesting sites in Glacier National Park. These include five in the North Fork area, two in Goat Haunt-Belly River area, two in the Going-to-the-Sun Road corridor, one in the Middle Fork area, and one in the Two Medicine area. There is another nest within 3 kilometers of the western boundary, and it is likely that those eagles forage inside the park. Recent activity in the Many Glacier Valley suggests that there may be additional nests.

Preferred wintering habitat is near open water where fish are available and waterfowl congregate or near a concentrated food source such as predator or road kills. Wintering areas in the park include the North Fork and Middle Fork Rivers, Lake McDonald, St. Mary Lake, and St. Mary River.

Roosting habitat is usually associated with large trees near a concentrated food source, while foraging habitat typically consists of lake inlets and outlets, shallow lakes, streams, rivers, wetlands, and meadows. These areas provide open flight paths, perches, and security from intrusions and other disturbances.

The U.S. Fish and Wildlife Service, the National Park Service, the U.S. Forest Service, the Bureau of Indian Affairs, the Bureau of Land Management, the Bureau of Reclamation, the U.S. Army Corps of Engineers, the Confederated Salish-Kootenai tribes and the state of Montana updated the *Montana Bald Eagle Management Plan* in July 1994 to guide conservation and management efforts for bald eagles in Montana. The plan provides landowners and resource managers with information on the biology of bald eagles that facilitates informed decisions about land use and promotes conservation of the species and its habitat. This plan is an extension of the 1986 *Recovery Plan for the Pacific Bald Eagle* developed by the U.S. Fish and Wildlife Service. The *Montana Bald Eagle Management Plan* (USFWS et al. 1994) and nest site management zones are general guidelines to be used in lieu of more site-specific data. The *Montana Bald Eagle Management Plan* directs that plans must be developed for each nest site to ensure protection. Specific nest site plans are being developed.

The *Montana Bald Eagle Management Plan* (USFWS et al. 1994) provides guidance for management based on minimum human disturbance and provides for various levels of protection within nesting territories. Specific nest site plans are currently being developed.

Human activity is unacceptable in bald eagle breeding areas during specific stages of the nesting cycle. Those dates are courtship, February 1 to April 15; egg laying, Feb. 7 to April 15; incubation, February 7 to May 30; hatching and rearing young, May 1 to August 15. Less sensitive times are fledging, June 15 to August 15; and when young migrate from the breeding area between mid-September and

early October, but human activity can still impact nesting success (McClelland et al. 1995).

Nest areas are critical, and human activity or development may stimulate abandonment of the breeding area, affect successful completion of the nesting cycle, or reduce productivity. Nest areas are within 0.25-mile (400 m) radius of all nest sites that have been active within 5 years. The objectives of designating nest site areas are to eliminate disturbance and maintain or enhance nest site habitat suitability.

Foraging habitat outside of nest site management zones is also important. Nonbreeding eagles are often excluded from preferred foraging areas by nesting bald eagles, and extensive foraging flights by breeding adults may extend well beyond the 2.5-mile (4 km) radius, or home range zone, as described in the *Montana BaldEagle Management Plan*. Quality and quantity of foraging habitat is essential to the entire population, not just the resident breeding bald eagles. Some of the management considerations of foraging areas include protection from contaminants and physical hazards, management of prey base, and management of human activity. There is bald eagle foraging and wintering habitat throughout Glacier National Park.

The park is within a major bald eagle migratory corridor, and use along the west side of the park has been extensively documented.

Gray Wolf. Since the Wolf Ecology Project began in the 1970s, the wolf population in the North Fork of Glacier has been intensively monitored from 1978-1996. From a lone female trapped and radio-collared in 1979 (Ream and Mattson 1982), the population had increased by fall 1990 to approximately 19 wolves in the Camas Pack (Ream et al. 1990). In 1986 the first documented denning of wolves in the western United States in over 50 years occurred in Glacier (Ream et al. 1986). Wolves have continued to den in the park nearly every year since. Two separate wolf packs with a total of 15-33 wolves have maintained home ranges in the North Fork since the early 1990s. Recent sightings suggest two packs may still occupy the North Fork. There are an estimated 7-12 wolves in each of the two packs. Wolf monitoring activities have been reduced since wolf-ungulate research concluded in 1996.

Gray wolves require an adequate prey base (ungulates). Gray wolves den in isolated areas that are free from human disturbance. Human activity near den sites can lead to the death of pups or to reproductive failure.

Wolves have been reported in every major drainage in the park in recent years. Wolves denned in 1993 and 1994 in the Belly River area in Alberta. There have been a number of recent reports of wolves in the Many Glacier, Cut Bank, St. Mary, Belly River, and Two Medicine Valleys. The sighting reports appear to be reliable, but to date there has been no verification of pack or denning activity. Continued sightings on the east side suggest that new packs may settle there in the future. The established wolf population in Glacier National Park continues to serve as a source for natural wolf recolonization in other parts of Montana and southern Canada.

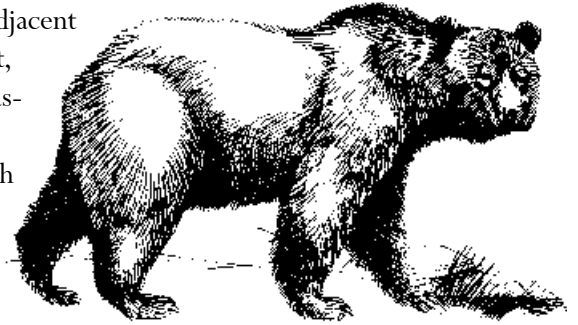
Grizzly Bear. The number of grizzly bears inhabiting Glacier National Park is unknown; no reliable estimate is currently available. An earlier estimate of approximately 200 bears (Martinka 1974) was based on sighting reports. Population estimates and trends are of unknown reliability due to the inherent difficulties in counting grizzly bears and the lack of intensive population research in the park. For this reason, very conservative management of grizzlies in the park is necessary.

The *Grizzly Bear Recovery Plan* (USFWS 1993) serves as a general guideline for Glacier National Park managers. It delineates the actions that are believed to be required to recover and/or protect the grizzly bear. The U. S. Fish and Wildlife Service has the legal authority to implement the *Grizzly Bear Recovery Plan* as part of the Northern Continental Divide Grizzly Bear Ecosystem Management Area. Glacier National Park's contributions to these efforts are to report the number of females with cubs through the Bear Information Management System (BIMS) each year and to actively manage the park to protect bears and their habitat to ensure their survival. The grizzly bear population will be judged as meeting recovery population requirements when, among other criteria, the annual number of unduplicated sightings of females with cubs is a minimum of 12 outside Glacier National Park and a minimum of 10 inside Glacier National Park, based on a 6-year average (USFWS 1993). Recent counts have been below the target.

Grizzly bear habitat includes the entire park for most of the year. Grizzly bear habitat is diverse because bears are omnivorous and their food sources are so diverse. The search for food is the primary influence on their movements. In the spring grizzly bears and their cubs feed on dead ungulates and early greening herbaceous plants at lower elevations. As summer begins, the bears move to higher elevations seeking out glacier lilies and other roots. They follow the berries as they ripen first at the lower elevations and then at higher elevations. During the huckleberry season, bears often concentrate in the Apgar Mountains, Belton Hills, Snyder Ridge, upper Harrison Creek, and other areas. Bears have been seen on many peaks feeding on cutworm moths, primarily from late June to late September. During the winter the bears hibernate in dens away from human disturbance, often at higher elevations on steep slopes where wind and topography cause an accumulation of deep snow. Recent evidence suggests that in the North Fork of the Flathead River drainage, some bears are not denning all winter or are denning for shorter periods than elsewhere, probably due to the abundant prey base (*International Bear News*, November 1996).

Grizzly bear/human interaction is of concern to park management. Bears that are attracted to and frequent visitor use areas may habituate to the presence of humans and are at increased risk of contributing to bear/human encounters. Habituated bears are usually relocated or hazed from developed areas and sometimes removed from the population. Adult male bears generally use the higher quality habitat. This behavior may displace females and cubs into lower quality habitat or areas also used by visitors. This behavior may also result in habituation by females and cubs. However, as male cubs grow up, they also become habituated to visitors, and may be less likely to use higher quality habitat. Research indicates that habituated bears have a higher mortality rate than other bears.

Grizzly bear habitat extends beyond Glacier National Park onto adjacent land. The Blackfeet Indian Reservation contains excellent bear habitat, and preliminary information suggests that bear populations are increasing on the east side of the park due to the quality of habitat on the reservation. (Chris Servheen, USFWS). Portions of Alberta and British Columbia and areas west and south of the park in the Whitefish, Flathead, and Swan ranges also provide grizzly bear habitat. Grizzly bears are protected in the United States under the Endangered Species Act, but they are not similarly protected in Canada.



The success of bear conservation in Glacier National Park can not be evaluated without reliable information on population trends. Until now, statistically rigorous grizzly population studies in forested habitat could be accomplished only with radio telemetry. Such studies entail intensive trapping with baiting, snaring, drugging, collaring, ear tagging, lip tattooing, and frequent aerial radio tracking. In a study area the size of Glacier National Park, it would be necessary to handle a large number of bears. This places both the bears and trappers at risk. The use of new DNA fingerprinting technology to estimate the density and a minimum population of the grizzly bears in Glacier National Park began in summer 1998. This technology will allow researchers to identify individual grizzly bears from a tissue sample as small as a follicle from a single hair or an intestinal cell found in scat.

Peregrine Falcon. Peregrine falcons are rare in the park, though sightings are reported nearly every year, occasionally during the nesting season. There have been no recorded peregrine nests in the park. Surveys of potential peregrine falcon nesting habitat began in 1989 and were completed in 1991.

Peregrine falcon habitat has been documented in many areas of the park.

Proposed Species

Proposed species are those that have been determined to be endangered or threatened by the U.S. Fish and Wildlife Service but for which rules have not yet been promulgated.

Lynx (*Lynx canadensis*). The lynx was listed as proposed in March 1998. Lynx have been seen and tracks detected in the coniferous forests of Glacier National Park. Population numbers of lynx in the northwestern United States, including Montana, appear to have declined in the last 25 years (Pers. Comm. L. Nordstrom, USFWS).

All lynx tracks documented in a 1994 survey were on the east side of the Continental Divide. Lynx tracks and sightings have been documented west of the Continental Divide prior to and since that survey.

Lynx use a wide variety of habitats ranging from seral to old-growth stands of coniferous forest but are usually found near their primary prey, snowshoe hare, in mixed coniferous stands (Butts 1992a). Lynx are most susceptible to disturbance during the denning period and while newborns are developing (May–August). Lynx sightings recorded in the park have declined since the late 1960s.

State-Sensitive Species

Table 3 presents wildlife species that are listed as state sensitive by the Montana Natural Heritage Program and are sensitive and/or rare in Glacier National Park. All have been sighted in the park. There is also suitable habitat outside the park on privately owned and Forest Service land, in Waterton Lakes National Park, on the Blackfeet Indian Reservation, and on public land in Canada.

NPS policy requires that sensitive species are to be managed to avoid the need to place them on the federal threatened and endangered list.

General Wildlife Discussion

Many wildlife species are common throughout Glacier National Park. There are 261 bird, 63 mammal and 172 native resident aquatic animal species in the park.

Review of the earliest records suggests that wildlife composition, at least for mammals and birds, has changed little since the park was established. Species known to have been extirpated include mountain bison (*Bison bison*) and mountain or woodland caribou (*Rangifer tarandus*). Known or probably exotic or nonnative species include the raccoon (*Procyon lotor*), ring-necked pheasant (*Phasianus colchicus*), turkey (*Meleagris gallopavo*), rock dove (*Columbia livia*), European starling (*Sturnus vulgaris*) and house sparrow (*Passer domesticus*). None of these species is widespread or abundant.



TABLE 3: STATE-LISTED RARE WILDLIFE SPECIES

Common loon (<i>Gavia immer</i>)	Fairly common from spring to fall on large and small lakes throughout the park productivity declining (Gniadek, unpublished data 1997). A significant proportion of Montana nesting pairs are found in Glacier.
Harlequin duck (<i>Histrionicus histrionicus</i>)	Fairly common from spring to fall in fast moving water (streams and rivers) and may occur on lakes. Productivity is highly variable. Harlequin duck declines have been documented throughout the western populations, including in Montana, where there are approximately 200 pairs. Approximately 20 percent of the Montana population breed in Glacier National Park. Upper McDonald Creek, with about 25 pairs, is considered the most critical harlequin breeding stream in Montana. Harlequins mate for life, and pairing occurs on the west coast. Adult harlequins return to several park streams each spring to breed and raise young. Females born in Glacier return to breed when they are 2-4 years old.
American white pelican (<i>Pelecanus erythrorhynchos</i>)	Rare during summer near water bodies along boundary areas, lower elevations on both sides of Continental Divide; no evidence of breeding.
Trumpeter swan (<i>Cygnus buccinator</i>)	Rare on lakes, ponds, rivers and streams during spring and fall migration; no evidence of breeding but may nest near eastern boundary. Known to nest in Waterton Lakes National Park and on adjacent ranch lands.
Osprey (<i>Pandion haliaetus</i>)	Fairly common from spring to fall along lakes and rivers; nesting documented but trend in productivity unknown.
Northern Goshawk (<i>Accipiter gentilis</i>)	Uncommon from spring to fall in forested areas, especially in mature, dense conifer forest; nesting is documented but the trend in productivity is unknown.
Cooper's hawk (<i>Accipiter cooperii</i>)	Uncommon from spring to fall in forested areas, especially in mature, dense conifer forest; nesting is documented but the trend in productivity is unknown.
Swainson's hawk (<i>Buteo swainsoni</i>)	Rare in grassland habitats from spring to fall, especially on east side; nesting undocumented but suspected in the Belly River area.
Ferruginous hawk (<i>Buteo regalis</i>)	Rare in grassland habitats from spring to fall, especially on east side; no nesting documented.
Golden eagle (<i>Aquila chrysaetos</i>)	Fairly common in open areas from spring to fall; nests in trees and cliffs throughout the park; trend in productivity unknown; migrate in large numbers.
Merlin (<i>Falco columbarius</i>)	Rare from spring to fall in open forests; trend in productivity unknown.
Prairie falcon (<i>Falco mexicanus</i>)	Uncommon from spring to fall in open country or meadows; nest on cliffs; nesting documented but trend in productivity unknown.
Long-billed curlew (<i>Numenius americanus</i>)	Very rare during spring and fall in open areas, usually near water; no documented nesting.
Upland sandpiper (<i>Bartramia longicauda</i>)	Very rare during spring and fall in open areas; no documented nesting.
Northern pygmy owl (<i>Glaucidium gnoma</i>)	Fairly common year-round forest resident; nesting documented but population trend unknown.
Barred owl (<i>Strix varia</i>)	Uncommon year-round resident of conifer forest and riparian areas; nesting documented but population trend unknown (has generally increased since being first recorded during range expansion in 1970s).
Great gray owl (<i>Strix nebulosa</i>)	Rare resident in dense conifer forest with meadows; nesting documented but trend in productivity unknown.
Long-eared owl (<i>Asio otus</i>)	Rare resident in thick forested habitat.
Boreal owl (<i>Aegolius funereus</i>)	Rare resident in dense forest, especially subalpine; nesting documented but population trend unknown.
Northern saw-whet owl (<i>Aegolius acadicus</i>)	Uncommon resident in conifer or mixed forest; nesting documented but population trend unknown.

TABLE 3: STATE LISTED RARE WILDLIFE SPECIES (continued)

Northern hawk-owl (<i>Surnia ulula</i>)	Rare resident and migrant in recently burned forest; nesting documented in the North Fork but population trend unknown.
Pileated woodpecker (<i>Dryocopus pileatus</i>)	Fairly common resident of mature forest; nesting documented but population trend unknown.
Olive-sided flycatcher (<i>Nattallornis borealis</i>)	Uncommon from spring to fall in conifer forests, bogs, and recently burned forest; nesting documented but population trend unknown.
Western bluebird (<i>Sialia mexicana</i>)	Rare in open woodlands and meadows; few records.
LeConte's sparrow (<i>Ammodramus leconteii</i>)	Rare from spring to fall in wet meadows, primarily on the west side; nesting documented but population trend unknown.
Clay-colored sparrow (<i>Spizella pallida</i>)	Rare from spring to fall in brushy meadows, riparian areas, and recently burned conifer forest; nesting documented but population trend unknown. Uncommon in Waterton Lakes National Park.
Brewer's sparrow (<i>Spizella breweri</i>)	Uncommon from spring to fall in shrubby subalpine habitats. Uncommon in Waterton Lakes National Park.
Gyrfalcon (<i>Falco rusticolus</i>)	Rare from fall/winter in alpine/subalpine areas; no evidence of nesting.
Northern bog lemming (<i>Synaptomys borealis</i>)	Rare resident in wet meadows, bogs, and marsh borders; breeding documented but population trend unknown.
Marten (<i>Martes americana</i>)	Fairly common resident in conifer forests; breeding documented but population trend unknown.
Fisher (<i>Martes pennanti</i>)	Rare resident of conifer forest and riparian areas; breeding probable but population trend unknown.
Wolverine (<i>Gulo luscus</i>)	Rare resident of conifer forest and alpine meadows, on both sides of the Continental Divide; breeding documented but population trend unknown.



The park provides important year-round habitat for many wildlife species. Riparian areas, meadows, and shrub fields provide important winter range for deer, elk, and moose. Grasslands and forest environments provide important spring range for deer, elk, and grizzly bears. As spring progresses into summer, deer and elk follow greening vegetation to higher elevations. Late winter and early spring may be the most sensitive time for elk and deer. The higher elevations provide important summer habitat for bears, bighorn sheep, and goats. Low elevation valleys in the fall and spring provide important habitat for almost all the wildlife species.

The animals in Glacier move freely (for the most part) across park boundaries onto adjacent land and back again. Plants grow and spread from one side of the boundary to the other. Human activities on one side of the park boundary can have critical consequences both for people and for the rest of the biota on the other side. The protected status of Glacier National Park makes it a genetic storehouse and a refuge, a place where natural processes reign.

There is evidence that the numbers of bighorn sheep may have declined over the past century. Bighorn sheep are vulnerable to diseases and other disruptions. Bighorn sheep make traditional use of seasonal ranges and if access to these areas is restricted, use can be reduced or eliminated.

During autumn 1996, over 3,000 raptors were counted at one site during September, October, and November as they crossed the McDonald Valley; 2,667 were eagles (92 percent golden eagles and 8 percent bald eagles). In spring 1996, 904 eagles were counted at one site in March and April. These numbers represent only a portion of the raptors moving through Glacier National Park in spring and autumn, as there are many documented migration routes that follow mountain ranges and ridges in Glacier National Park. The raptor migration is a significant event, and the park may be one of the largest golden eagle migration areas in North America. This may become even more important because golden eagle numbers may be declining. The biggest threat to migrating raptors in Glacier National Park is helicopter overflights.

More specific wildlife information for each area in the park includes:

The riparian areas, meadows, and forests throughout the North Fork provide important winter range for deer, elk, and moose.

The Many Glacier area contains outstanding wildlife habitat, particularly for grizzly bears, bighorn sheep, and goats and offers excellent opportunities for viewing. There are also abundant populations of other ungulates, and wolves are using the area for hunting, although denning has not been documented. A wide variety of other mammals, raptors, and forest predators such as wolverine, marten, and lynx are also found in the valleys. Considerable movement occurs between the three main valleys by a variety of species. This area also provides critical fall, winter, and spring habitat for several species of ungulates.

Additionally, the Many Glacier area is an important crossroads for wildlife because it lies at the confluence of three valleys. Significant numbers of bighorn sheep, mountain goats, and elk all winter in the area. The meadows at Apikuni Flat are critical bighorn sheep winter range. Other animals, including mule deer, badg-

er, weasel, moose, and black and grizzly bears can be found in the valley. The Many Glacier / Swiftcurrent drainage historically had no fish, but kokanee salmon and brook trout were introduced.

The Goat Haunt-Belly River area contains outstanding wildlife habitat, particularly in the Waterton River and Belly River Valleys. Considerable populations of elk spend the summer in these valleys and moose are commonly seen in the Waterton River Valley. Wolves use the Belly River Valley and grizzly bears utilize the entire area. The area also constitutes important habitat for forest predators such as marten, lynx, and mountain lions. Goats are common in the higher elevations and raptors regularly nest in the rocky cliffs of the area.

The Two Medicine area provides important habitat for grizzly bears and a wide range of other wildlife from elk, moose, black bears, and deer to forest predators such as wolverine, marten, and lynx and higher elevation residents such as bighorn sheep and goats. It also provides critical fall, winter, and spring habitat for bighorn sheep and other ungulates. The transition zone between the prairies and mountains, shared with the Blackfeet Reservation, is an important habitat for ungulate and bird species.

The Going-to-the-Sun Road corridor area supports most of the wildlife species found in the park. Bald eagles, black bear, grizzly bear, elk, deer, fisher, and pine marten all use the area around Apgar (the area between Apgar and West Glacier is a wildlife corridor). Black bears regularly travel and feed in this area. Elk use the Apgar area as spring range and as a calving area. Elk are sensitive to disturbance during calving. White-tailed and mule deer are primarily found in the eastern portion of the Apgar area. Pine martens use the area between Lake McDonald and the Going-to-the-Sun Road and Camas Creek Road in the winter. Pine martens are becoming less common in the United States because of the loss of the forest habitat they require.

Mammals most commonly found in the McDonald Valley include moose, elk, mule and white-tailed deer, black and grizzly bear, snowshoe hare, coyote, lynx, cougar, and red squirrel.

The Logan maintenance pit area provides habitat for white-tailed deer, moose, harlequin duck, pileated woodpecker, and ruffed grouse. The Moose Country area provides habitat for moose, harlequin duck, barrow's goldeneye, raven, and others.

The Lunch Creek area provides habitat for grizzly bear, mountain goat, bighorn sheep, mule deer, ptarmigan, water pipit, and others.

The Sunrift Gorge area provides habitat for deer and other woodland animals.

Rodents such as Columbian ground squirrels use the area in the summer, as do perching birds such as gray jays, mountain chickadees, and Clark's nutcracker. Wolverine and lynx may pass through on their winter rounds.

The Logan Pass area provides habitat for grizzly bears, goats, bighorn sheep, black bear, wolverine, etc.

The vegetation in the Rising Sun area provides excellent forage and cover for many species of mammals. The Rising Sun/St. Mary grasslands area provides critical winter range for elk. Other mammals, including deer, hares, ground squirrels, beaver, and muskrats, can be found in the area. Black and grizzly bears and

mountain lions also use the area. Bighorn sheep and mountain goats live in the surrounding mountains. Bald eagles have nested successfully on St. Mary Lake near Red Eagle Creek.

St. Mary flats provides important wildlife range during the late fall and winter, when the Going-to-the-Sun Road is usually closed to visitor traffic. Elk spend the winter on the open wind-blown meadows between St. Mary and Rising Sun. Wolves have recently been using the area in the winter.

The Granite Park area contains outstanding grizzly bear habitat, and the bears frequently use much of the area along the Garden Wall.

The Middle Fork area provides outstanding pristine habitat for a variety of species. The remote character and low visitation ensure a high level of security. Elk, goats, bears, deer, and moose are common. Forest predators and other smaller mammals utilize the heavily forested valleys. A bald eagle nest has been successfully used on Nyack Creek, far from the heavily floated corridor of the Middle Fork of the Flathead. The Goat Lick near Walton draws goats from a wide geographic area. The winter range along the Belton Hills is used extensively by deer and elk and is a popular viewing area.

The North Fork area contains excellent year-round habitat for elk, deer, and moose, and supports a healthy population of all three. Predators such as wolves and mountain lions depend on these species. Wolves have denned in the North Fork area for the last 12 years. Grizzly and black bears used the entire area from the river corridor to the mountain peaks. The forested valleys provide abundant habitat for forest predators such as marten, lynx, and wolverine.

VEGETATION

Threatened and Endangered Species

No federally listed threatened or endangered plants have been identified in the park. Glacier may have habitat for the federally threatened water howellia (*Howellia aquatilis*). This species is found in northwestern Montana wetlands. Water howellia requires a combination of very particular habitat and weather patterns before it can germinate. Water howellia has not been discovered in wetlands that have been surveyed.

Species at Risk

Three “species at risk” are known to exist in Glacier National Park: peculiar moonwort (*Botrychium paradoxum*), lens-fruited sedge, (*Carex lenticularis* var. *dolia*), and the alpine glacier poppy (*Papaver pygmaeum*). Species at risk were formerly listed as notice of review (category 2) by the U.S. Fish and Wildlife Service. Current information indicates that listing of these species as threatened or endangered is possible, but appropriate or substantial biological information is not on file to support a ruling. Research is underway on many such species to determine whether proposing listing is appropriate. NPS policy directs that these species be consid-



ered as if they were already listed as threatened or endangered until a final determination is made. Further discussion is provided below on each of these species.

Peculiar moonwort grows in open meadows to dense stands of tall herbs in foothill and subalpine zones near the Continental Divide in Montana. It is known to grow along a heavily used trail in the Many Glacier area and in the North Fork.

Lens-fruited sedge grows in wet meadows and boggy ground along lakeshores and on rock ledges. In Montana this plant is present at only two known sites, the North Fork and Going-to-the-Sun Road areas.

The **alpine glacier poppy** is an endemic with a very restricted distribution and occurs mostly near Glacier National Park. It is found at several locations in the park. It grows on talus slopes of high mountains and is known to grow in the North Fork, Goat Haunt, Many Glacier, Going-to-the-Sun Road, and Two Medicine areas.

State-Sensitive Species

The following are state-sensitive plant species according to the Montana Natural Heritage Program and are known to grow in Glacier National Park. For many of these species, there is also suitable habitat outside the park on the surrounding land.

Fringed onion (*Allium fibrillum*) is an endemic species, occurring on scablands and high mountain ridges in shallow soils in moist, open, or particularly shaded areas at low elevations. It is known to grow in the Middle Fork area.

Peculiar moonwort (*Botrychium paradoxum*) occurs near lakeshores and in open meadows and in dense stands of tall herbs in foothill and subalpine zones,

often on disturbed sites near the Continental Divide. It is known to grow in the Many Glacier and North Fork areas.

Giant helleborine (*Epipactis gigantea*) grows on open, wet sites, often adjacent to mineral hot springs and in mossy shady areas along rivers, streams, meadows, seeps, and hanging gardens from warm desert shrub to spruce communities. It is more common in the open than in forests. This is the only native member of its genus in Canada and the United States. It is known to occur in the Going-to-the-Sun Road area.

Glaucous gentian (*Gentiana glauca*) is a tundra species that grows on moist subalpine and alpine banks, ledges, sphagnum bogs, and meadows. The only known Montana population is found in the Going-to-the-Sun Road area.

Northern beechfern (*Thelypteris phegopteris*) grows in areas with boreal, wet temperate, cool mesothermal climates and on moist, calcareous cliff crevices or moist banks in rich, damp forest floors. It is known to grow in the Going-to-the-Sun Road area.

Velvetleaf blueberry (*Vaccinium myrtilloides*) grows in moist to rather dry forests in the montane zone. The only two known occurrences of this species for the entire northern Rocky Mountains are in the Going-to-the-Sun Road area. The largest (in the Middle Fork) may be threatened by development.

Lyre-leaf rockcress (*Arabis lyrata* var. *kamchatica*) grows on open, rocky slopes in montane and subalpine zones. The only place it is found in Montana is in the Going-to-the-Sun Road area.

Boreal wormwood (*Artemisia norvegica* var. *saxatilis*) grows on talus slopes and rock outcrops and in open woods at subalpine or alpine elevations and is found in spruce-fir, lodgepole pine, and alpine tundra communities. It is known to occur in the Two Medicine area.

Western moonwort (*Botrychium hesperium*) is endemic and grows in meadows and grasslands in the valleys and foothills. It is known to grow in the Many Glacier, Middle Fork, and North Fork areas. One population in Glacier National Park recently could not be located and is presumed extirpated.

Mingan Island moonwort (*Botrychium minganense*) grows in moist meadows and woods in acid to neutral soil at low to high elevations. It is known to occur in the Many Glacier and Going-to-the-Sun Road areas.

Rope-root sedge or creeping sedge (*Carex chordorrhiza*) grows in sphagnum bogs at low elevations. In Montana rope-root sedge is at the edge of its range and is found only in Glacier National Park. The two locations, both in the North Fork area, are the only known sites in the western continental United States.

Lens-fruited sedge (*Carex lenticularis* var. *dolia*) grows in wet meadows and boggy ground, along lakeshores and on rock ledges. In Montana this plant is present at only two known sites — in the North Fork and Going-to-the-Sun Road areas.

Maritime sedge (*Carex maritima* var. *incurviformis*) grows on wet rock ledges and moist tundra in the alpine zone. It is known to occur in the Two Medicine area.

Rock sedge (*Carex petricosa*) grows in barren, stony, limestone soils. In Montana and the rest of the western continental United States, this species is only known to inhabit one site on the east border of Glacier National Park. A disjunct population occurs below the summit of Divide Mountain in the Going-to-the-Sun Road area.

Thin-flowered sedge (*Carex tenuiflora*) grows in the montane zone around the 5,000-foot elevation. In Montana and the western continental United States it has only been found in the North Fork area.

Pink corydalis (*Corydalis sempervirens*) grows most commonly on dry soils of disturbed sites, frequently after a burn. In the western United States, it is found only in the Many Glacier and Going-to-the-Sun Road areas.

Macoun's draba (*Draba macounii*) grows in moist areas. The only known Montana populations of this plant are in the Goat Haunt and Going-to-the-Sun Road areas.

Northern wildrye (*Elymus innovatus*) grows in sandy meadows, riparian areas, and rocky hillsides and in open lodgepole or spruce forests. It is known to grow in the Goat Haunt area.

Green-keeled cottongrass (*Eriophorum viridi-carinatum*) grows in cold, calcareous sphagnum bogs, swamps, and meadows at mid to high elevations. It is known to occur in the Goat Haunt area.

Northern eyebright (*Euphrasia arctica* var. *disjuncta*) is a member of a stable tundra community and grows in alpine bogs, moist peaty soil, streambanks, open ground, and other wet places. It is known to occur in the Many Glacier and Going-to-the-Sun Road areas.

Viviparous fescue (*Festuca vivipara*) grows between 7,000-8,000 feet. In Montana it has only been found in the Going-to-the-Sun Road area.

Macoun's gentian (*Gentianopsis macounii*) grows in the boggy soil of wet meadows and fens in the foothill zone. It is presently known from only two locations in Montana, one in the Goat Haunt area.

Bractless hedge-hyssop (*Gratiola ebracteata*) grows in drying mud around ponds in the foothills and on the plains. It grows in the Going-to-the-Sun Road and Two Medicine areas.

Three-flowered rush (*Juncus triglumis* var. *albescens*) grows in wet alpine areas. The only known occurrences in Montana are in the Many Glacier and Going-to-the-Sun Road areas.

Simple kobresia (*Kobresia simpliciuscula*) grows in moist areas. In Montana it has only been found in the Going-to-the-Sun Road area.

Ground-pine (*Lycopodium obscurum*) grows at relatively low elevations. Montana's only populations of ground pine are found in the Going-to-the-Sun Road and Goat Haunt areas where it is at the southern periphery of its range.

Stalked-pod crazyweed (*Oxytropis podocarpa*) grows on exposed rocky alpine ridges or turf alpine hillsides, often on limestone substrates. It is known to grow in the Goat Haunt area.

Palmate-leaved coltsfoot (*Petasites frigidus*) grows in wet forested areas. In Montana it has only been found in the Goat Haunt area.

Austin's knotweed (*Polygonum douglasii* ssp. *austinae*) grows in open, graveled, often shale-derived soil of eroding slopes and banks in the montane zone. It is known to grow in the Middle Fork area.

Five-leaf cinquefoil (*Potentilla quinquefolia*) grows in the dry, gravelly soil of windswept ridges and slopes in the alpine zone. It is known to grow in the Going-to-the-Sun Road and Two Medicine areas.

Heart-leaved buttercup (*Ranunculus cardiophyllus*) grows in moist meadows in the foothill zone. It is known to occur in the Goat Haunt area.

Northern buttercup (*Ranunculus pedatifidus*) grows in moist meadows, alpine tundra, or open, rocky soil on windswept ridges, growing best in calcareous regions. It is known to grow in the Going-to-the-Sun Road area.

Arctic pearlwort (*Sagina nivalis*) grows in moist, open, gravelly soil in the alpine zone. Within Montana arctic pearlwort has only been found in the Goat Haunt area. The Glacier National Park population of this species is the only one known in the continental United States.

Barratt's willow (*Salix barrattiana*) grows on boggy meadows, moist open hillsides in mountains, and along lakeshores and streambanks. It has been reported on rockslides and recent alluvial deposits. Barratt's willow grows near the Continental Divide in the Going-to-the-Sun Road area.

Hudson's Bay bulrush (*Scirpus hudsonianus*) grows in wet meadows and springs at low to mid elevations. Montana distribution is limited to the North Fork and Many Glacier areas.

Water bulrush (*Scirpus subterminalis*) grows mostly submerged in rivers, ponds, lakes, streams, and standing water up to 3 or 4 feet deep at low elevations in valleys, foothills, and montane zones. It grows in the Going-to-the-Sun Road area.

Little false asphodel (*Tofieldia pusilla*) grows in moist areas. In Montana it has only been found in Glacier National Park, where there are several small populations in the Many Glacier and Going-to-the-Sun Road areas.

Flat-leaved bladderwort (*Utricularia intermedia*) grows in shallow, standing, or slow-moving water. In Montana it has only been found in the Going-to-the-Sun Road area.

Kidney-leaf white violet (*Viola renifolia*) grows from inland forests to sub-alpine slopes on cool or damp sites in moist coniferous forests at low to middle elevations. It grows in the Two Medicine and Middle Fork areas.

Pale sedge (*Carex livida*) grows in cold, calcareous, poorly drained lowlands and wet peaty ground at low elevations in foothill and submontane zones. The species is shade intolerant. The only known Rocky Mountain occurrence is in the North Fork area.

Spotted lady's-slipper (*Cypripedium passerinum*) grows in moist to wet forests at low elevations. It also grows on sand dune complexes and near streambanks or lakeshores and grows more rapidly in the open than in the shade. It is known to occur in the North Fork area.

Buckler fern (*Dryopteris cristata*) grows at low elevations in moist woods, forest, thickets, marshes, swamps, and sphagnum bogs. It is known to occur in the Middle Fork area.

Northern rattlesnake-plantain (*Goodyera repens*) is a shade-loving species found in cool, coniferous forests, usually with a mossy understory. Occurrence in Glacier National Park is in the North Fork area.

Round-leaved orchid (*Orchis rotundifolia*) grows along streams and in wet woods, usually with good drainage, often on limestone. It is known to occur in the Goat Haunt area.

Mountain Bladder Fern (*Cystopteris Montana*) grows in moist areas in the mountains in mid to high elevations. In Montana it has only been found in the Going-to-the-Sun Road and Middle Fork areas.

VEGETATION (GENERAL)

Vegetation communities of the central and boreal Rocky Mountains, the Great Plains, the Pacific Northwest, and the alpine all meet in Glacier National Park. Many species are at the limits of their distribution in the park.

Glacier supports over 1,000 species of native vascular plants. Large-scale climatic influences and the variety of environmental conditions in the park foster vegetation diversity. In addition to the large-scale influences, local climate that changes with elevation and proximity to mountain ridges or large bodies of water affects vegetation. The steep, variable terrain, ranging from 3,200-10,500 feet, exhibits marked contrasts in temperature and precipitation over relatively short distances. Glaciation and other geologic processes have also influenced the distribution of vegetation. Across most life zones and vegetated communities fire has had a significant influence through periodic burning and recycling of nutrients and vegetation. Fire regimes have also changed, not only in response to climate but also through suppression and through the elimination of the native cultural practice of igniting fires (USFS, Barrett 1993). In some vegetation communities in the park, fire exclusion has altered historical age-class structures and the natural forest mosaic. As a result, some forests of mixed severity fire regimes have been changed to stand-replacement fire regimes.

Vegetative landcover types in the park include: dry herbaceous, (plants and shrubs that grow in dry areas — approximately 77,067 acres); mesic herbaceous (plants and shrubs that grow in wet areas, including riparian areas — approximately 48,821 acres); deciduous trees and shrubs (64,924 acres); coniferous forests and dense mesic (334,943 acres); coniferous forest and open dry areas (160,744 acres); and barren rock, snow, and ice (298,357 acres).

The major community types in these larger landcover types consist of grasslands (dry herbaceous), pine or woodland savannahs (open, dry coniferous and deciduous), bottomland forests (mesic herbaceous and deciduous), ponderosa pine/Douglas fir forests (open, dry coniferous), western red cedar/western hemlock forests (dense, mesic coniferous), spruce/fir forests (dense, mesic coniferous landcover), and alpine communities (mesic herbaceous and barren). Additional

communities include marshes, swamps, and lakes and barren, rocky talus slopes (Habeck 1970). Though these latter habitats cover only a small area in the park, they contribute an important component of the park's diversity and contain many, if not most, of the rare plant species.

Grassland communities include the fescue-wheatgrass prairie, which is dominated by rough fescue and a variety of other grasses (Wayne Phillips, retired USFS ecologist, pers. comm., Jan. 1999) These include pockets dominated by shrubs such as big sagebrush. While composed of a wide variety of species, east side prairie communities are primarily dominated by Idaho fescue. They include the introduced timothy and smooth brome. A variety of sedge species dominate sedge meadows and marshes.

Pine or woodland savannahs include quaking aspen and black cottonwood groves and open lodgepole pine, ponderosa pine, and limber pine stands. Limber pine is restricted to the east side of the Continental Divide in the park and, like whitebark pine, is suffering because of white pine blister rust. The five needle pines, white pine, limber pine, and whitebark pine are suffering serious ecological effects as a result of fire exclusion and the exotic white pine blister rust.

Currently, 90 percent of the whitebark pine in Glacier are lethally infected with the rust and are likely to die in the next 5-15 years. About one-third of their cone-bearing crowns are already dead. The park has begun a small project to collect seed from apparently rust-resistant trees to restore whitebark and limber pine before they become extirpated. Whitebark pine is an important food source to Clark's nutcracker, red squirrels, and grizzly bears; and it plays an important role in defining timberline, as it can become established under harsher conditions than other trees. It also provides a microhabitat suitable for the establishment of sub-alpine fir.

Bottomland forests, common in riparian zones and floodplains, are generally dominated by black cottonwood in association with a wide variety of codominants, such as pine, red cedar, or spruce. Thin-leaved alder and willow swales also make up bottomland vegetation.

Ponderosa pine, though common in Montana, makes up only a minor portion of stands in Glacier National Park and is found only on the west side. It occupies the warmest and driest sites that support forests and grades into savannah communities. Douglas fir occupies sites just slightly cooler and more mesic than the ponderosa-dominated sites and is somewhat more common, occurring on both sides of the divide. Even as seral species in the development of climax forests, such as cedar/hemlock, ponderosa and Douglas fir tend to be minor in comparison with lodgepole, western larch, spruce, and fir. The latter are common seral species in forests throughout the park, except western larch, which occurs only rarely on the east side.

The western red cedar and western hemlock forests include nearly every species of tree that grows in the park. Cedar and hemlock do not establish quickly in recently opened stands, and hemlock requires shady conditions for seedling establishment. New stands are first established by pioneering species, such as lodgepole, larch, aspen, or cottonwood, and later filled in with seral species such

as Douglas fir, white pine, spruce, and fir. As these trees die, cedar and hemlock saplings fill in gaps left by the seral species. The process of development from newly opened stands, such as those following a fire, to cedar/hemlock forest takes centuries.

As elevation increases, particularly above 3,500 feet, subalpine fir and Engelmann spruce become increasingly more important, and cedar and hemlock drop out by about 4,000 feet. At higher elevations spruce/fir communities dominate, although subalpine fir remains the most abundant. Whitebark pine communities, once abundant in certain areas, have been decimated by blister rust, and there are only remnant populations. Alpine larch are found in some higher elevations of the park. As elevation increases above 6,000 feet, the stunted growth form referred to as *krummholz* becomes increasingly pronounced (Habeck 1970).

Above timberline there are alpine communities, including wet meadows found on level terrain adjacent to streams dominated by undergreen willow and a variety of forbs and sedges and rock ledge communities dominated by saxifrages.

The flora of Glacier National Park also includes more than 120 species of exotic plants that have been intentionally or inadvertently introduced. A number of these species are increasing in quantity, area, and density and are threatening native plant communities. They inhibit the perpetuation of native plant communities and hence the quality of the wildlife in the park. Exotic plants also affect the park's scenic quality and have the potential to spread. This has direct effects on wildlife and recreational enjoyment. Most exotics occur in disturbed areas such as roadsides, construction projects, old homesteads, grazed fields, burns, floodplains, and utility sites. Removing topsoil and vegetative cover creates favorable microhabitats for exotic colonization. Spread occurs when seeds are transported by visitors, construction equipment, animals, wind, and water. Particular issues are addressed in the park's "Exotic Vegetation Management Plan."

Within the Going-to-the-Sun Road corridor, the vegetation in the Apgar area is characterized by lodgepole, hemlock, Engelmann spruce, white spruce, (only location in the park), cedar, larch, black cottonwood, riparian, and meadow species. Prior to a large fire in 1929, the Apgar area was a cedar/hemlock forest. It is now in early to mid successional stages. The Avalanche area is characterized by cedar/devil's club, which is a rare habitat type in Montana and may reach its easternmost extension in Glacier. Hemlock, cottonwood, Engelmann spruce, Douglas fir, maple, paper birch, hawthorn, and snowberry are also in the area.

The Logan maintenance pit area has spruce/fir and riparian vegetation. The Moose Country area is in cedar/hemlock forest. The Road Camp and Haystack areas have subalpine fir. The Sunrift Gorge area is characterized by spruce/fir forest near the roadside, and a trail leads to alpine communities. The Packers Roost area is in spruce/fir forest. The Sun Point area is a rocky outcrop with lodgepole pine, dry, herbaceous cover, and downed limber and whitebark pines.

The Logan Pass area is characterized primarily by dry, subalpine meadows, along with *krummholz* subalpine fir. The Lunch Creek area has subalpine fir *krummholz* in a riparian setting with willow, honeysuckle, huckleberry, and bear-grass and contains rare plant species.

AQUATIC RESOURCES

Threatened and Endangered

Bull Trout. The bull trout in the Upper Columbia River Basin was accorded “threatened” status by the U.S. Fish and Wildlife Service under the provisions of the Endangered Species Act in 1998. Glacier National Park contains a significant amount of lake and stream habitat for bull trout, and management and research regarding this species have high priority in the park’s *Resource Management Plan* (NPS 1993b).

The historic range of the bull trout has become fragmented due to habitat alteration and nonnative fish introductions throughout western North America. In addition to populations directly associated with the Columbia River Basin, there are also bull trout east of the Continental Divide in the Hudson Bay drainage. The Hudson Bay population is being considered for listing as threatened under the Endangered Species Act. Because of declining numbers, bull trout fishing is prohibited in the park, and spawning streams in the park and along the Middle and North Forks of the Flathead River are closed to fishing year round. A number of unique subpopulations of bull trout also survive in isolated enclaves in remote lakes in the park.

Proposed Species

Montana Capshell Limpet. A relict population of the Rocky Mountain capshell (*Acroloxus coloradensis*), also known as the “Montana capshell” or simply the “capshell,” was discovered in a small pond in the Going-to-the-Sun Road area in the mid-1960s. This is one of only a few sites in the United States where a viable population has survived. Most other documented populations are in Canada. It has also been found in several lakes in Colorado. In 1992, *Acroloxus coloradensis* was petitioned for emergency listing as a threatened species in the United States, but the decision is pending further evaluation.

At present, the U.S. Fish and Wildlife Service is evaluating the westslope cutthroat trout for possible listing under the Endangered Species Act. Westslope cutthroat are native to all major drainages within the park, but they are common in the North Fork and Middle Fork of the Flathead River, which remains one of the last strongholds for genetically pure westslope cutthroat in the United States. Selected spawning streams (along the Middle Fork of the Flathead River and within the park) have been closed to fishing to protect cutthroat spawning areas.

State Species of Special Concern

The state of Montana lists the following fish species found in Glacier National Park as “fish of special concern:” westslope cutthroat trout, Yellowstone cutthroat trout, bull trout, arctic grayling, shorthead sculpin, spoonhead sculpin, and trout-

perch. Of those listed, only the Yellowstone cutthroat trout and the arctic grayling are not native to Glacier National Park.

Places like Glacier become increasingly important as sources for pure genetic stocks of fish as habitats outside the park become more fragmented and as inbreeding with nonnative species becomes more prevalent.

General Aquatic Species

Within the aquatic ecosystem in Glacier National Park there are 17 native and 7 nonnative species of fish. The Columbia River basin, the area west of the Continental Divide, is characterized as a complex network of unique streams and lakes displaying abundant water volumes, low fertility, low temperatures, and high clarity. Major native fish species present are classified as adfluvial (species that spend their adult lives in a lake but migrate into tributaries to spawn) and resident species (which complete their entire life cycle within a specific environment). Eleven of the 16 known fish populations of the drainage are indigenous species. The river-lake system of the Columbia River basin is recognized as an integral unit of importance, with one system relying on the other for survival.

The Missouri River drainage, in the southeast area of the park, is characterized by low productivity lakes and streams but possesses a significantly different fish species composition than the Columbia River basin. Much of this drainage in the park is thought to have been originally barren of fish, although westslope cutthroat trout, mountain whitefish, grayling, and longnose suckers are known to be indigenous to the drainage.

The Saskatchewan River drainage is another unique watershed that flows north to Hudson Bay. The headwaters, which are in the northeast area of the park, are low in productivity, with both native and nonnative species occupying the lakes and streams of this drainage.

The 11 sport fishes found in the park are westslope cutthroat trout, Yellowstone cutthroat trout, Rocky Mountain whitefish, Lake Superior whitefish, lake trout, rainbow trout, eastern brook trout, kokanee salmon, burbot, northern pike, and grayling. As of 1995, fishing for bull trout was prohibited because of its declining numbers.

In addition to the ichthyofauna of the park's lakes and streams, Glacier is also home to salamanders, frogs, and aquatic macroinvertebrates. Although primary surveys on amphibians and localized studies of macroinvertebrates have been done, no comprehensive parkwide surveys have ever been completed.

WATER RESOURCES

The park's alpine meadows and sculpted peaks form a triple divide from which water descends to three oceans. Water east of the Continental Divide flows into either the Saskatchewan River drainage, which flows into Hudson Bay, or into the Missouri River drainage, which flows into the Gulf of Mexico. West of the Continental Divide, water flows into the Columbia River drainage, which flows into the Pacific Ocean.

The park is divided into four major drainages: the Hudson Bay, the Missouri River, the North Fork of the Flathead River, and the Middle Fork of the Flathead River.



WATER QUALITY

The water quality in Glacier National Park is very high. Between 1984 and 1990 a monitoring study measured the water quality of five large lakes that are heavily used by park visitors and have lakeshore developments (hotels, cabins, commercial boating) and eight backcountry lakes that are in very remote alpine headwaters. The frontcountry lakes were Lake McDonald, Swiftcurrent, Waterton, St. Mary, and Two Medicine. The backcountry lakes were Beaver Woman, Cobalt, Gunsight, Gyrfalcon, Medicine Grizzly, Snyder, Stoney Indian, and Upper Dutch. These lakes were selected because they included all the regions and geology in Glacier National Park. It was assumed that the study lakes represented the array of conditions present in the many park lakes. No trends that could be related to pollutants were evident; only normal variations were documented. This provides a baseline for water quality.

The results of the study indicated that the lakes contained few dissolved solids because of the low dissolution rates of the belt series bedrock. Cobalt, Snyder, Upper Dutch, Gyrfalcon, and Two Medicine Lakes have very little buffer capacity and are extremely

sensitive to acidic deposition. All of the lakes were low to very low in nutrients and productivity because of low phosphorus and would be extremely sensitive to phosphorus loading.

The amount of phytoplankton (largely algae) was low, ranging from almost none in Gyrfalcon to 1.84 ml/m³ in Gunsight. The shallow lakes at lower elevations (Medicine Grizzly, Swiftcurrent, and Two Medicine) with fast flushing rates consistently had the most phytoplankton. The more dilute lakes (Upper Dutch, Two Medicine) had more phytoplankton species. Zooplankton (tiny animals and animal matter) numbers were also low, but lakes with higher phytoplankton did not necessarily have high zooplankton numbers. Presence of fish clearly had a negative effect on zooplankton numbers and biodiversity, especially in the small backcountry lakes.

FLOODPLAINS AND WETLANDS

Wetlands

According to a wetland inventory completed in cooperation with the U.S. Fish and Wildlife Service in 1993, there are 4,639 known nonriverine wetlands larger than 5 acres and 1,430 known riverine wetlands in the park. A total of 37,848 acres in the park are classified as wetlands. Glacier has a wide variety of wetlands due to local differences in vegetation, hydrology, water chemistry, soils, topography, climate, and other factors. According to the wetlands and deepwater classification system, Glacier contains 39 subclasses of wetlands in three major systems: lacustrine, palustrine, and riverine.

The riverine wetlands are those areas associated with rivers and streams. Water is usually, but not always, flowing in the riverine system. There may be upland islands or palustrine wetlands in the channel, but they are not included in the riverine system. Palustrine moss-lichen wetlands, emergent wetlands, scrub-shrub wetlands, and forested wetlands may occur adjacent to the riverine system, often in the floodplain. The bogs and fens in Glacier, although generally small and sparse throughout the park, are quite special.

The lacustrine systems include wetlands and deepwater habitats and (1) are situated in a topographic depression or a dammed river channel, (2) lack trees, shrubs, persistent emergents, emergent mosses, or lichens with greater than 30 percent area coverage, and (3) total more than 20 acres. Where a river enters a lake, the extension of the lacustrine shoreline forms the riverine-lacustrine boundary. It includes permanently flooded lakes and reservoirs and intermittent lakes. Typically, there are extensive areas of deep water. Islands of palustrine wetland may lie inside the boundaries of the lacustrine system.

The palustrine system includes all nontidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens. The palustrine system was developed to group the vegetated wetlands traditionally known as marsh, swamp, bog, fen, ponds, and prairie. Palustrine wetlands may be situated shoreward of lakes, river channels, or estuaries on river floodplains, in isolated catchments, on slopes, or as islands in lakes or rivers.

In the Many Glacier area there are approximately 3,094 acres of wetlands. Most of them are associated with Lake Sherburne and Swiftcurrent Lake. They are primarily palustrine (612 acres) and lacustrine (2,375 acres) wetland types. There are 106 acres of wetlands associated with rivers and creeks (riverine).

In the North Fork area there are approximately 11,991 acres of wetlands. Most of these are in the North Fork Valley near the North Fork of the Flathead River and some of the lakes. They are primarily palustrine (3,397 acres) and lacustrine (7,432 acres) wetland types. There are 1,161 acres of riverine wetlands.

In the Goat Haunt-Belly River area there are approximately 4,220 acres of wetlands. Most of these are in the area north of the head of Waterton Lake and the Belly River Valley. They are primarily palustrine (936 acres) and lacustrine (3,030 acres) wetland types. There are 254 acres of riverine wetlands.

In the Going-to-the-Sun Road area there are approximately 13,527 acres of wetlands. These are spread throughout the entire geographic area. They are primarily palustrine (1,052 acres) and lacustrine (11,698 acres) wetlands. There are 776 acres of riverine wetlands.

In the Two Medicine area there are approximately 1,953 acres of wetlands. These are primarily concentrated near lower Two Medicine Lake and in the southern half of the geographic area. They are primarily palustrine (627 acres) and lacustrine (1,252 acres) wetlands. There are 73 acres of riverine wetlands.

In the Middle Fork area there are approximately 3,053 acres of wetlands. They are spread throughout the area, with a major concentration in the vicinity of the Middle Fork of the Flathead River. They are primarily palustrine (1,183 acres) and lacustrine (1,016 acres) wetlands. There are 853 acres of riverine wetlands.

Floodplains

The 100- and 500-year floodplains have only been identified for the rivers and creeks in Glacier National Park that are adjacent to developed areas.

In the Going-to-the-Sun Road area there are a number of developments in the 100- and or 500-year floodplains. Based on the 1964 flood, which was determined to be in excess of a 200-year flood, it was determined that the 100-year floodplain for McDonald Creek includes the area occupied by the Village Inn and the adjacent motel. The 500-year floodplain for McDonald Creek includes Apgar Village.

The 100-year floodplain of Sprague Creek probably includes a portion of the Sprague Creek Campground, sewage lift station, and picnic area.

The 100-year floodplain of McDonald Creek includes the picnic area and comfort station at Avalanche. The campground is not in the 100-year floodplain. The 100-year floodplain also includes a portion of the Going-to-the-Sun Road. The 500-year floodplain boundaries have not been determined for that area of McDonald Creek.

The 100-year floodplain for Divide Creek and the St. Mary River may include the St. Mary Visitor Center and the parking lot. In 1986 the Army Corps of Engineers determined that the 100-year floodplain did not include these areas, but both creeks are very unstable and have moved. The exact boundaries of the 100- and 500-year floodplains of these two creeks are not known.

Divide and Wild Creeks, like many of the creeks in Glacier National Park, transport and deposit glacial material. The streams erode and transport this material through most of the length of their steep channels with high velocities and deposit it in the stream bottoms when they slow on the flat, alluvial fans of the St. Mary housing and administrative area and St. Mary Campground. This deposition raises the elevation of the stream bottoms and causes the streams to seek alternate courses in the lower portion of the floodplain. For this reason, the stream channels of these two creeks are very unstable, and historically have shifted over a large area.

The entire extent of the alluvial fans of Divide and Wild Creeks in the area of development should be considered in the base (100-year) floodplain. This is because of the frequency of recent flooding in the area, the uncertainty of determining flood magnitudes, instability of the Divide and Wild Creek alluvial fans, and the difficulty in interpreting hydraulic modeling.

VISUAL RESOURCES

Many of the names that were given to the mountainous terrain, such as “Backbone of the World” and “Land of the Shining Mountains,” relate to the visual prominence of the mountains that were both a barrier and a backdrop for the lives of the people who lived in the area. The establishment of Glacier National Park was rooted in the preservation and appreciation of the scenic resources of the area, which are still very important.

The North Fork provides views primarily in a natural forested environment with open meadows along streams and in the prairies north of Polebridge. Outstanding views of the mountains along the Continental Divide are to be found at several lakes that extend to within a few miles of the divide.

The Going-to-the-Sun Road area provides views of a cross-section of Glacier’s environment from the forested, lake, and streamside areas on each side of the park to the rocky, exposed alpine areas near the divide. The road provides a viewpoint for the park scenery that is harmonious with the natural features it traverses.

The Middle Fork area is heavily forested with few viewpoints. Views of mountain peaks are most important in the valley of the Middle Fork.

The Two Medicine area has an open landscape and views of the abrupt, prominent escarpment of the Rocky Mountain front. The mountains that make up the front are visible from a great distance to the east and define the landscape of the region. The mountains have been seen as a barrier, as a destination, and as a dwelling place of the gods.

In the Many Glacier area there is a sense of enclosure in the lower valley, and there are views of the mountain peaks from all points in the valley. The Many Glacier Hotel and associated facilities were constructed to take advantage of the outstanding views. The rest of the geographic area is well known for its views of alpine meadows, lakes, and glacier-carved mountains.

The Goat Haunt-Belly River area has a sharp interface between the mountains and the prairies to the north and east. It has several lakes that lead the eye to the prominent mountain ranges. Chief Mountain, astride the park boundary and the Blackfeet Indian Reservation, is visible from a great distance on the plains to the east. It has been a prominent landmark for many cultures.

NATURAL SOUNDS

Natural sounds predominate through most of the park. Natural sounds include those made by animals, water, wind, and other natural phenomena. Natural quiet does not mean complete silence; it exists when the only sound is produced by the

natural and historic components of the park. It may include silence - the apparent absence of any sound - or the rush of air over the wings of a soaring bird or the overwhelming roar of waterfalls or gale force wind. Most agree that it is thought of as a mixture of mostly low decibel background sounds punctuated by the songs and wingbeats of birds and insects or the faint clatter and calls of other wildlife.

Noise levels in the park vary depending on time, wind direction, and location (Harris, Miller, Miller and Hansen, Inc. 1998). Sources of noise in the park include scenic air tours, road traffic, motorboats, railroad traffic, and developed area activity (generators, music, and people). There are also administrative activities that create noise, such as chainsaws, helicopter flights, and emergency vehicle sirens. Noise is generally concentrated and more apparent in developed areas and along roads. Noise from scenic air tours can be heard throughout the park. Future developments outside the park, including mineral development, logging, and new construction, also pose possible threats.

SOILS

There are no prime and unique farmlands in the park as defined by the U.S. Department of Agriculture, Natural Resources Conservation Service (Pers. com. Dutton 1997).

The soils in the park are characterized by a variety of parent materials, climates, topography, vegetation, and ages (Dutton and Marrett 1997). A soil mapping project was begun in 1995 and has been completed except for the Middle Fork. Many soils in the park were found to have severe limitations for most common uses due to steepness, high rock content, high clay content, and shallow bedrock. This does not prevent development and use, but development and use may be more difficult and more expensive and require more cost and mitigation to avoid adverse environmental effects.

In the Going-to-the-Sun Road area the soils on the west side of Logan Pass are identified as alluvial soils, bedrock (colluvial) soils, glacier till soils, and bedrock limestone soils. In the Apgar developed area the soils are identified as floodplain, cobbly alluvial, sandy over cobbly alluvial, and silty over cobbly alluvial. These soils each have individual ratings, and they are rated from low to high for productivity and revegetation. The ability depends on the amount of rock content and low water and nutrient holding capacity. They are moderately to well suited for road and trail development based on the rock content and ability to drain. They are very susceptible to invasion by weeds when disturbed. They have a low to moderate erosion potential depending on the sand content of the soil, and they are rated from low to high for waste disposal with septic tanks or drainfields, dependent on the silt loam texture and rock content. At the southern end of Lake McDonald on the east bank the soils are a mixture of bedrock colluvial soils that are shallow, moderately deep, and deep. These soils have very low to high potential for productivity and revegetation depending on the depth, rock content, and water and nutrient holding capacity. They range from poorly to well suited for road and trail development. They are moderately to highly susceptible to invasion by weeds

and have a low to moderate erosion potential depending on the rock content. They are rated as low to moderate for waste disposal using septic tanks or drainfields.

The majority of the soils surrounding Lake McDonald, including the Lake McDonald developed area, Moose Country, and Avalanche developed area, are glacial till soils. These soils have a high potential for productivity and revegetation. They are not well suited to road and trail development and are moderately susceptible to invasion by weeds. They have a moderate erosion potential and are rated moderate for waste disposal using septic tanks and drainfields. The Logan maintenance pit and Packers Roost areas are characterized by stony glacial till soils. The Road Camp area is a colluvium land type with 80 percent rock and gravel and 20 percent soils. They have low water-holding capacity and low fertility. The Going-to-the-Sun Road historic quarries are near the west tunnel across the road from the Bird Woman Falls overlook. The soils in these areas are classified as limestone bedrock. The area just above the tunnel has only shallow soils, whereas Bird Woman Falls overlook has shallow to moderately deep limestone soils. Due to the high rock content and limited soil depth, revegetation potential is moderate, and there is a moderate erosion potential.

On the east side of the park in the Going-to-the-Sun geographic area (including Logan Pass) the soils are largely bedrock limestone in the higher elevations and bedrock quartzite and argillite in the mid elevations. Surrounding St. Mary Lake are glacial landslide and mixed alluvial soils. In the Logan Pass area, the soils are largely limestone rock outcrop, shallow soils, and alpine meadow soils. There is very little actual soil material in the limestone rock outcrops. The shallow and alpine meadow soils are rated low to moderate for potential productivity and revegetation. Both soils are rated low for road building due to the limited depth, loamy texture, and low rock content. They are rated moderate for trails. They have a low to moderate susceptibility for weed invasion when disturbed and a moderate to high erosion potential. They have a low suitability for waste disposal using septic tanks or drainfields due to the limited soil depths. The soils at Lunch Creek are similar to those at Logan Pass. The soils at Sunrift Gorge are moderate, deep, and shallow colluvial soils, with small areas of quartzite, argillite outcrops. They are well-drained soils with loam and a large amount of gravel. The bedrock below them is fractured. The soils surrounding St. Mary Lake are a mixture of glacial and colluvial. The revegetation and productivity potential of the soils are moderate to high. They are rated as moderate for road and trail construction, although trail erosion is often 6-10 inches deep. They are moderately susceptible to invasion by weeds. They have a high erosion potential and moderate suitability for waste disposal due to their texture and rock content. Soils in the St. Mary developed area are alluvial and rocky sandy alluvial grasslands. These soils have a moderate to high potential for revegetation and productivity in the upper layers that decreases in the deeper layers due to high rock content and low ability to hold water and nutrients. They are well suited to road and trail construction due to good drainage and rock content but are highly susceptible to weed invasion when disturbed. They have a

moderate erosion potential and a moderate potential for waste disposal (Land and Water Consulting, Inc. 1995, Dutton and Marrett 1997).

AIR QUALITY

Glacier is designated as a mandatory class I area under section 162(a) of the Clean Air Act. This designation gives the federal land manager (the assistant secretary of the interior for fish and wildlife and parks) and the park manager the responsibility to protect the air quality and air quality-related values in the park. Air quality-related values are defined as visibility and those scenic, cultural, biological, and recreational resources of an area that are affected by air pollution. The park is in two air quality control regions: the Missoula Intrastate region west of the Continental Divide, and the Great Falls Intrastate region east of the divide. The Missoula region is maintaining all national air quality standards except for fine particulate matter (PM-10), while the Great Falls region is maintaining all standards except for carbon monoxide in the city of Great Falls. However, no major metropolitan areas are within 125 miles (200 km) of Glacier, and regional smog typical of highly populated areas with high vehicle use is not present. The "Special Report on Transboundary Air Quality Issues" reported that visibility is being affected by wildfires, prescribed fires, and industrial emissions from sources in the northern states and Canadian provinces on the boundary. Monitoring in Waterton Lakes and Glacier National Parks showed that two-thirds of the particles that reduce visibility in Waterton-Glacier International Peace Park originate in Canada and that half of the contribution comes from sources in Alberta.

Air quality is considered good in the park. Visibility is occasionally marred by airborne particulate matter, including smoke from both natural and manmade fires and dust from unpaved roads. Sulfuric compounds, including sulfur dioxide and ammonium sulfate from industrial emissions, can also contribute to local haze. When inversions occur, visibility problems in the park can be more severe. Flathead County, which includes the part of the park west of the Continental Divide, is currently out of compliance with Montana standards for particulate emissions. Montana is required to develop a state implementation plan to attain the particulate standard.

Air pollution in national park system units reduces visibility, injures vegetation, changes lake and stream chemistry, and causes the deterioration of cultural resources. Since the late 1970s, the National Park Service has monitored visibility and ambient levels of fine particles (particles with diameters less than 2.5 micrometers), ozone, and wet deposition.

The annual average visibility levels at Glacier National Park are about 84 kilometers (corresponding to a 1993-1997 average extinction of 46.3 mm), which is less than the typical 130 kilometers or greater in the Colorado Plateau and Central Rocky Mountains but greater than the 20 to 30 kilometers typical of many eastern sites. Impaired visibility results from concentrations of fine particles suspended in the ambient air. On the average at Glacier National Park, about 31 percent of the visibility reduction is caused by sulfate fine particles, 22 percent by organic fine

particles, 10 percent by nitrate fine particles, 8 percent by soot fine particles, and 8 percent by coarse mass and soil particles. The organic and soot particles have their origin in vegetative burning and urban sources; sulfates and nitrates originate from sources of sulfur dioxide and nitrogen oxides like power plants, and coarse mass and soils from wind-blown dust. In the nine years 1988-1996, on the dirty days (when measured fine particle concentrations were at or above the 80th percentile of the mass distribution) visibility showed a statistically significant improving trend at the $p = 0.10$ level. On average days, (when measured fine particle concentrations were between the 40th and 60th percentiles of the mass distribution) visibility exhibited a statistically significant improving trend at the $p = 0.05$ level. On clean days (when measured fine particle concentrations were at or below the 20th percentile), visibility showed no statistically significant change in the nine-year period.

Sulfate and nitrate ion concentrations in precipitation measured at Glacier National Park are very low compared to most sites in the eastern United States. In 1997 Glacier reported a sulfate ion concentration of 0.3 milligrams per liter (mg/L). Sulfate ion concentrations throughout Washington, Oregon, Idaho, Montana, and Wyoming varied between 0.2 and 0.5 mg/L. By comparison, the 1997 sulfate ion concentration at Shenandoah National Park was 1.9 mg/L. Nitrate ion concentrations at Glacier and the northwestern United States exhibit a similar spatial trend for 1997, with an annual nitrate ion concentration of 0.5 mg/L at Glacier and a range of 0.2 to 0.8 mg/L recorded at sites in the above states. Shenandoah's nitrate ion concentration in the same year was 1.4 mg/L. The 1997 pH measured at Glacier and other sites in the Northwest varied between 5.0 and 5.4. The 1997 pH at Glacier was 5.0; that measured at Shenandoah was 4.4. For the period 1985-1993, the National Atmospheric Deposition Program reported a negative-sloped trend for sulfate ion concentration and a positive-sloped trend for nitrate ion concentration and Glacier National Park. However, neither trend was statistically significant ($p > 0.05$).

At higher elevations in Glacier National Park, much of the annual wet deposition falls as snow. Research to understand seasonal snow hydrology and chemistry are being sponsored by both the BRD global change program of the U.S. Geological Survey and the PRIMENet program of the Environmental Protection Agency and the National Park Service. Glacier National Park has been a part of the Rockies-wide synoptic snow survey for about five years, which makes it possible to determine where Glacier National Park fits in the regional deposition picture.

The annual maximum 1-hour ozone levels at Glacier National Park are lower than those measured at most of the other monitoring sites in the national park system. Annual daily maximum one-hour concentrations at Glacier varied between 58 and 77 ppb between 1992 and 1997. Glacier's peak ozone levels are comparable to those measured at other national park system sites in the Pacific Northwest but are significantly lower than ozone concentrations measured in national park system units in southern California and in the northeast and east-central United States. Glacier's ozone levels are also well below the U.S. Environmental Protection Agency (EPA) 8-hour average ozone standard designed to protect human health.

The EPA standard is exceeded if the three-year average of the fourth highest daily maximum 8-hour concentration exceeds 84 ppb. The 1995-1997 three-year average at Glacier National Park is 47 ppb. During 1988-1997, the May-September average daily maximum one-hour ozone concentration showed no statistically significant trend at the $p = 0.15$ level.

Winter inversions cause local increases in carbon monoxide at Kalispell, 13 miles (20 km) south of West Glacier. Most of Flathead County's 70,000 residents live within 15 miles (25 km) of Kalispell, the largest city in northwestern Montana. Emissions from automobiles, wood-burning stoves, and the Columbia Falls Aluminum Company, combined with winter meteorological conditions, cause seasonal increases in carbon monoxide (NPS 1998).

Glacier National Park participates in the following air quality monitoring programs:

The National Dry Deposition Network measures gaseous pollutants and meteorological data. Ambient ozone, sulfur dioxide, particulate sulfate, particulate nitrate, and nitric acid are measured in addition to meteorological data.

The Visibility Monitoring and Data Analysis Program / Interagency Monitoring of Protected Visual Environments measures visual range, air temperature, and relative humidity. Visibility conditions are measured by the IMPROVE sample, which collects fine particles (PM_{2.5}) of sulfate, nitrate, elemental carbon, soil, and PM₁₀ coarse soil.

The National Atmospheric Deposition Program / National Trends Network measures acidity, conductivity, precipitation, chemical concentrations, deposition, anions, and cations.

Fluoride is measured using sodium bicarbonate tube instrumentation and forage and vegetation sampling. This monitoring allows the park to participate in the Columbia Falls Aluminum Company baseline fluoride monitoring program.

It is important to distinguish between emission source regions and receptor regions, where effects occur. Because air pollutants are transported in the atmosphere, their adverse effects can occur not only within the emission source regions but also in other regions downwind of the primary contributing sources. For some air issues such as persistent toxic substances, the primary source regions and the primary receptor regions of concern may not be at all coincident; they may in fact be quite distant from each other. However, the pollutants can be controlled only where they are emitted.

Glacier's air quality monitoring program measures a number of parameters that would indicate sources of airborne pollutants. In addition to this onsite monitoring, the Air Resources Division of the National Park Service models new source pollutants or changes from existing sources to measure their effects on the park.

The main sources of pollutants surrounding the park west of the Continental Divide are industrialized areas south and west of Glacier. These sources are under the authority of the state of Montana, which works closely with Glacier on air quality issues. Sources around the park include Columbia Falls Aluminum Company, Plum Creek Lumber, Stoltze Land and Lumber, Pack and Company, Fording Coal, Crestbrook Forest Industries, Cominico Ltd. Shell, Waterton Gas

facilities, and Gulf compressor stations. On the east side of the park, airborne pollutants are often associated with a northern air flow. A variety of regional air quality management frameworks for managing this transboundary air quality issue are being considered in the United States and Canada.

Glacier National Park has been selected to take part in the Environmental Protection Agency's Demonstration Index Site Project (DISPro) program along with 12 other national parks. The intent of the program is to examine whether a network of sites in the parks can be used to address monitoring issues for both global and local environmental stressors such as water-borne pollutants or air deposition. As an initial program, ultraviolet-B radiation will be measured in the DISPro parks. To best meet these conditions at Glacier a site at St. Mary was chosen.

Cultural Resources

AMERICAN INDIANS

Prehistoric Use

Recent archeological and ethnographic studies have shown that the area that became Glacier National Park has been used by people for 2,000-10,000 years. American Indian tribes have long been associated with the area that became Glacier National Park. The tribes' cultural memories are preserved in oral tradition and in writing by ethnographers. The tribes include the Pikuni (Blackfeet, Blood), Cree, Kootenai, Gros Ventre, Stony (Assiniboine), Crow, Pend Orielle, and Salish.

The tribes moved seasonally, usually in response to food sources, special events, or spiritual needs. All lived in the mountains as their needs dictated, and they used the various areas differently according to the seasons. They hunted for food and raw materials and collected plants and other items for medicinal, utilitarian, and religious purposes. They protected the resources they needed from others. People on both sides of the divide traveled across the mountains to hunt, fish, or raid on the other side.

Historic Use

East of the Continental Divide, the Blackfeet fiercely defended their territory. Despite repeated smallpox epidemics they maintained a strong presence in the area through the 19th century. They interacted with the Lewis and Clark party.

During the westward expansion of the United States, more and more land was taken from all of the American Indian tribes, including those living around what would become Glacier National Park. The United States began developing a formal relationship with the Blackfeet in the 1850s through treaties. A reservation was created in 1855 for the Blackfeet beginning at the Continental Divide and extending east. Despite the established boundaries, the Blackfeet spent much time and effort keeping new residents of the area from encroaching on the land that had been set aside for their use.

Soon after 1800 Catholic missionaries began spreading Christianity among local American Indian groups. In 1855 the first attempt was made to establish

reservations for Indians in Montana. Historical records show that Blackfeet and Kootenai groups camped at the foot of upper St. Mary Lake periodically during the 19th century. The Cree and Metis camped near Babb during that time. A group of Stony Indians were camped at Quartz Lake in 1876. Crees and Kootenais were sometimes encountered on the North Fork drainage prior to the establishment of the park.

Some of the white men drawn to the area became close friends and champions of the rights of the Blackfeet, and some of them married into the tribe. Notable were J.W. Schultz, a writer, and G.B. Grinnell, who was instrumental in establishing the area as a national park.

The first indication that there were minerals on Blackfeet land came in 1889. Eager prospectors had no legal way to exploit the minerals. In 1894 serious efforts began to encourage the Blackfeet to cede the mountainous portion of their reservation so that mineral claims might be staked. There was very little evidence that large amounts of mineral wealth were hidden there.

Negotiations began and included conferences with J. W. Schultz and G.B. Grinnell. Grinnell was later appointed to the formal negotiating commission seeking agreement on the details of selling the mountainous land. An 1895 agreement with the Blackfeet withdrew the land that was to become the eastern part of Glacier National Park from their reservation.

After the establishment of the park, the association of the Blackfeet people with the park was publicized by the Great Northern Railway. Traditionally dressed Blackfeet were often employed to greet tourists at depots and hotels. Their presence was used by the railway as an attraction to increase visitation to the area. This association continued through the 1930s.

The close physical, emotional, and religious ties of all involved tribes to this area have never diminished. What makes this area important to native groups is the diversity of resources in the area and their sacred aspects. The area was and is a source of many physical resources and spiritual quests, contains landmarks of importance, and (because of its sacred nature) lends more power to the resources collected and the experiences found.

Archeology

Field studies have located over 400 archeological sites in Glacier National Park. The prehistoric sites are camps, sites associated with fishing and hunting, religious sites, and a quarry. There are also historic archeological sites associated with homesteads and other historic developments such as roads, trails, and chalets.

Sacred Sites Associated with American Indians

American Indian religions in the area recognize the significance of natural features such as high ridgetops and mountaintops for vision quests. Chief Mountain is a sacred place to many different tribes, including the Blackfeet and the Salish and Kootenai. There are a number of other vision quest sites in the park.



There are plants that grow in the park that are used in ceremonies and in healing, and the places where the plants grow are sometimes considered to have spiritual power, as are areas where certain ceremonies were once performed. Animals and their totems, such as the bear, are also believed to possess spiritual powers.

HISTORIC RESOURCES

National Register Sites, Historic Districts, and National Historic Landmarks. The National Historic Preservation Act of 1966 mandated that all facilities more than 50 years old on federal land be evaluated for eligibility for nomination to the National Register of Historic Places. National register listing has

been completed for 357 park structures, and six are national historic landmarks.

The national historic landmarks include the Many Glacier Hotel, which was listed on the national register in 1976 as the centerpiece of the historic district that now includes the pedestrian trails, outbuildings, and dormitories and the boatmen's residence. It was made a national historic landmark in 1987 in a nomination that included the Two Medicine lodge, Granite Park Chalet, and Sperry Chalet. The chalets were celebrated for their massive Swiss chalet style architecture and for being the remnants of a linked network of hotels and chalets built by Great Northern Railway. In 1976 Lake McDonald Lodge was made the centerpiece of a historic district that now includes all the cabins and outbuildings and the Snyder Creek bridges closest to the hotel, as well as cabin 1105, the boatmen's quarters, and the horse concession quarters. In 1987 it achieved national historic landmark status for its architecture, which combines elements of the Swiss chalet and hunting lodge styles, the integrity of its interior and exterior, and its setting. The Going-to-the-Sun Road was listed on the national register in 1984 and became a national historic landmark in 1997 for its singularity as an engineering feat and for its narrowness, the stonemasonry guardrails and bridges, its precipitousness, and its views.

Management of the Going-to-the-Sun Road is focused on conserving and maintaining its historic fabric and character and the outstanding natural environment that it traverses.

Other historic facilities include Rising Sun and Swiftcurrent cabin camps; Logging Creek and Walton Ranger Stations; employee housing at headquarters and St. Mary, maintenance shops and sheds, patrol cabins such as those at Coal Creek and Baring Creek; fire lookouts such as Numa Ridge and Scalplock; campgrounds such as Avalanche; and trails such as the Grinnell Glacier Trail.

In the Goat Haunt-Belly River area there is one historic district, two sections of historic trail, and 11 structures listed on the National Register of Historic



Places. Examples of some of the historic structures include the Belly River Ranger station, Slide Creek patrol cabin, and the Goat Haunt shed.

In the North Fork there are three historic districts, one historic phone line, two sections of historic road, one rural historic landscape, and 29 structures listed on the National Register of Historic Places. Examples of some of the structures include Polebridge Ranger Station residence, Kintla Lake Ranger Station and the Ford Creek patrol cabin.

In the Two Medicine area, there are two historic districts, two sections of historic trail, and 14 structures listed on the National Register of Historic Places. Examples of some of the structures include the Two Medicine boathouse, the Cut Bank Ranger Station, and the East Glacier Ranger Station.

In the Going-to-the-Sun Road area there are seven historic districts, two sections of historic trails, and 165 structures listed on the National Register of Historic Places. Examples of some of the structures include the Lake McDonald Ranger Station, Rising Sun Motel and St. Mary 1913 Ranger Station.

In the Many Glacier area there are four historic districts, three sections of historic trail, and 74 structures listed on the National Register of Historic Places.

Examples of some of the structures include the Many Glacier Hotel caretaker house, horse concession bunkhouse and the Swiftcurrent fire lookout.

In the Middle Fork area there is one historic district, and there are 15 structures listed on the National Register of Historic Places. Examples of some of the structures include Scalplock Mountain fire lookout, Walton Ranger Station and the Harrison Lake patrol cabin.

Cultural Landscapes. Glacier has a number of landscapes that have been used over the years that could be considered cultural landscapes. Chief Mountain is a prominent feature on the eastern front of the mountains that has been significant to almost every culture associated with it. The Going-to-the-Sun Road and Lake McDonald Lodge and their surroundings are significant to many people. All of these landscapes are managed in a broad, all-encompassing manner that takes the entire visible landscape into account. The Going-to-the-Sun Road, with its scenic views, turnouts, vegetation, and proximity to vast wilderness areas, is a good example of a resource that is difficult to understand or manage without considering the entire landscape. To view a resource area as a cultural landscape provides a way of understanding and managing the full range of the values represented. No cultural landscapes have been formally evaluated and documented in the park, but a study has been proposed that would identify those areas.

Museum Collection. The museum collection includes historical and archeological artifacts; biological, geological, and paleontological specimens; and archival material. Housed in several storage areas in the headquarters complex, these objects document the park's history and its cultural and natural resources. Photographs, architectural drawings, and correspondence files contain documentation of the park's cultural history, its historic districts, national register properties, national historic landmark buildings, roads, and trails. Archeological artifacts attest to the longevity of the human presence in the area. The herbarium, other natural history specimens, and associated files provide a permanent record of the park's plants and animals. Acquired through donations, research projects, and day-to-day park operations, these resources help to tell the park's story.

The collection is organized and managed to provide the staff and the public with access to the information it contains. Interpreters, resource management staff, maintenance employees, and administrative personnel use the collection in the preparation of planning documents, public programs, publications, and for other day-to-day business purposes. Writers, historians, researchers, the media, and the general public also use the collection for magazine articles, video productions, research reports, books, and personal research. Most access the collection on an individual basis, because there are few opportunities for the long-term exhibit of the collection.

Physical and environmental conditions provided by current storage and exhibit facilities vary. The two primary storage locations in the headquarters complex provide the most acceptable conditions and house the bulk of the collection. Most of the archival material is stored in a modular structure built inside one of the older headquarters area buildings; most artifacts and specimens are stored in the basement of another old building. Both of these structures provide minimum protection from environmental damage (light, extremes of heat, cold, and humidity, and

pests) and physical threats (fire, theft, and improper handling). Most items are stored in standard museum cabinets and on shelves and have been organized to use the space available in the safest and most efficient manner.

PARK USE AND DEVELOPMENT

Transportation

Early access to the backcountry chalets and camping areas was on horseback and foot. The large hotels, constructed by the Great Northern Railroad, were accessed by rail and by horse-drawn coaches, wagons, and steamboats. The hotels provided a jumping off point for visitors to experience the backcountry areas of the park.

The Great Northern Railroad constructed a road to provide access for the construction of the chalets at Two Medicine, St. Mary, Sun Point, and the hotel at Many Glacier. This road was later named the Blackfeet Highway and is now traversed by portions of Highways 49 and 89. Glacier National Park received funding for and assisted in the maintenance of this road outside the park for many years, then funding was discontinued. The state of Montana now maintains Highways 49 and 89.

The Going-to-the-Sun Road, initially called the Transmountain Road, was completed in 1933. It was built to accommodate the emerging use of the park by visitors in private automobiles. From the start there were privately owned concessioner tour buses operating on the road. Use of the road rapidly increased after World War II, and congestion became a major issue for park management by the late 1970s. A vehicle length restriction was placed on the road that reduced congestion.

The park's primary concessioner has the right to provide all transportation services in the park. In 1992 the primary concessioner waived its contractual right to provide shuttle services, and a separate permit was issued. The right was again waived in 1994 to allow for contracting for Blackfeet interpretive tours. These services were provided under the permit through the 1996 season. Since 1997, a limited shuttle service has been offered by the major concessioner.

U.S. Highway 2 traverses the southern boundary of the park and is inside the park boundary for about 4 miles near Goat Lick and the Walton Ranger Station.

There are several access roads on Blackfeet land outside of the park on the east side. These roads connect with either Highway 49 or 89 and are maintained by the park under the authority of the Park Approach Roads Act.

Visitor Service Development and Concession Operations

The park has a variety of buildings, roads, trails, and sites that support visitor use and operational activities. They are summarized in the following table.

Many of these developments were built during the early days of the park and are valuable historic resources. In the early development of the national park system the large natural parks in the west did not have facilities for meals and lodg-

ing. The size of the parks and the time required to traverse them before there were roads necessitated the establishment of lodging and food services in the park. Concessions became an effective means for providing the services. To some extent this still holds true. Although modern methods of transportation have improved, there is still a strong desire on the part of the public to stay in or near the park.

Visitors were originally transported to the park by rail. They traveled by horse or foot around the park; road construction made travel by vehicle possible and other developments resulted. Some developments have been removed or were destroyed by avalanches or fires. Concession development is currently limited to seven distinct areas.

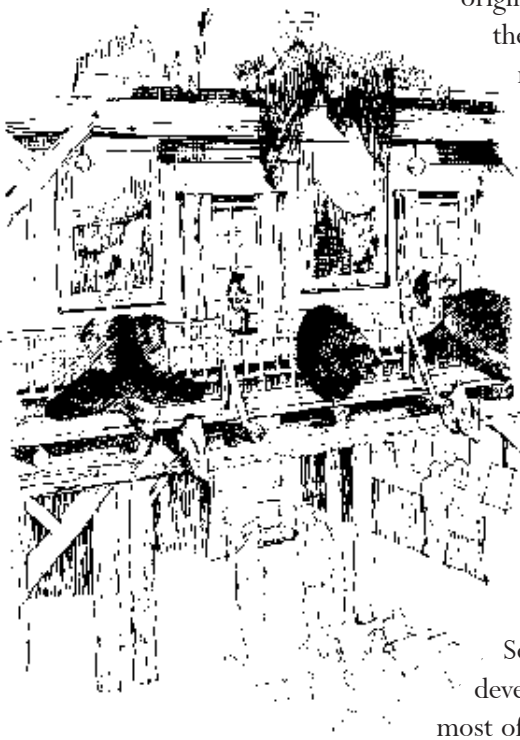
Apgar. The Village Inn is a 36-unit, concession-operated motel with an office and managers' quarters. Other commercial visitor services are provided on privately held land in the Apgar area, including four retail shops, a restaurant, motel and cabin rentals, a deli, and some associated employee housing. A short distance away a horse stable provides trail rides and houses 6-8 employees.

Lake McDonald Lodge Historic District. The Lake McDonald Lodge historic district has the oldest visitor accommodations in the park. Originally home-steaded in the early 1890s, the area played a major role in westside visitor services at the turn of the century. Built between 1913-1914, construction of the lodge was a massive undertaking. Most of the building materials had to be hauled 10 miles by barge up the lake from Apgar. The Swiss-alpine style hotel provided a convenient base for people to hike or take saddle horse trips into a park that was still remote and primitive while enjoying the comforts of civilization. Other

buildings around the hotel date to as early as 1906. The lodge and the original guest cabins are of log and frame construction, which gives the complex a rustic European appearance with the charm it originally possessed when it was known as the "Lewis Glacier Hotel."

Lake McDonald Lodge, which is operated as a concession, includes 32 lodge rooms, 38 cabin rooms, 30 motel units, 11 employee housing buildings (housing approximately 146 employees), a post office, two restaurants, a lounge, a gift shop, a campstore, and a maintenance facility. A separate concessioner operates a horse stable with trail rides, housing for seven employees, and ticket offices. Another concessioner provides boat tours and small boat rentals with employee housing for two employees and a ticket office. The lodge operates June-September and is extremely popular. Occupancy rates typically range mid 80 percent to high 90 percent. The overall annual occupancy rate is about 94 percent.

The lodge was partially renovated by the National Park Service in 1989, but the kitchen, upper floors, cabins, and site developments were not completed due to lack of funding. Although most of the structures are owned by the National Park Service and assigned to the concessioner under a contract, the concessioner retains a



compensable ownership interest (possessory interest) in several of the buildings and full ownership of the Stewart Motel.

Sperry Chalet. Sperry Chalet will offer lodging and meals in a setting that is only accessible by foot or horse when it reopens after renovation in 1999. The chalet can host up to 42 guests per night and has employee housing for 11.

Granite Park Chalet. Also under separate concession, Granite Park Chalet offers overnight accommodations to hikers who bring their own food and bedding. No meals are provided. The chalet can host up to 38 guests per night and has housing for one or two employees. Plans for the chalet are pending funding and include renovation of the water and sewer system to allow for food service.

Two Medicine. The primary concessioner operates a campstore and snack bar in the Two Medicine Chalet. A separate concessioner operates a tour boat and small boat rentals and has housing for five employees.

Many Glacier Hotel Historic District. There are two distinct concession developments in the Many Glacier Valley, Many Glacier Hotel, and Swiftcurrent Motor Inn. Many Glacier Hotel was built between 1910 and 1915 by the Great Northern Railway and its subsidiary, the Glacier Park Hotel Company. The company constructed a series of hotels and backcountry chalets; the Many Glacier Hotel and the Glacier Park Hotel were the core structures. The Great Northern development in Glacier used one architectural theme in extensive backcountry development that encouraged the visitors to leave the luxury of the enormous hotels and experience the park. Louis Hill, president of the Great Northern Railway and responsible for much of the development in Glacier, chose a style that provided architectural unity and a sense of place for the entire region. The historic district has been identified, and the hotel has been designated as a national landmark.

The facilities at the Many Glacier Hotel typically operate from the first week in June through the first week in September. Occupancy rates range from 70 percent to more than 90 percent. The overall average occupancy rate is about 90 percent. The Many Glacier Hotel complex includes 211 guest rooms, a restaurant, a lounge, a gift shop, a small grocery, maintenance offices, an employee pub, and housing for 20 employees. Two dormitories provide housing for 159 employees. A separate concessioner operates a horse stable that provides trail rides. The corral and housing for approximately 12 employees are offsite. Another concessioner operates tour boats and small boat rentals and has housing for 6-8 employees.

Swiftcurrent Historic District. In 1933, under pressure from the National Park Service to construct economical accommodations for auto tourists, the Glacier Park Hotel Company began construction of the Swiftcurrent auto camp. The Swiftcurrent complex is about 3 miles west of the Many Glacier Hotel near Many Glacier Campground. The buildings are concentrated in an obscure wooded area away from the lakeshore and are screened from the mountains.

This complex includes 62 motel units, 26 cabins without baths, a restaurant, a campstore, public showers, laundry, and 18 units for approximately 51 employees. The Swiftcurrent auto camp shows the changes that were made in the infrastructure to respond to changing travel patterns and the increased mobility of the middle class. The district reflects an important change in the tenor and tone of devel-

opment in the national parks evidenced by the small scale of the developments and their siting away from the lakeshore and prominent vistas.

The Swiftcurrent Motor Inn operates from mid June-mid September. The cabins without baths are popular and occupancy rates range from 70-96 percent.

Rising Sun. Construction of the Rising Sun auto camp in 1941 marked the culmination of a construction program initiated at Swiftcurrent eight years earlier. The complex is just east of Rose Creek and just north of the Going-to-the-Sun Road on the east side. Modern additions include a large coffee shop and two motel units. Historic components of the district (a large general store, motel, two dormitories, a powerhouse, and 19 cabins) are concentrated in the scrub pine on a slight slope behind the modern development. These buildings were sited in an irregular pattern along the natural topographical lines of the wooded area and provide only occasional and incidental views of the mountains. The buildings are small and finished with rustic materials. The concentrated location and consistent use of the rustic style and paint colors lend coherence to the district.

This facility was the only Glacier concession that remained open throughout World War II. The Rising Sun auto camp historic district is listed on the National Register of Historic Places for significance in architecture and history. Like those at Swiftcurrent, Rising Sun facilities represent a major shift in NPS policy and concession development. The small-scale rustic design and the isolated random placement of the buildings exemplify a shift in NPS policy regarding the appropriate mass and placement of concession facilities.

The concession-operated Rising Sun Motor Inn complex includes 37 motel and 35 cabin rooms, a restaurant, a campstore, public showers, and housing for up to 53 employees. A separate concessioner operates a tour boat and small boat rentals on St. Mary Lake and also has housing in the Rising Sun developed area for six employees. These facilities typically operate from mid June-mid September. Occupancy rates for the location range from 50-97 percent.

Others. Commercial services that are not tied to a specific area include tours that use a fleet of historic 1920s-1930s red buses, a limited point-to-point shuttle service on the Going-to-the-Sun Road, interpretive motor tours giving a Blackfeet Indian perspective of the park, guided backpacking and day hiking services, guided cross-country ski tours, photography and art seminars, and guided bicycle tours.

Socioeconomic Environment

PARK VISITATION AND USE

In 1911 (the first year statistics were kept) 4,000 visitors arrived in Glacier. Visitation gradually increased as the park's reputation spread. In 1933 when the Going-to-the-Sun Road opened, some 77,000 visitors were counted. Most facilities in the park closed during World War II; only a small caretaker staff remained. Even with gasoline rationing and the world in upheaval, over 23,000 visitors came to the park in 1943. In 1946 the war was over and more than 200,000 visitors were counted. The highest recorded visitation, 2,204,131, was in 1983. Since then park visitation has exceeded 2 million only four times. In recent years visitation has ranged between 1.7–1.8 million. Visitation has been up and down over the years, but the overall trend is for increasing visitor numbers.

Visitors come to Glacier for a variety of reasons. A 1991 visitor survey found that 65 percent of those contacted came to view scenery and wildlife, and 18 percent were looking for recreational opportunities such as hiking, fishing, and biking. Another 11 percent were just passing through on their way to another primary destination. Those surveyed said they were participating in a variety of activities during their stay. The most frequently mentioned activities by all respondents were sightseeing, photography, wildlife viewing, day hiking, stopping at visitor centers, camping, taking part in guided activities, and picnicking.

The 1991 survey found that most of the park's visitors were family groups (71 percent) or family and friends traveling together (17 percent); 9 percent were traveling alone. Of the visitors contacted, 84 percent were from the United States (13 percent from Montana), 12 percent from Canada, and 4 percent from other countries. Forty percent of all visitors reported that they would spend less than one day in the park, while 33 percent would stay 1–3 days and 27 percent would stay 4 or more days.



The majority of park visitors enter through West Glacier. Approximately 60 percent of all Glacier visitors first experience the park from the foot of Lake McDonald. Approximately 30 percent enter at St. Mary, and the rest are evenly divided among Many Glacier, Two Medicine, and Polebridge.

Glacier has 735 miles of maintained trails that provide a variety of experiences for hikers and horseback riders of all skill levels. Day hiking was identified as a popular activity. A study to determine trail use by day hikers was conducted in 1988 (McCool, Brathwaite, and Kendall 1988). Most of the park's trails (with the exception of the Trail of the Cedars and the Hidden Lake Trail) were surveyed. The surveys of hikers and nonconcession stock users indicated that about 180,000 visitors took day trips. Adjustments for concession stock use, the Hidden Lake trail, and late season use brought the total to approximately 200,000.

Backcountry camping also attracts park users. Glacier's extensive trail system links approximately 60 backcountry campgrounds. A permit system regulates use and ensures that users are well informed concerning trail conditions, bear sightings, and the "leave no trace" backcountry skills. Registration also provides exact use figures. In 1996 approximately 5,000 permits were issued for a total of 27,806 camper nights.

There are 13 auto campgrounds containing over 1,000 sites. In 1997 approximately 200,000 visitors used frontcountry campgrounds.

In FY97 approximately 700,000 visitors were contacted by ranger naturalists at a visitor center while another 136,000 took a ranger-led hike or attended an evening campfire talk. The Internet made the mountain scenery and wildlife available by computer to more than 121,000 cybervisitors.

PRIVATELY OWNED LAND

There are 418.68 acres of privately held land in the park. The land is undeveloped or used for residential, recreational, or commercial purposes. Most tracts are small, but a few are over 50 acres. Most of the residential use and all of the commercial use occurs during the summer. Most of the private land is in the Going-to-the-Sun Road area in Apgar Village or on Lake McDonald. There is also privately held land in the North Fork area.

REGIONAL USE AND ECONOMY

Glacier National Park lies within a day's drive of several world class areas with natural, cultural, and recreational opportunities. Yellowstone and Grand Teton National Parks to the south and the Banff, Jasper, Yoho, and Kootenay National Parks to the north encompass some of the most spectacular wild country in North America. Head-Smashed-In Buffalo Jump and Frank Slide Interpretive Center in Alberta, Canada, and Grant-Kohrs Ranch in Montana interpret portions of the region's cultural history.

The Forest Service manages 51 percent of the land in Flathead County. Glacier National Park manages 19 percent. Only 18 percent of the land base is privately

owned. Figures on landownership are not readily available for Glacier County, but most land is held by the Blackfeet or is privately owned. The Blackfeet reservation encompasses approximately 1.5 million acres. Hunting, fishing, and other recreational opportunities are controlled by the Blackfeet nation but are available to non-Indians for a fee.

Flathead Lake, the largest natural freshwater lake in the western United States, is another recreational focus in the region. It is unknown how many visitors are coming to the area primarily to vacation on Flathead Lake, but the number is probably significant.

Winter use of the Glacier region is much lower than summer use. Park visitation is approximately 75 percent local during the winter. Many of the out-of-state visitors who arrive in Glacier during the winter are in the area to ski at Big Mountain Ski Resort. Winter visitation in the Flathead Valley is almost solely for ski vacations. Big Mountain is the winter tourism anchor for the region.

Tourism is a significant part of the Montana economy, and it has experienced a dramatic increase in the region. Tourism has grown steadily during the last several years. Regional growth in tourism and service jobs reflects a national and local trend.

Tourism has dramatically increased as this region has become one of Montana's premier tourism destinations. The growth in tourism has been spawned by a number of factors, such as increased state and regional promotion, expanding interest in environmentally related recreation and western or American Indian culture, and enhanced local capacity for providing more recreational opportunities. Tourism is a cross-sectorial industry. Unfortunately, no specific figures estimating the number of nonresidents or their expenditures are available on a county basis. Maiorano (1995) identified a variety of nonresident visitor segments based on travel patterns in Montana. The analysis suggested that about 20 percent of all nonresident visitor groups in the state traveled through the Flathead-Glacier area, and about 50 percent visit the park. These figures translate to roughly 750,000 people, assuming 7.7 million nonresidents visiting Montana in 1993-94.

The trend in tourism can be estimated by examining visits to the park, traffic counts on U.S. Highway 2, and lodging tax revenue. All three show steady growth from 1980 to about 1994. Accommodations tax revenue for the summer quarter (July, August, and September), when about 70-73 percent of the annual visits to the park are made, shows continuous and dramatic increases from 1987, when the tax was first implemented, to 1993 or 1994, depending on the county. While this is not a direct indicator of the economic significance of the park, it does show the rise in travel to northwestern Montana.

For confidentiality reasons, data for metals processing (a potentially large sector of Flathead County's economy) cannot be displayed. The Bureau of Business and Economic Research at the University of Montana estimates that it represents about 12 percent of basic industries in the county (Polzin 1996). This figure is not comparable to personal income because it excludes a wide variety of sources of income from nonbasic industries. Personal income from lodging for Glacier County is not available for confidentiality reasons.

Accommodations tax revenue is a function of the number of room nights sold and average room rate. Some of the increased revenue is due to rises in the average room rate rather than increased tourism. Reliable statistics on regional room rates over this period are not available.

Annual and summer visitation to the park also show an increase for the period ending in 1994. The increase is substantial (about 30 percent), although not as high as accommodations tax revenue. Part of the increase may be due to changes in visitor patterns, and some may be due to changes in the methodology for calculating the number of visits. The 1995 yearly figure, down about 14 percent from 1994, reflects construction on the Going-to-the-Sun Road, its temporary closure in June, and probable reductions in Canadian visits.

Traffic on Highway 2 (as measured by a permanent traffic counter just west of Kalispell) has increased dramatically. This figure compares only the 1980 and 1995 figures and the data is displayed on a monthly basis. It shows, however, that traffic volumes have increased 2-3 times over the comparable 1980 figures. While some of this may be due to population growth, a portion of the increase relates to growth in recreational travel in the region.

Glacier National Park exists within the context of a changing economy, one increasingly dependent on the outstanding amenities in the region, including the park. While the tourism industry may be diversifying in the sense that a wider variety of recreational opportunities exist in the region than before, the park remains one of the principal cornerstones of the regional and state tourism economies. At the same time, Glacier represents the type of amenity that business and industry find increasingly attractive as a reason for locating in the region. For these firms, it is difficult to estimate the importance of the park and access to it. Businesses locating in the region for amenities may be as dependent on the park as firms more directly linked to the tourism industry, and the park has amenities that are important to individuals deciding to retire in the area. These factors together suggest greater interest in the management of the park as well as demand for recreational opportunities.

Tourism in Montana generates \$1.2 billion annually and directly employs 32,000 workers. Tourism, the service industry, and transfer payments (money that is paid to employees in Montana, but earned elsewhere, such as social security and pensions) comprise the only growing areas of the region's economy.

In western Montana incomes are relatively low, and people live in rural or remote locations. Montana incomes are 82 percent of the national average. Regionally, Flathead and Missoula Counties have the highest per capita incomes and Glacier County has the lowest. Historically the wood products industry has been significant in Flathead and Missoula Counties, but the industry is on the decline. Farming is a significant source of income in Lake and Glacier Counties. Traditionally the northwest Montana economy has relied on timber and wood processing. Over the last 10 years, there has been a reduction in wood products processing, aluminum smelting, mining, and agriculture.

Over the last several years there has been considerable population growth on the west side of the Continental Divide. Growth has been slow on the east side of the mountains. A slow rate of growth is expected to continue in the region. If the predicted rate of growth continues, it is estimated that Flathead and Missoula Counties will each exceed 100,000 people by 2010. If population predictions materialize for Flathead County, 11,000 new housing units will be needed to accommodate growth. Increase of commercial and private traffic flow can be anticipated.

Population centers within a day's drive of Glacier include Great Falls, Bozeman, Billings, Missoula, and Kalispell, Montana. Other areas are Spokane, Washington; Calgary and Edmonton, Alberta; and Boise, Idaho. Continued population and economic growth in these areas would affect visitation to the park.

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Derivation of Impact Topics

IMPACT TOPICS CONSIDERED

To focus the discussion of potential consequences of the alternatives and the management strategy, specific impacts topics were selected based on (1) federal laws, regulations, and executive orders, (2) NPS Management Policies, (3) knowledge of resources, (4) resource studies, and (5) concerns expressed by the public, including special interest groups, the Blackfeet and Confederated Salish-Kootenai Tribes, and other agencies during scoping and throughout the development of this General Management Plan. A brief rationale for selecting each major impact topic is discussed below. The impacts of the alternatives have been grouped by placing all the impacts of the no-action alternatives together, all the impacts of the preferred alternatives together, and all the impacts of the other alternatives together. The effects of the management strategy are also analyzed.

Water Resources. Executive Orders 11990 and 11988 require the examinations of the impacts on wetlands and floodplains. Since the headwater drainages for the Columbia River, the Missouri River, and the Saskatchewan River, which terminates at Hudson Bay, are all in the park, pristine water quality is of concern not only to the National Park Service but to those downstream. Water quality and floodplains and wetlands are important resources in Glacier National Park, and actions in the park that affect these resources could have downstream effects as well.

Scenic Resources. A fundamental park purpose, according to the NPS Organic Act, is to conserve the scenery. The purpose and significance statements that were developed for Glacier National Park recognize the value of the scenic resources. The scenes include the views into the park from the outside and views out of the park from the interior. It is important to understand the effects the alternatives might have on these resources.

Air Quality. Glacier National Park is a class I air quality area. The Clean Air Act requires federal land managers to protect park air quality and air-quality related values. The potential impacts on air quality are analyzed.

Soils. Soils are important resources because they support plant and wildlife habitat. Proposed development and visitor activity would affect soils.

Vegetation, Including State-Rare Plant Species. The NPS Organic Act directs that the National Park Service protect and conserve the natural resources

in the park. The purpose and significance statements that were developed recognize the value of the vegetation and the five floristic provinces in the park. Vegetation communities, federally listed species at risk, and state-rare plant species were identified as important resources that could be threatened by increasing visitor use and development. There are three species at risk and an additional 45 state-rare plant species in the park. There are no known federally listed threatened or endangered plant species in the park.

Wildlife, Including Federally Listed Threatened and Endangered and State-rare Wildlife Species. The NPS Organic Act directed the protection and conservation of natural resources in the park. The purpose and significance statements also recognize the value of wildlife. Wildlife habitat, federally listed wildlife species, and species considered to be rare in the state are important and could be threatened by increasing visitor use and development. There are four federally listed threatened or endangered wildlife species in the park (wolves, peregrine falcons, grizzly bears, bald eagles). Lynx are expected to be listed soon.

Aquatic resources, including federally listed threatened or endangered and state-rare species. The NPS Organic Act directed the protection and conservation of natural resources in the park. There is one aquatic species listed as threatened (bull trout), one proposed species (capshell limpet), and one state-rare species (westslope cutthroat trout).

Natural Sound. Natural sound and the opportunities to experience solitude are valued resources in Glacier National Park and were frequently mentioned during scoping. Concerns were expressed about the effects of scenic air tours and personal watercraft.

Biological Diversity. NPS Management Policies lists a requirement for protection of biological diversity in NPS areas.

Cultural Resources, Including Archeological Resources, National Register Properties, National Historic Landmarks, National Historic Districts, and Other Sites of Cultural Significance. Glacier has a significant cultural record that dates from prehistoric times. The NPS Organic Act, sections 106 and 110 of the National Historic Preservation Act and sections of NPS Management Policies require that the effects on cultural resources from NPS actions be evaluated. The purpose and significance statements also recognize the value of cultural resources in the park. Actions related to development and visitor use have the potential to affect cultural resources. Glacier has six national historic landmarks and more than 350 properties listed on the national register.

American Indians. Concerns were expressed during scoping about the rights of the Blackfeet and the Confederated Salish and Kootenai Tribes in the park.

Regional and Local Economies. Glacier National Park contributes to the local and state economies in various ways, including tourism, employee, and operational expenditures. The alternatives are analyzed for their effects on regional and local communities.

Local and National Visitors. National visitors comprise 87 percent of the visitors to Glacier and local residents comprise 13 percent. The alternatives are

analyzed for their effects on visitor experiences for both local and national visitors. Concerns were expressed about congestion.

Private Land Inside the Boundary. There are 418.68 acres of private land inside the boundary of Glacier National Park. And there is private land adjacent to the park on the east and west sides, in the North Fork, and south and west of the boundary. The alternatives were analyzed for their effects on the owners of that land.

Energy Consumption. The National Environmental Policy Act requires a discussion of the energy requirements of each of the alternatives.

Environmental Justice. In accordance with Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, the National Park Service is required to analyze the impacts of park actions on minority populations.

IMPACT TOPICS DISMISSED FROM FURTHER ANALYSIS

Impacts on Prime and Unique Farmlands. There are no prime and unique farmlands as defined by the Natural Resource Conservation Service inside the park boundary; thus there would be no impacts on these lands (Dutton, pers. com. 1997).

Impacts on Federally Listed Threatened or Endangered Plants. There are no known federally listed threatened or endangered plant species in the park. Not all areas in the park have been surveyed, and some areas chosen for development would have to be surveyed before the completion of the design phase to meet the requirements of section 7 of the Endangered Species Act.

Impacts of All No-Action Alternatives

IMPACTS ON THE NATURAL ENVIRONMENT

Impacts on Water Resources, Including Water Quality, Floodplains and Wetlands

Methods for Analyzing Impacts. In cooperation with the U.S. Fish and Wildlife Service, the park staff completed a national wetlands survey of the park in 1993. Floodplain information was gathered from reports by the U.S. Army Corps of Engineers. All available reports were also consulted (see Bibliography). The park staff monitors drinking water in all developed areas on varying schedules as required by the state of Montana and in accordance with the Clean Water Act. Chlorine levels are measured daily, the presence of bacteria is measured monthly, and yearly chemical analyses are done to measure a variety of elements such as nitrates, volatile organics and inorganics, lead, copper, and synthetics. Relevant published literature concerning the impacts of personal watercraft was reviewed, and other parks and recreational areas that have assessed PWC impacts were consulted.

Existing Management Zoning. There would be no additional adverse effects on water resources and wetlands as a result of continuing management zoning as described in the 1977 *Master Plan* because no management actions would be taken as a result of zoning. Wilderness values would not be affected.

Visitor Use on the Going-to-the-Sun Road — Water quality of the creeks and streams adjacent to the Going-to-the-Sun Road might be affected by increasing visitor use. Visitors who pull off the road in undesignated areas could cause a direct adverse impact on water quality through gradual erosion resulting in sediment entering creeks and rivers along the road. There would be no impact on floodplains and wetlands.

Preservation of the Going-to-the-Sun Road — The Going-to-the-Sun Road bisects or parallels dozens of watercourses along the 30 miles that would be reconstructed over the next 50 years. Some, like McDonald, Reynolds, and Logan Creeks, are perennial; many others are intermittent or ephemeral and flow in response to snowmelt or summer thunderstorms. The road is also situated within

the historic floodplain of several streams (including Avalanche Creek) and is located alongside several wetland areas (McDonald Creek and St. Mary River). The potential to impact water quality during the reconstruction process is a concern. Without mitigation to protect streams and rivers adjacent to the Going-to-the-Sun Road, water quality would be adversely affected by increased sediment and turbidity. Potential impacts include the flushing of blasting residue (nitrate salts, ammonia, and hydrocarbons) into streams and rivers. With mitigation in place, water quality would be protected from adverse effects. Mitigation would include sediment barriers, diversion of overland flow away from the construction site, timing of construction during low flow periods, and prompt revegetation after reconstruction. In cases where construction disturbs park streams (such as replacing culverts) measures would be taken to limit the amount of slumping and erosion. Side streams might be temporarily routed past the construction area. Any turbid water would be collected and allowed to settle before being replaced in the stream. Culverts would be designed to allow for fish passage when appropriate. Prior to any road construction project, an Army Corps of Engineers 404 permit (as defined by the Clean Water Act) and state permits would be obtained. These permits define the activity to take place and the required mitigation to protect water quality.

Preservation of Historic Hotels and Visitor Services — There would be no adverse impacts on water quality or floodplains and wetlands as a result of the no-action alternative for cultural heritage and visitor services because there would be no additional ground disturbance.

Scenic Air Tours — There would be no adverse impacts on water quality or floodplains and wetlands as a result of the no-action alternative for scenic air tours because there would be no surface disturbance. The aircraft cannot land in the park.

Personal Watercraft — The use of personal watercraft on St. Mary and Sherburne Lakes and Lake McDonald could adversely impact water quality through the release of petroleum products into the water, depending on the amount of use. Virtually all personal watercraft are powered by two-stroke engines (not fuel-injected) that lose about 30 percent of their unburned fuel and oil mix directly into the air and water (Tahoe Research Group 1997). The PWC industry has begun phasing out 2-stroke units, but the phaseout could take 25 years or more.

Research results are inconclusive regarding what happens to the unburned fuel emitted into air and water. Several studies suggest that as much as 50 percent evaporates immediately and an additional 30-40 percent evaporates within eight hours. Because of the number of uncontrollable variables, such as the degree of sunlight, it is difficult to determine the exact percentage. A recent Michigan State University study found that unburned fuels contained or produced polycyclic aromatic hydrocarbons (PAH) plus the toxic residues of various fuel additives. Studies by the Swiss government and Michigan State University show that PAH concentrations as low as two parts per billion can kill microscopic aquatic organisms at the bottom of the food chain (Giesy 1997). Wetlands associated with these lakes could also be adversely affected. Personal watercraft cause turbidity because they are

often operated in relatively shallow water. They could cause contamination through release of unburned fuels. There would be no adverse impacts on floodplains.

Winter Use — There would be negligible adverse impacts on water quality or on floodplains and wetlands as a result of the no-action alternative for winter use because the ground would be frozen and most use would occur on roads and trails.

Divide Creek Flood Hazard — The water quality of Divide Creek would continue to be threatened and could be adversely impacted during a flood by hazardous material spills from the maintenance facility. It would continue to be threatened and could be significantly impacted by hazardous materials kept in employees' homes or in the administrative facility. Emergency actions such as breaching the Going-to-the-Sun Road during high risk flood periods and any clearing of the channel would adversely affect water quality by increasing sediment loads in the water.

There could continue to be adverse impacts on the floodplain and riverine wetland associated with Divide Creek. Increased sediment and vegetation disturbance would continue to be caused by activity to protect property and employees.

West Side Discovery Center and Museum — There would be no adverse impacts on water quality or on floodplains and wetlands as a result of the no-action alternative for continued use of the Apgar visitor contact station because it is in a paved area (already disturbed) and no additional disturbance would take place.

Conclusion. There could be adverse impacts on water quality from increasing use of the Going-to-the-Sun Road. Visitors parking in undesignated areas, denuding vegetation and exposing soils, would result in increasing sediment in the rivers and streams. There could be significant adverse impacts on water quality from personal watercraft in Lake McDonald and St. Mary Lake and from flood abatement activities adjacent to Divide Creek.

There could be adverse impacts on wetlands from the use of personal watercraft.

Cumulative Impacts. Contamination of wetlands and waters inside the park from personal watercraft combined with that from outside the park would have a cumulative impact on water resources. Landowners adjacent to the park have built berms that have disturbed the channel of Divide Creek. A cumulative impact on water quality could result from flood abatement measures in the park being added to that disturbance.

Impacts on Aquatic Resources

Methods for Analyzing Impacts. Current studies (see bibliography) and staff biologists were consulted.

Existing Management Zoning. Aquatic resources would not be adversely affected by the continued use of the management zones as described in the 1977 *Master Plan*. Wilderness values would not be affected.

Visitor Use on the Going-to-the-Sun Road — Aquatic resources could be adversely affected by increased visitor use on the Going-to-the-Sun Road and increased off-road parking. Trampling of vegetation and exposure of the soil would lead to increased runoff into the rivers and streams adjacent to the road. Small soil particles that do not settle readily reduce light penetration and hinder the growth of aquatic plants and the activities of fish. High concentrations can clog the gills of aquatic animals and interfere with respiration. Larger soil particles settle, but in high concentrations they can smother bottom-dwelling organisms and fish eggs. Chronic low-level sedimentation can have significant adverse effects on aquatic resources by reducing the diversity and the amount of habitat available for aquatic insects and fish spawning.

Preservation of the Going-to-the-Sun Road — During the reconstruction of the Going-to-the-Sun Road aquatic resources would be affected by increased sediment and possibly by accidental spills of petroleum and other chemical products unless mitigating measures were used. With mitigation, impacts would be reduced. The impacts of sedimentation and increased turbidity on rivers and streams would be minimized during reconstruction by effective erosion control. Proper construction procedures would be used to prevent the contamination of adjacent rivers and streams caused by accidental petroleum spills.

Preservation of Historic Hotels and Visitor Services — Aquatic resources would not be affected by continued maintenance of the Many Glacier Hotel, Lake McDonald Lodge, and other historic structures in the park or by the eventual closure because ground disturbance would be negligible and standard water quality protection measures would be taken when there was ground disturbance.

Scenic Air Tours — Aquatic resources would not be affected by increases in scenic air tours because aircraft do not land in the park or cause ground disturbance.

Personal Watercraft — Personal watercraft on St. Mary Lake and Lake McDonald would adversely affect aquatic resources by increasing the risk of spills of petroleum products. Aquatic vegetation would also be adversely affected from increased sedimentation and turbidity caused by the operation of personal watercraft in the shallower areas of these lakes.

Winter Use — Winter use activities would not adversely affect aquatic resources because use occurs on roads and trails.

Divide Creek Flood Hazard — Aquatic resources would continue to be adversely affected by development on the Divide Creek floodplain and activity in the creek to control flooding. Continued activity in that area would result in increased sediment in Divide Creek. Small soil particles that do not settle quickly reduce light penetration and hinder the growth of aquatic plants and the activities of feeding fish. High concentrations can clog the gills of aquatic animals and interfere with respiration. Larger soil particles in high concentrations can smother bottom-dwelling organisms and fish eggs. Chronic low level sedimentation can have significant adverse effects on aquatic resources by reducing the diversity and the amount of habitat available for aquatic insects and fish spawning.

West Side Discovery Center and Museum — Continued use of the visitor contact station in Apgar would not adversely affect aquatic resources because it is in a previously disturbed area.

Conclusion. Aquatic resources could be adversely affected by the continued activity to control the flooding of Divide Creek. Aquatic resources could also be adversely affected by increased visitor use along the Going-to-the-Sun Road, the use of personal watercraft on St. Mary and Sherburne Lakes and Lake McDonald, and the reconstruction of the Going-to-the-Sun Road. Mitigation measures would be used to control adverse effects on aquatic resources during reconstruction of the Going-to-the-Sun Road.

Cumulative Impacts. The impacts on aquatic resources in Divide Creek from flood control measures combined with actions taken by private landowners and the Blackfoot Tribe could result in adverse effects. Aquatic resources inside and outside the park could also be adversely impacted by the use of personal watercraft inside and outside the park.

Impacts on Scenic Resources

Methods for Analyzing Impacts. A viewshed analysis was conducted using the park's geographic information system for all park roads, including the Going-to-the-Sun Road and developed areas along the road (see Viewshed map).

Existing Management Zoning. There would be no adverse effects on scenic views as a result of continuing the management zoning strategy described in the 1977 Master Plan because the zoning scheme would not affect views. Design standards would continue to be followed for any new developments. Wilderness values would not be affected.

Visitor Use on the Going-to-the-Sun Road — There would be no effect on the broad panoramic scenic views from the Going-to-the-Sun Road because there are no developments proposed that would affect the views. The view immediately adjacent could be adversely affected by off-road parking and the creation of denuded areas by illegal parking.

Preservation of the Going-to-the-Sun Road — Scenic resources would be temporarily adversely affected during the road reconstruction due to increased dust and construction activity.

Preservation of Historic Hotels and Visitor Services — There would be no effects on scenic views from continued operation and maintenance of the visitor overnight facilities and other visitor services because they are part of the historic landscape. However, when concession facilities deteriorated to the point that they were no longer open to the public, scenic integrity would be adversely affected.

Scenic Air Tours — Current and increasing numbers of unregulated scenic air tours would have significant adverse effects on scenic views from the Going-to-the-Sun Road and from other locations in Glacier National Park because the park's proposed wilderness would be adversely affected by the intrusion of mechanical objects.

Personal Watercraft — There would be a temporary adverse effect on the scenic views on Lake McDonald and St. Mary Lake from personal watercraft because the craft would disrupt the natural views across the lakes.

Winter Use - There would be no adverse impacts on scenic views from winter use because of the nature of the use and the small number of users.

Divide Creek Flood Hazard — There would be an adverse effect on the scenic views in the Divide Creek area from continued flood abatement activities.

West Side Discovery Center and Museum — Continued use of the Apgar visitor contact station would have little adverse effect on the scenic quality of the area because the area is already developed and has many other uses.

Conclusion. There would be adverse impacts on scenic resources from off-road parking along the Going-to-the-Sun Road, which would continue to denude adjacent vegetation. This could become a significant adverse impact as use increased. There would be adverse impacts on the scenic views on Lake McDonald and St. Mary Lake from PWC use. Adverse impacts could become significant as scenic air tour use increased.

Cumulative Impacts. There would be cumulative adverse effects on scenic views of Divide Creek due to combined flood abatement efforts by the park and adjacent landowners.

Impacts on Air Quality

Methods for Analyzing Impacts. A 1990 amendment to the Clean Air Act (section 176c) requires that the National Park Service analyze the impacts of the alternatives, including visitor traffic and staff commutes, on the ability to conform with air quality standards. Flathead County is currently not in attainment for particulate matter (PM-10). The NPS Air Quality Division was contacted to conduct the analysis of the alternatives on air quality. Wilderness values would not be affected.

Existing Management Zoning. There would be no adverse impacts on air quality as a result of continuing the management zoning strategy described in the 1977 Master Plan for Glacier National Park because the zoning scheme does not call for any action that would affect air quality.

Visitor Use on the Going-to-the-Sun Road — Visitors traveling through the park and park staff commutes would have negligible adverse effects on air quality from carbon monoxide emissions. Carbon monoxide emissions would continue to increase as visitation increased. It is not expected that this increase would affect the state's ability to maintain conformity with the required air quality standards. However, automobile emissions are not good for the park's air quality. Over the past 20 years, vehicle emissions have improved in general, so if auto use in the park increased in general, the net result would be no net gain in auto pollutants to the environment. Present monitoring does not indicate an increase in nitrous oxide. Furthermore, according to the park's Transportation Plan (NPS 1990d, 26), average daily traffic is projected to reach 6,080 by 2007 from the west entrance to Camas Road. The peak day volume may be 7,200-7,800 vehicles per day. Visitor

use limits would decrease emissions and have a beneficial effect on air quality. Additional analysis would be completed as part of the comprehensive use plan for the Going-to-the-Sun Road.

Preservation of the Going-to-the-Sun Road — Road construction would continue in accordance with DEQ guidelines and regulations to ensure continued maintenance of national air quality standards for motor vehicle-related pollutants such as ozone and carbon monoxide, and adverse effects would be avoided.

Preservation of Historic Hotels and Visitor Services — Air quality would not be affected by continued operation of the concession facilities in the park because the operations generate negligible air pollutants.

Scenic Air Tours — Continued increases in scenic air tour operations would not adversely affect air quality.

Personal Watercraft — Air quality could be adversely affected by PWC emissions. The effect would probably be negligible but would depend on the amount of activity.

Winter Use — Continued patterns of winter use, including motor vehicle emissions, might adversely impact air quality during atmospheric inversions.

Divide Creek Flood Hazard — Air quality would not be affected by the development adjacent to Divide Creek.

West Side Discovery Center and Museum — Air quality would not be adversely affected by continued use of the visitor contact station in Apgar because the facility does not pollute the air and the number of people using the area is small.

Conclusion. Overall, the effects on air quality would be minor. No state air quality standards would be knowingly exceeded at this time. Temporary adverse impacts might occur during construction from dust and potential operation of an asphalt batch plant, but they would not be significant. As scenic air tours, levels of winter use, and use of personal watercraft increased, air quality could be significantly affected during some periods of the year and during certain weather conditions.

Cumulative Impacts. The increase in carbon monoxide emissions caused by increased visitation, increased scenic air tours, and use of personal watercraft, combined with the increase in emissions from increasing traffic around the area, would cumulatively affect air quality.

Impacts on Threatened and Endangered and State-Rare Wildlife Species

Methods for Analyzing Impacts. Informal consultation was conducted with the U.S. Fish and Wildlife Service. A number of wildlife biologists from outside the National Park Service were consulted, as were Glacier National Park wildlife biologists, regarding all threatened, endangered, and state-rare species and wildlife species in general. Information was based on research and operational knowledge of wildlife activity in the park. The National Park Service recognizes that any development in wildlife habitat could displace wildlife or result in habituation of wildlife to humans. Because NPS policy calls for management of naturally functioning wildlife populations, displacement and habituation of wildlife to

human development and use are considered adverse effects. Wildlife habitat and use in developed areas in the park have already been affected, and impacts are described for changes in the existing conditions.

Existing Management Zoning. Impact Analysis. Continuing to follow the management zoning as outlined in the 1977 *Master Plan* for Glacier National Park would have no additional adverse impacts on threatened and endangered and state-listed rare species. Wilderness values would not be affected.

Further environmental analysis, NEPA documentation, and compliance with the Endangered Species Act, including consultation with the U.S. Fish and Wildlife Service, would be completed during the site analysis and design stage for all proposed developments.

Federally Listed Threatened and Endangered Species

Bald Eagles.

Visitor Use on the Going-to-the-Sun Road — The Going-to-the-Sun Road would continue to be managed as the principal visitor use corridor in the park. No new development would occur under this alternative. Consequently, direct loss of eagle habitat or removal of important habitat components such as foraging perches or screening vegetation would not occur due to management actions. However, eagles are susceptible to disturbance and displacement by human activities. Concentrated visitor use would continue in and near developed areas, roads, and trails in the corridor. The Going-to-the-Sun Road corridor includes two known nesting sites and is also part of a major bald eagle migration route. Available habitat and opportunities for nesting, perching, foraging, and roosting would continue to be limited by development and associated use. If visitor use increased and more visitors use occurred in eagle habitat, such as along lakeshores, disturbance of bald eagles could increase. Increased use of informal pullouts along the lakes would be likely to occur with increasing traffic volume. This indiscriminate use of the shorelines, if it occurred near foraging or resting perches, could also disturb eagles. There is one nest site near to the road that would be disturbed.

Human activity near bald eagle nests can disturb the birds, especially during nest building and incubation stages. Disturbance of nest sites and important foraging areas could reduce the reproductive success of the birds. Site-specific nest plans would be developed to minimize human activity near nest sites and foraging areas during sensitive periods of the breeding cycle to avoid disruption of normal behavior, loss of productivity, or abandonment of the breeding area. Visitor use restrictions, including site-specific and/or specific time closures, would continue to be placed on boating and hiking activity during sensitive nesting periods and spring migration in some nesting territories. These restrictions would vary depending on conditions at each of the nesting territories; some remote nests would have no restrictions. Education efforts would be directed toward informing visitors about habitat needs of and visitor impacts on bald eagles.

Preservation of the Going-to-the-Sun Road — Reconstruction of the Going-to-the-Sun Road would primarily occur along the higher road elevations outside of eagle habitat.

Preservation of Historic Hotels and Visitor Services — Ongoing maintenance of historic visitor service facilities has the potential of disturbing eagles that nest and feed in the Lake McDonald area. Mitigation would continue to be used to reduce those impacts. Ongoing maintenance of Many Glacier and other areas would not disturb any known eagles.

Scenic Air Tours — The continuation of unrestricted scenic air tours and anticipated increases in scenic air tours would continue to have a wide range of impacts on wildlife. Impacts caused by aircraft overflights have been reported in the scientific literature. In general, wildlife respond to low-altitude aircraft overflights. The closer the aircraft come to the animals, the more probable is a response. Stronger responses were noted as aircraft came closer to the animals. The manner in which wildlife react depends on the life history characteristics of the species, characteristics of the aircraft and flight activities, and a variety of other factors such as habitat type and previous exposure to aircraft. Some habituation to overflights has been observed when flights are frequent or regular but not among all species. Studies and incidental observations have documented various effects of overflights on wildlife, including physiological and behavioral responses (indicators of stress), accidental injury, reproductive losses, energy losses, and habitat avoidance and abandonment (NPS 1995, Knight and Gutzwiller 1994, NPCA 1990). Whether effects such as increased heart rates cause harm is unknown, as are long-term impacts such as population effects due to decreased reproductive success.

Breeding bald eagles showed the greatest alert and flight response to helicopters, compared to jets and light planes, in a study in Arizona and Michigan (Grubb and Bowerman 1997). One pair of bald eagles at Cross Creek National Wildlife Refuge reportedly abandoned nesting activities altogether and left the area after repeated overflights by a military helicopter (Gladdys 1983, as reported in NPS 1995). Low level overflights have caused eagles to attack, avoid, or leave an area entirely (Fyfe and Olendorf 1976; Fraser et al. 1985; Grubb and King 1991 in Grubb and Bowerman 1997). Helicopter overflights in Glacier are suspected of disrupting nesting and foraging activities of bald eagles based on evidence from the literature and known helicopter flight paths in the park (memorandum dated March 7, 1994, from the superintendent of Glacier National Park to the NPS acting associate director for operations as reported in NPS 1995). Scenic air tours through raptor migration corridors, where migrating raptors sometimes fly through in numbers that exceed 50-100 birds per hour, have the potential for collisions and disruption of bird flight paths. Consequently, there could be adverse impacts on bald eagles from continued and increasing scenic air tour activity, especially helicopter tours, throughout the park.

Personal Watercraft — Bald eagles are known to be disturbed by boat use (Skagen 1980; Knight and Knight 1984; Buehler et al. 1991; McGarigal et al. 1991; Stalmaster and Kaiser 1998). The National Park Service requires the Lake McDonald tour boat concessioner to travel at low speeds on the lake. Personal

watercraft are high performance vessels designed for speed and maneuverability. The combination of speed, ability to maneuver into shallows, and noise (accentuated by repeated accelerations and decelerations) of personal watercraft, particularly when used in groups, would cause various impacts on eagles that use the lakes, depending on time, frequency, duration, and location of use. Such impacts would include disturbance, avoidance, or displacement from areas along the lakes and could eventually result in permanent loss of habitat. Continued disturbance could result in decreased reproductive success or nest abandonment. Restrictions on the time and location of use could be imposed to reduce some impacts.

Winter Use — Bald eagles use the Lake McDonald and St. Mary Lake areas during the late fall, winter, and early spring when increased winter use by visitors may occur, primarily on the Going-to-the-Sun Road. Visitors can disturb and even displace eagles during critical winter migration periods. Visitors can also disrupt early nesting activity and incubation, thus increasing the chances of nest abandonment or failure. The park has imposed temporary limited area closures along Lake McDonald in the past to protect nesting eagles.

Divide Creek Flood Hazard — There would be no effect on bald eagles with continued flood abatement and development in Divide Creek because there are no known nests or foraging areas near the area.

West Side Discovery Center and Museum — The Apgar visitor contact station is part of the larger development in bald eagle foraging habitat associated with the lower lakeshore and outlet. No new development would occur in this area, and retaining the contact station would not cause more impacts. However, the developed area and associated use along the lakeshore and outlet would continue to affect eagle habitat and displace birds. If visitor use increased and there was more visitor use near the outlet and lakeshore, disturbance of bald eagles would probably increase. Restrictions on human activity in these areas could be imposed during critical eagle use times.

Gray Wolves.

Visitor Use on the Going-to-the-Sun Road — Wolves could be indirectly affected by increasing use along the Going-to-the-Sun Road in St. Mary Valley, where there is evidence that wolves are recolonizing. Increasing use on the Going-to-the-Sun Road could displace elk that feed in the meadows. This could reduce prey availability if prey numbers declined as a result of lost foraging opportunities in meadows or if animals were displaced to areas outside the park where they could be hunted. Displacement effects would probably be minor because elk are expected to habituate to increased use. Elk have evidently adapted to present levels and types of human disturbance along this often heavily used road. Where elk are habituated to human presence along roads, disturbance from vehicles and people who stop to view them appear to be minor (Schultz and Bailey 1978; Cole 1983). Gradual increases in this same type and pattern of human activity in a road corridor would probably continue to displace elk adjacent to the road but would probably not affect their distribution or displace them from the area. An exception to

this would be if people left the regularly traveled road or trail areas, especially if they were to approach wildlife. In that case, animals would probably be displaced from feeding areas.

Preservation of the Going-to-the-Sun Road — Reconstruction of the Going-to-the-Sun Road could temporarily displace wolves and prey species in the vicinity of construction, although most of the reconstruction would occur outside of known wolf habitat.

Preservation of Historic Hotels and Visitor Service — Continuation of early season maintenance activity at the Many Glacier Hotel and other lodges and visitor facilities throughout the park would not result in any additional impacts on wolves. Temporary avoidance of the building areas during maintenance activities would continue. Eventual closure of facilities would result in a positive impact by decreasing human disturbance.

Scenic Air Tours — Gray wolves could be disturbed by low flying scenic air tours, especially helicopters, over the park. Documented responses of wolves to aircraft have varied (Chapman 1977; NPS 1995). Some wolves ignored aircraft; others ran and jumped toward aircraft; and others fled. Several studies indicated that wolves habituated to aircraft if they were repeatedly flown over at altitudes of 100 meters or more. Flights lower than 100 meters seemed to frighten wolves that were accustomed to aircraft (Chapman 1977). Helicopters would probably have greater effects on wolves than fixed-wing aircraft because helicopters are able to fly at lower elevations.

Personal Watercraft — Noise and rapid movement of personal watercraft, particularly along the shorelines of Lake McDonald and St. Mary Lake, could disturb wolves or prey species in areas surrounding the lake and result in avoidance of those areas.

Winter Use — There would be no actions taken to enhance public access. Wolves tend to avoid humans and areas near high use roads and would probably avoid the areas near the access road and ski trails, at least when people were present. There is ungulate wintering habitat throughout the park, including the Many Glacier, St. Mary, McDonald, and North Fork Valleys, among other areas inside and outside of the park. Increased human presence could affect wolf prey species' habitat use and distribution. Prey species would also be likely to avoid human activity near access roads and trails. This disturbance would probably have a negligible influence on their distribution and movements. Use levels would be relatively low and primarily limited to the road and trails. Animals often habituate to human activity in protected areas such as parks, and where adjacent cover for screening and refuge exists. However, if prey species were displaced to less productive areas or to portions of their winter range outside the park, where they could be hunted, this would reduce prey availability for wolves. The severity of this reduction would depend on habitat conditions and prey population status and trends as they affected adequate prey numbers.

Divide Creek Flood Hazard and West Side Discovery Center and Museum — Continued use of the Divide Creek facilities and Apgar visitor contact station

would not adversely affect wolves because these facilities are year-round centers of human activity that wolves already avoid.

Grizzly Bears.

Visitor Use on the Going-to-the Sun Road — Increasing visitor use resulting in more informal parking and use along the Going-to-the-Sun Road could eventually adversely affect grizzly bears. Bears display varying responses to roads and road activity, including increased habituation through human contact and food attractants, or avoidance resulting in a decrease of usable habitat (see conclusion for more detailed discussion on habituation). Increased habituation can lead to increased incidences of human/bear contacts and conflicts that can ultimately result in the removal or death of bears. Additionally, the disturbance generated by heavy traffic in grizzly habitat may create barriers to grizzly movement. Bears may alter their use of areas near roads from daylight to night, allowing continued use of habitat near roads and crossings.

Preservation of the Going-to-the-Sun Road — Reconstruction of the Going-to-the-Sun Road could temporarily displace bears from the area but also could create unnatural attractants such as food, petroleum products, and human waste. Measures to reduce impacts from construction, such as restrictions on yearly initiation of construction containment procedures for construction materials, times of day that construction would be allowed, or food storage and disposal requirements, would be developed.

Preservation of Historic Hotels and Visitor Services — Continued maintenance of historic structures would not affect bears because repair of the buildings would be confined to current developed areas where there is no habitat available.

Scenic Air Tours — Grizzly bears could be affected by continued and increasing scenic air tour overflights, especially by helicopters, throughout the park. It has been documented that grizzly bears run away from aircraft flying at altitudes as high as 3,000 feet. Harding and Nagy (1976) noted that grizzly bears never became habituated to aircraft, despite frequent exposure. Grizzly bears have also been noted to abandon areas in response to small craft overflights, even when overflights were infrequent (McCourt et al. 1974). In Glacier, bear research studies that used helicopters in the park from 1982 to 1986 found that 80 percent of grizzly bears observed in a remote section of the park reacted strongly to helicopters (Kendall, Waits, and Schirokauer 1996). Bears feeding on cutworm moths on high peaks and other exposed feeding sites would also be susceptible. Limited habitat availability in spring and fall (when bears are emerging from or preparing for hibernation) would also result in increased susceptibility to potential impacts.

Personal Watercraft — Personal watercraft on Lake McDonald, Lake Sherburne and St. Mary Lake could disturb bears in areas surrounding the lakes and result in displacement or avoidance of those areas and possibly permanent loss of habitat.

Winter Use — Continuing winter use patterns would not have adverse effects on grizzly bears in the Lake McDonald Valley. The large valleys throughout the park

such as Many Glacier and Two Medicine provide quality habitat in spring and before fall hibernation because they are the last areas to be covered with snow in winter and the first areas to melt out in spring. If visitor use increased during spring and fall in the valleys, increased encounters between bears and visitors would probably result. This could adversely affect bears and could result in removal, displacement, or death.

Divide Creek Flood Hazard and West Side Discovery Center and Museum — Continued use of the Divide Creek facilities and Apgar visitor contact station would not result in any additional impacts on bears because these facilities are already year-round centers of human activity.

Peregrine Falcons.

Although suitable habitat exists in many locations throughout Glacier, this species is rarely recorded in the park, and there are no known park nest sites. No effect on this species would be expected.

Federally Proposed Species

Lynx.

Winter Use — There is very little information available on lynx use in the park, but they could be adversely affected if winter use increased appreciably in areas like the Lake McDonald Valley, the east side of the park, or other suitable coniferous forest habitats. Lynx could also be affected by the use of personal watercraft on Lake McDonald and St. Mary Lake, although the high degree of human use and development along the Going-to-the-Sun Road corridor has probably already negatively affected lynx use of this habitat during the visitor use season.

There could be adverse impacts on lynx from increased scenic air tour activity, especially helicopter tours, throughout the park. In general, wildlife respond to low-altitude aircraft overflights, and the closer the aircraft, the greater the probability of response and the stronger the response. The type of response depends on the life history characteristics of the species, characteristics of the aircraft and flight activities, and a variety of other factors, such as habitat type and previous exposure to aircraft. Some tolerance for overflights has been observed when flights were frequent or regular but not among all species. Studies and incidental observations have documented various effects of overflights on wildlife, including physiological and behavioral responses (indicators of stress), accidental injury, reproductive losses, energy losses, and habitat avoidance and abandonment (NPS 1995; Knight and Gutzwiller 1994; NPCA 1990). Whether effects such as increased heart rates cause harm is unknown, as are long-term impacts like population effects due to decreased reproductive success. Lynx would probably be most susceptible to impacts during vulnerable life stages such as denning or when prey populations were low.

Other no-action alternatives would have no effects on lynx.

State-Listed Rare Species

There is very little information available about the use of the park by many of the state-listed rare species, so further analysis would be needed during the environmental assessments of individual actions. The information available is discussed below.

Common Loon.

Scenic air tours would have an unknown effect on the common loon, although studies have shown various responses of waterbirds to aircraft overflights. The combination of rapid movement, ability to maneuver into shallows, and noise of personal watercraft, particularly when used in groups, would impact loons on Lake McDonald and St. Mary Lake. Impacts would vary depending on time, frequency, duration, and location of use and would probably include disturbance, avoidance, or displacement along the lakes and could eventually result in the permanent loss of habitat. Continued disturbance could result in decreased reproductive success and nest abandonment. Because loon nests float, they would be more prone to PWC disturbance, including wakes. Other no-action alternatives would have no effect on loons.

Harlequin Duck.

Harlequin ducks could be adversely affected by the use of informal pullouts along McDonald Creek that provide easy human access to stretches of creek habitat. Harlequins are very sensitive to human disturbance and will not attempt to nest again if disturbed. Scenic air tours would have an unknown effect on this species, although studies have shown various responses of waterbirds to aircraft overflights. Other no-action alternatives would have no effect on harlequin ducks.

Osprey.

Osprey would not be adversely affected by any of the actions except possibly by increased air tours and lifting the temporary ban on personal watercraft. The effects would be similar to those on loons.

Northern Goshawk, Cooper's Hawk, Golden Eagle, Merlin, and Prairie Falcon.

These birds would not be adversely affected by any of the actions except possibly by increasing scenic air tours. The degree of effect is not known. Scenic air tours through raptor migration corridors could adversely affect the raptors. The effects would include the potential for collision between raptors and helicopters and the disruption of flight paths. Golden eagles would be the most likely to be affected because they are the most abundant during migrations.

Trumpeter Swan, Northern Pygmy Owl, Barred Owl, Great Gray Owl, Long-eared Owl, Boreal Owl, Northern Saw-whet Owl, Northern Hawk-Owl, Pileated Woodpecker, Olive-sided Flycatcher, Western Bluebird, LeConte's Sparrow, Clay-colored Sparrow, Brewer's Sparrow, and Gyrfalcon.

There is not a great deal of information available about these species, so it is not possible to predict the full effects of the actions. Scenic air tours would have unknown effects. All of the species could be affected to a limited degree by loss of habitat caused by informal pullouts and disturbance from increased visitor use.

Northern Bog Lemming.

The northern bog lemming would probably not be adversely affected by any of the alternatives. Impacts are not expected to occur in lemming habitat.

Marten, Fisher, and Wolverine.

Development and visitor use in the lower elevations of the park would continue to reduce the habitat suitability and use of these areas. Increasing winter use by visitors in these areas could further disturb these species, although even the current, generally low levels of visitor use may have already resulted in avoidance of these areas. Wolverines are the most sensitive to human presence. If increasing winter use extended into higher elevations, the wolverine could be affected by disturbance at late winter den sites; animals could abandon dens when disturbed during this sensitive period.

Conclusion. Most of the above species would be affected to some degree by increasing visitor use in the Going-to-the-Sun Road corridor and by increased winter use. The extent of impacts from scenic air tours is unknown, although behavioral responses for some of these species and the effects of low elevation flights have been documented.

Grizzly bears have the greatest probability of being significantly affected. Adult females and subadult males often feed near humans, so they more often become habituated than other bears (Mattson et al. 1987; Olsen et al. 1987; Warner 1987). Adult males are also known to habituate to humans (Herrero 1985). Habituated females may teach this behavior to their offspring. Adult females and subadult males more often come into conflict with humans than adult males because of habituation. Consequently subadult males and adult females are more often killed by humans, especially in areas where the bear population is protected from hunting (Craighead et al. 1988). Any loss of female bears from the population is significant, given that recovery of bears in the ecosystem is dependent on the survival and reproduction of females.

Wolves could be adversely impacted by increased winter use, particularly if the same irregular plowing pattern continued on the east side of the park, which allows more people into ungulate wintering areas. This might disperse other wildlife such as elk or deer and disrupt the feeding behavior of wolves, because

they abandon kills when disturbed. Increasing use along the Going-to-the-Sun Road could displace wildlife or cause habituation, which could decrease their availability as prey.

Cumulative Impacts. The *Grizzly Bear Recovery Plan for the Northern Continental Divide Ecosystem*, as developed by the U.S. Fish and Wildlife Service and the Interagency Grizzly Bear Committee (in which the park staff participates), outlines the park's responsibility for actions necessary for the conservation and recovery of the grizzly bear. Implementation of this plan will result in positive cumulative benefits for the recovery of the grizzly bear.

The actions called for in the *Montana Bald Eagle Management Plan*, completed by state and federal agencies with private landowners, would result in positive cumulative impacts on bald eagle recovery in the ecosystem. The management goal for Montana is to provide secure habitat for bald eagles and to maintain a viable, healthy, and self-sustaining population as close to peak level as possible. However, productivity (the number of young produced and fledged) of eagle nests in the park is poor and is below the level established for recovery of the species. The low productivity is attributed to a relatively short nesting season, decline in native fish populations, and recreational facility development and associated use in the nesting territories.

The implementation of actions called for in the *Northern Rocky Mountain Wolf Recovery Plan* would result in positive cumulative impacts for the recovery of the gray wolf. A viable prey base and secure denning areas are particularly important. Disruption of prey, particularly on winter range, coupled with continued development outside the park and problems with landowners, could have adverse cumulative effects.

Cumulative effects could result from continued management as proposed in the no-action alternative and actions outside the boundary, such as coal mining and logging in British Columbia, increasing private development in the North and Middle Fork Valleys and the corridor between West Glacier and Columbia Falls, increased freight train traffic carrying hazardous materials, and gas and oil leases and private development on the Blackfeet Indian Reservation. Because the park is not large enough to support sustainable populations of all the species, the impacts could be cumulative and adverse. Winter use has the greatest potential for impacts.

Impacts on Wildlife Other than Listed Species

Impact Analysis.

Visitor Use on the Going-to-the-Sun Road — Increased use of the Going-to-the-Sun Road and informal pullouts along the road could result in further loss of habitat and disturbance of various wildlife species that live or travel close to the road.

Preservation of the Going-to-the-Sun Road — Reconstruction of the Going-to-the-Sun Road would temporarily adversely affect wildlife species that live or

travel adjacent to the road. Wildlife would be temporarily displaced during construction. No long-term effects would be expected.

Preservation of Historic Hotels and Visitor Services — Continuation of early season maintenance activity at the Many Glacier Hotel and other lodges and visitor facilities throughout the park would not result in any additional impacts on wildlife. Eventual closure of facilities, and therefore decreasing visitor activity in the area, would result in a positive impact on wildlife species that have been displaced.

Scenic Air Tours — Unrestricted scenic air tours and anticipated increases could adversely affect wildlife species over time, disrupting behavior and possibly reproduction. Scientific evidence from Glacier and other areas suggests that low flying aircraft (especially helicopters) alter the behavior of wildlife in the natural environment and subject them to stress. Stress probably affects some wildlife species more than others during particularly vulnerable times such as winter or migration. Studies of mountain goats during the summer in the Canadian Rockies just north of Glacier found that helicopter flights disturbed mountain goats, caused the disintegration of social groups, and resulted in severe injury (Cote 1996). A similar study on Dall sheep in the Yukon showed that sheep ran from helicopters, even at distances of 3 km (Frid 1998). The studies recommended restricting helicopter flights within 2-3.5 km of alpine areas and cliffs known to support mountain goat populations and Dall sheep. A number of other studies on a variety of wildlife species indicate behavioral responses to overflights (NPS 1995).

Personal Watercraft — Wildlife would be adversely affected by use of personal watercraft on Lake McDonald, Lake Sherburne, and St. Mary Lake. PWC noise, rapid movement, and access to shallow areas would cause various impacts on wildlife that use the lake and adjacent shoreline, depending on time, frequency, duration, and location of use. Such impacts would include disturbance, avoidance, or displacement from areas along the lakes and could eventually result in permanent loss of habitat. Waterfowl in general are wary and seek refuge from many forms of disturbance, particularly if the activities are associated with loud noise and rapid movement (Knight and Gutzwiller 1995). Continued disturbance could result in decreased reproductive success or even mortality from direct or indirect effects. Lake McDonald is an important staging area for migrating and post-breeding Canada geese and migrating ducks and swans. Displacement of these birds to less secure areas at a vulnerable period could affect their survival.

Winter Use — Increased winter use in the lower elevations of the park would adversely affect wildlife that are active in the winter, displacing them from areas near roads, ski trails, and developed areas. It could also result in habituation and could lead to more conflicts with wildlife such as white-tailed deer, bighorn sheep, or mountain lions.

Divide Creek Flood Hazard and West Side Discovery Center and Museum — The development adjacent to Divide Creek and the Apgar visitor contact station would not have any additional effects on wildlife. Animals would continue to be displaced from these areas of concentrated human activity.

Conclusion. Wildlife could be adversely affected by increased traffic, informal pullouts, and increased use of facilities along the Going-to-the-Sun Road, increased unrestricted scenic air tour activity, increased winter use, and the use of personal watercraft.

Cumulative Impacts. Continued management as proposed in the no-action alternative and actions outside the boundary, such as timber harvest activities on Forest Service roads, private development in the North and Middle Fork Valleys and in the corridor between West Glacier and Columbia Falls, increased train traffic carrying hazardous materials, coal development in British Columbia, and gas and oil and private development on the Blackfeet Indian Reservation, could cumulatively affect wildlife populations and habitat. Because the park is not large enough to support sustainable populations of all these species, the impacts could be cumulative and adverse.

Impacts on Vegetation, Including Species at Risk and State-Rare Plant Species

Methods for Analyzing Impacts. There are no known federally listed threatened or endangered plant species in Glacier National Park. There are federally listed species at risk and state-listed rare plant species. Databases kept by Glacier National Park and the Montana Natural Heritage Program were consulted for known rare plant locations. Surveys were not conducted of each of the areas proposed for development, and site-specific surveys would have to be done during the design phase of the projects to determine if any rare plants or species at risk were present. If they are found in the areas to be developed, development could be designed to avoid adverse impacts, another site could be selected for development, or, as a last resort, the plants could be moved to suitable habitat.

Existing Management Zoning. There would be no additional adverse impacts on federally listed species at risk and state-rare plant species as a result of continuation of the management zoning strategy as described in the 1977 *Master Plan* for Glacier National Park because the zoning scheme does not call for any actions that would disturb vegetation or rare species. Wilderness values would not be affected.

Visitor Use on the Going-to-the-Sun Road — Continuing the current visitor use at Lunch Creek and Logan Pass would result in adverse impacts on vegetation from continued trampling of plants. There is also a risk of destroying rare plant species. Trampling results in plant destruction and slight shifts in species composition. Vegetation disturbance also can lead to increases in exotic plant populations.

Preservation of the Going-to-the-Sun Road — There would be no adverse impacts on federally listed species at risk and state-rare plant species from reconstruction of the Going-to-the-Sun Road. These plants would be avoided or moved when there were no other options.

Preservation of Historic Hotels and Visitor Services — Cultural heritage and visitor services would not affect rare plants.

Scenic Air Tours — Scenic air tours would not affect rare plants because they are not allowed to land in the park.

Personal Watercraft — The use of personal watercraft could result in significant adverse impacts on known rare plants such as the water bulrush in St. Mary Lake and Lake McDonald. Personal watercraft have a shallow draft with the ability to penetrate areas not formerly available to conventional watercraft. This access can adversely impact aquatic vegetation. Other adverse impacts would be caused by the release of petroleum products into the water, increased turbidity, and soil disruption from operation in shallower waters.

Personal watercraft are highly maneuverable and can operate well in very shallow water (less than 12 inches deep) and are able to operate in sensitive aquatic habitats. Potential impacts include the loss of emergent aquatic vegetation, shoreline erosion, and increased water turbidity. These impacts are amplified because PWC users frequently run multiple circuits in the same area.

Winter Use — Plants are dormant during the winter and covered with snow, so no effect would be expected.

Divide Creek Flood Hazard — Continuing the flood abatement activities on Divide Creek would not affect rare plants.

West Side Discovery Center and Museum — The continued use of the Apgar visitor contact station would not affect rare plants.

Conclusion. There might be adverse impacts on species at risk from off-road parking along the Going-to-the-Sun Road, the continued undirected and unmanaged use of the Lunch Creek area, and the operation of personal watercraft.

Cumulative Impacts. Several of the rare and sensitive species in the park are found in few other locations in the region. Therefore, seemingly minor impacts on a few individual plant species could have serious cumulative effects on some of these species.

Impacts on Vegetation (General)

Visitor Use on the Going-to-the-Sun Road — As visitation increased, more off-road parking along the Going-to-the-Sun Road would result in adverse impacts on vegetation from trampling and denuding of vegetation. Along road shoulders vegetation would be crushed, and soils would be compacted. Exotic vegetation can become more prevalent in areas where vegetation is disturbed.

Preservation of the Going-to-the-Sun Road — Vegetation would be adversely affected during road reconstruction because of disturbance and removal of vegetation during the course of the repairs. Mitigation would include revegetation.

Preservation of Historic Hotels and Visitor Services — There would be no adverse impacts on vegetation as a result of the no-action alternative in regard to cultural heritage and visitor services.

Scenic Air Tours — There would be no adverse impacts on vegetation as a result of continued scenic air tours because aircraft do not land in the park.

Personal Watercraft — The use of personal watercraft could result in significant adverse impacts on wetland vegetation in St. Mary and Sherburne Lakes and

Lake McDonald. Personal watercraft have a shallow draft with the ability to penetrate areas not available to conventional watercraft. This use adversely impacts aquatic vegetation. Other adverse impacts on vegetation result from the release of petroleum products into the water, increased turbidity, and soil disruption from operation in relatively shallow water.

Winter Use — No additional adverse impacts would be caused by winter use patterns. Some roadside vegetation is affected by graveling and plowing.

Divide Creek Flood Hazard — There would be no adverse impacts caused by leaving the development adjacent to Divide Creek. Continued flood abatement would disturb the floodplain, which would be vulnerable to exotic plant invasion.

West Side Discovery Center and Museum — There would be no adverse impacts caused by the continued use of the Apgar visitor contact station.

Conclusion. There would be adverse impacts on vegetation from off-road parking along the Going-to-the-Sun Road and activities associated with the manipulation of Divide Creek. Continued flood abatement activities at Divide Creek would result in the adverse impacts on vegetation because of the use of heavy equipment off-road. Wetland vegetation would be adversely impacted by the use of personal watercraft in the three lakes and indirectly from the release of petroleum products and increased turbidity.

Cumulative Impacts. Over time increased use of personal watercraft in sensitive areas combined with similar activities outside the park would decrease the diversity of vegetation throughout the region. Several of the rare and sensitive species in the park are found in few other locations in the region. Therefore, seemingly minor impacts on a few individual plants could have serious adverse effects on the survival of a viable population of these species.

Impacts on Soils

Methods for Analyzing Impacts. Soil surveys have been conducted for all areas of the park except the Middle Fork. The surveys identified and mapped the soils in the park and discussed their strengths and weaknesses in regard to development and ability to support vegetation. Impact information was derived from these reports based on the actions in each of the alternatives.

Existing Management Zoning. Soils would not be affected by continued management of the park using the management zones described in the 1977 Master Plan for Glacier National Park because the zoning scheme does not call for any actions that would disturb soils. Wilderness values would not be affected.

Visitor Use on the Going-to-the-Sun Road — Increased use along the Going-to-the-Sun Road and off-road parking would adversely affect soils. Exposed soils would become compacted, decreasing their ability to absorb water and support plant growth. In areas where the soil layer is shallow, the soils could be washed away after exposure, leaving only bedrock.

Preservation of the Going-to-the-Sun Road — Soils would be adversely affected during road reconstruction. Adverse effects would be temporary, and most would be mitigated to reduce the amount of sediment entering watercourses. All

soils from which the vegetation was removed would be revegetated to protect the soils from wind.

Preservation of Historic Hotels and Visitor Services — Continued maintenance of the cultural heritage and visitor services of Glacier would result in no adverse impacts on soils.

Scenic Air Tours — Continued scenic air tour activity and anticipated increases would have no adverse impacts on soils because there would be no ground disturbance.

Personal Watercraft — The soils found in the shallower sections of St. Mary Lake and Lake McDonald would be adversely affected by personal watercraft because of soil disturbance and turbidity in shallow water. There would be contamination from petroleum products released into the water that would eventually settle in the soil.

Winter Use — Continued winter use activities would have no adverse impacts on soils because there would be no ground disturbance.

Divide Creek Flood Hazard — There could be adverse impacts on soils from flood abatement activities and from the use of heavy equipment off-road.

West Side Discovery Center and Museum — Continued use of the visitor contact station in Apgar would have no adverse impacts on soils because there would be no ground disturbance.

Conclusion. There would be significant adverse impacts on soils from illegal parking as visitor use along the Going-to-the-Sun Road increased. Soils in the shallower sections of St. Mary Lake and Lake McDonald would also be significantly adversely affected by the use of personal watercraft in the park.

Cumulative Impacts. There would be no known cumulative impacts on soils.

Impacts on Natural Sounds

Methods for Analyzing Impacts. Glacier National Park has been identified by the National Park Service as one of nine parks where “maintaining or restoring natural quiet is an immediate priority” (NPS 1995). Glacier has been included in sound studies of seismic blasting associated with mineral exploration (EPA 1995) and aircraft overflights (NPS 1995). More recently, natural sound levels were measured at four locations in the park, and analyses were conducted regarding the frequency and amplitude of such human-caused intrusions as automobiles and aircraft. These studies were all limited in the extent of the park that was surveyed, so the impact analysis that follows is based on research at Glacier and at other NPS units.

Existing Management Zoning. Continuing use of the management zones system described in the 1977 *Master Plan* for Glacier National Park would not have an adverse effect on natural sounds because the zoning scheme does not contain actions that affect natural sound. Wilderness values would not be affected by management zoning.

Visitor Use on the Going-to-the-Sun Road — Increased visitor use of the Going-to-the-Sun Road could result in some increase in noise and masking of natural sounds, which could be an adverse effect.

Preservation of the Going-to-the-Sun Road — During reconstruction of the Going-to-the-Sun Road, there would be a temporary increase in noise in the road corridor caused by the use of heavy equipment, which would be a temporary adverse effect.

Preservation of Historic Hotels and Visitor Services — Continued maintenance and operation of the park's cultural heritage and visitor service facilities would not cause a significant increase in noise and would not be an adverse impact on natural sounds.

Scenic Air Tours — Continuing current scenic air tours and the expected increase in that activity over time would adversely impact natural sounds by increasing the frequency of aircraft noise (from rotors and engines). This could eventually result in a significant adverse impact as noise from scenic air tours began to permeate more regularly and for longer periods over extensive areas.

Personal Watercraft — Natural sounds would be significantly adversely impacted in the vicinity of Lake McDonald and St. Mary Lake by personal watercraft. Personal watercraft create an erratic sound because of their method of propulsion. The sound changes in response to load, cavitation (the formation of partial vacuums in the water), and throttle setting, all of which vary constantly. Personal watercraft are generally operated close to shorelines and developed areas, intruding on and masking natural sounds.

Current PWC brands produce noise in the range of 85-105 decibels per unit. The sound emitted is in the form of a high pitched whine. This sound, while not exceeding park decibel limits from the shoreline, can be annoying to other park visitors. (The park decibel limit is 82 decibels at 82 feet [36 CFR 3.7].) PWC noise is compounded when PWC users travel in groups, causing cumulative noise. Also, PWC operators frequently accelerate and decelerate their machines, which affects noise levels.

Winter Use — There would be no adverse impacts on natural sounds from the continued management of current levels and types of winter use experiences.

Divide Creek Flood Hazard — There would be negligible adverse impacts on natural sounds from the flood abatement activities. The effects would be temporary and would occur only during flood abatement activities.

West Side Discovery Center and Museum — There would be no adverse impacts on natural sounds from the continued use of the visitor contact station in Apgar.

Conclusion. Natural sounds would be significantly adversely impacted by unregulated increased scenic air tour activity and by the use of personal watercraft on selected lakes in the park. Natural sounds would be temporarily adversely impacted along the Going-to-the-Sun Road corridor from increased traffic and visitor use during reconstruction.

Cumulative Impacts. The combination of increased scenic air tours, personal watercraft, and increased traffic on the Going-to-the-Sun Road could have a

cumulative adverse effect in the park. This could be exacerbated by increases in development and community activities outside the park. Because air tour operators are based outside the park, there would be a cumulative effect on noise levels outside the park.

Impacts on Biological Diversity

Methods for Analyzing Impacts. Biological diversity means the full range of variety and variability that has evolved in and among living organisms and their ecological complexes, including ecosystem or community diversity, species diversity, genetic diversity, and the diversity of ecological processes (Kasten Senate Bill, 100th Congress).

Glacier National Park Global Climate Change Research Program Capabilities and Interest Statement (Key 1990) and World Heritage List Nomination, Waterton-Glacier International Peace Park (Canada and the United States of America 1994 as amended) described the status of biodiversity in the park, which was compared to the potential impacts on wildlife and vegetation as described in earlier sections of this Draft General Management Plan and Environmental Impact Statement.

Existing Management Zoning. Continuing use of the management zones described in the 1977 Master Plan would not adversely affect biodiversity because no actions called for in the plan would affect biodiversity. Wilderness values would not be affected.

Visitor Use of the Going-to-the-Sun Road — Impacts on biodiversity from visitor use of the Going-to-the-Sun Road would vary by road segment and time of year. Increasing use of the Going-to-the-Sun Road might cause additional displacement of some animal species that are less tolerant of people (such as wolverines and grizzly bears) from the road corridor, thus contributing to habitat fragmentation. Increasing use might also result in more road-killed wildlife. Increases in off-road parking along the road could lead to destruction of vegetation and proliferation of exotic species.

Preservation of the Going-to-the-Sun Road — Biodiversity could be adversely affected because of the length of the reconstruction process. It could result in more fragmentation of habitat and displacement of wildlife species because animals could be displaced by activity associated with construction. Only those species that are tolerant of road reconstruction activity would remain, decreasing the diversity of wildlife in the area.

Preservation of Historic Hotels and Visitor Services — Continued maintenance and operation of the visitor service facilities throughout the park should have little impact on park biological diversity overall. Depending on the timing and types of repairs, there would be some displacement of species around such areas as the Lake McDonald Lodge and the Village Motor Inn. Displacement would apply particularly to eagles that use large trees in these areas as perches when searching for food.

Scenic Air Tours — Scenic air tours operated over Glacier National Park would indirectly impact biological diversity as the result of the effects of aircraft noise on wildlife. Specific impacts would include: interruption of courtship behavior, disturbance during critical feeding periods (early spring and fall), and increased energy expenditure.

Personal Watercraft — Biological diversity could be adversely impacted by the use of personal watercraft on Lake McDonald and St. Mary Lake. Personal watercraft can access shallow shoreline areas where biological diversity tends to be higher than in other lake areas.

Evidence suggests that the noise associated with personal watercraft causes many wildlife species (including bald eagles and common loons) to leave their feeding, roosting, or cover areas. These impacts can be exacerbated by the ability of the craft to access shallow bays and inlets. This access can adversely impact the diversity of wildlife and aquatic vegetation.

Hydrocarbon emissions attributable to personal watercraft could be lethal to some aquatic organisms, which could impact aquatic ecosystems.

Winter Use — The continuation of winter use patterns could have additional impacts on park biological diversity. Impacts would be attributable to the avoidance response exhibited by some species when vehicles or skiers enter their winter range.

Divide Creek Flood Hazard — Impacts on Divide Creek and on associated wetland areas at St. Mary could impact the integrity and biodiversity of local aquatic ecosystems. The Divide Creek channel and associated wetlands are periodically damaged by sedimentation associated with road removal and by hazardous materials that are swept into the water during flooding. The disturbed channel would be subject to exotic plant invasion.

West Side Discovery Center and Museum — There would be few additional impacts on park biological diversity, particularly wildlife, from continued use of the visitor contact station in Apgar. Increased use could result in longer hours and more congestion in the Apgar area, which could adversely affect wildlife movements, thus potentially impacting biodiversity. Grizzly bears and bald eagles are known to use the Apgar area.

Conclusion. It is unlikely that any plant or animal species would be eliminated as a result of continuing the park management direction as represented in the no-action alternatives. There would, however, continue to be impacts on individual species and on biological communities in the park. Some of these impacts could weaken biological diversity by damaging community integrity or by preventing species numbers from naturally expanding.

Cumulative Impacts. The cumulative impacts of the no-action alternatives on wildlife would probably grow over time. The principal concern would be dispersal of certain species from feeding areas as personal watercraft, scenic air tours, and travel on the Going-to-the-Sun Road increased.

Regional threats to biological diversity would result from habitat fragmentation and degradation of important winter range outside the park to the east and south if development continued in these areas.

IMPACTS ON THE CULTURAL ENVIRONMENT

Impacts on Cultural Resources

Methods of Analyzing Impacts. The National Park Service completed a historic resources study in 1995 that examined over 360 structures in the park, identified and evaluated the historic properties of each, and determined whether they are eligible for listing on the National Register of Historic Places. The National Park Service also completed an archeological resources study in 1995 that identified over 400 archeological sites. These studies comprise a complete current inventory of known cultural resources inside the park.

Existing Management Zoning. The continued use of the management zones described in the 1977 *Master Plan* for Glacier National Park would not affect cultural resources in the park because no actions are recommended that would affect them.

Visitor Use of the Going-to-the-Sun Road — Increased use of the Going-to-the-Sun Road would not adversely affect cultural resources because use patterns would not change.

Preservation of the Going-to-the-Sun Road — Some of the Going-to-the-Sun Road's cultural resources would probably be lost during the 50-year construction period due to structural failure of the retaining walls and guardwalls before they could be repaired.

Preservation of Historic Hotels and Visitor Services — No action would result in eventual closures of hotels. Five buildings are recognized as national historic landmarks, so loss of the buildings or their integrity would be an adverse effect. An indirect effect would be that visitors would no longer be able to find lodging in the park. Staying in hotels in the park is a traditional and historic visitor activity that could be lost.

Scenic Air Tours — Scenic air tours would have no direct or indirect effect on cultural resources.

Personal Watercraft — PWC use on St. Mary Lake and Lake McDonald would have no direct effects on historic properties. However, the ambiance of the Lake McDonald historic district would be affected by the noise and visual intrusion of personal watercraft.

Winter Use — Unchanged winter use would not directly affect cultural resources. Indirectly, low or no use of buildings during winter months could lead to a certain amount of winter damage resulting from lack of use, changes in temperature, etc. With no action, historic buildings would continue to incur minor damage during winter and be repaired in spring.

Divide Creek Flood Hazard — Continued location of the facilities in the St. Mary developed area would eventually result in the loss of the St. Mary maintenance area historic district during a flood.

West Side Discovery Center and Museum — The continued use of the Apgar visitor contact station would not have a direct effect on cultural resources. Indirectly, visitors entering from the west would have less of an introduction to the historic properties in the park, and that would lead to less appreciation and less

funding for maintenance of historic buildings over time. Historic items that are now stored in three different areas would not be adequately protected. Additions to the collection could not be adequately stored onsite because of lack of adequate facilities.

Conclusion. Divide Creek would eventually catastrophically flood and destroy or severely damage the St. Mary maintenance area historic district. Some facilities, such as the Many Glacier Hotel, Lake McDonald Lodge, and Two Medicine Chalet (campstore), as well as the Going-to-the-Sun Road, would eventually have to be closed because they would become unsafe and much too expensive to maintain. Cultural resources would continue to suffer a low profile and the museum collection would continue to deteriorate due to the lack of adequate storage space.

Cumulative Impacts. Early 20th century grand hotels and cabin camps would be lost, which would result in a cumulative adverse effect on resources for those eras. The historic structures provide experiences of history and are genuine park resources that would be destroyed and lost. This would be a cumulative adverse effect.

Impacts on the Blackfeet and Salish and Kootenai Tribes

Regular consultation with the Blackfeet Tribal Business Council and the Flathead Cultural Protection Office would ensure that the tribes would not be adversely affected by any of the no-action alternatives.

IMPACTS ON THE SOCIOECONOMIC ENVIRONMENT

Method for Analyzing Impacts. Bioeconomics, Inc., of Missoula, Montana, was contracted in 1997 to conduct a socioeconomic impact analysis of the alternatives for the *Draft General Management Plan and Environmental Impact Statement*. The analysis relied largely on already available information from the National Park Service. A minimal amount of original data was collected, and an analysis was conducted with the use of IMPLAN (a socioeconomic modeling program).

The Institute for Tourism and Recreation Research of the School of Forestry at the University of Montana undertook an analysis of the economic impacts of the Going-To-The-Sun Road in 1998. That study, again relying on existing data, reported the economic impacts on the differing sectors of the state and regional economies.

Impacts on Regional and Local Communities

Existing Management Zoning. Continued management of the park using the management zones as described in the 1977 *Master Plan* would not adversely affect regional and local communities because no actions under the zoning scheme would affect regional or local communities.

Visitor Use on the Going-to-the-Sun Road — Negative economic impacts of continued reconstruction activity over 50 years would not be as great in any one year as it would for the other alternatives. Failures of the road that resulted in closure would have adverse effects on state and local economies. If the road failed these impacts could be greater in any one year than in any other alternative.

Preservation of the Going-to-the-Sun Road — All alternatives, including the no action alternative, call for the continued maintenance of the Going-to-the-Sun Road. Regardless of the alternative chosen, there would be periods when the road would be closed for rehabilitation and maintenance. The impact associated with this action would be a reduction in park visitation and cross-park travel, which would negatively impact local businesses and concessions. Offsetting this impact would be the contribution made to the local economy by the construction project itself. The degree of the impact would depend on the length of time the road was closed and the season of closure. The local and regional economy would be adversely affected if a catastrophic event closed the road. The effects would depend on the length of time the road was closed and how much of the road was closed.

Except in the periods when the road would have to be closed for construction, the regional and local economies would be unaffected by the no-action alternative for the Going-to-the-Sun Road. The economic benefits of travel and tourism associated with the Going-to-the-Sun Road would continue unchanged. Maintenance activities and periodic construction projects would continue and would contribute to the local and regional economies.

Preservation of Historic Hotels and Visitor Services — In the short term, little change to the local and regional economies would result from the no-action alternative for lodging and overnight visitor services. The inventory of park accommodations would not change. In the longer term, without upgrading, some park lodging would have to be closed for public safety reasons. Revenue loss would impact the concessioner and would have the potential to cause business failures if enough of the rooms or other services were lost. Depending on the number of units lost, this could have a large impact on the local economy and a noticeable impact on the regional economy. According to the economic analysis undertaken by Bioeconomics, Inc., the worst case estimate of annual losses to the local and regional economies would be \$8.9 million and 599 jobs. The loss in total industrial output was estimated at \$20.7 million. Their worst case estimate considered that all park lodging would eventually be closed and that all overnight visitors consequently would not visit the park.

Scenic Air Tours — There would be no adverse economic impact as a result of the no-action alternative for scenic air tours.

Personal Watercraft — PWC use would be permitted on certain lakes, which would result in a slight increase in visitor spending. This impact was characterized as negligible by Bioeconomics, Inc.

Winter Use — There would be no adverse economic impact as a result of the no-action alternative for winter use.

Divide Creek Flood Hazard — At Divide Creek, the economic impact on the local economy (and to a lesser extent on the regional economy) as a result of tak-

ing no action is difficult to predict. If major flooding occurred, rebuilding costs associated with replacing housing, maintenance, and administration facilities would contribute to the local economy for the lifetime of the construction project. If flooding did not take place, the no-action alternative would have no impact. Continued manipulation of the stream threatens property outside the park, since it has been manipulated to avoid park structures.

West Side Discovery Center and Museum — There would be no adverse economic impact as a result of the no-action alternative for the Apgar visitor contact station.

Conclusion. The contribution Glacier National Park makes to the local economy and the economy of the region would continue since the park would remain a significant national attraction. The potential loss of some lodging in the long term would be a significant negative impact. The lodge closures could result in a major negative economic impact by reducing the numbers of visitors attracted and the resulting spending.

Cumulative Impacts. When examined in the context of the economy of northwestern Montana the no-action alternative is the only alternative with a negative cumulative economic impact due to the potential loss of lodging inventory. Bioeconomics, Inc., however, found that any change due to implementation of the no-action alternative for preservation of historic hotels and visitor services would have a minor impact on the overall robust economy of the region.

Impacts on Local and National Visitors

Existing Management Zoning. Continued use of the management zones as described in the 1977 *Master Plan* for Glacier National Park would not adversely affect local and national visitors because no actions under the zoning scheme would affect them.

Visitor Use on the Going-to-the-Sun Road — The Going-to-the-Sun Road would continue as the primary attraction for the national visitor and would continue to provide access to the multiple attractions of Glacier for all visitors. If the trend toward increasing visitation continued, congestion would increase and visitor enjoyment and satisfaction would diminish. Logan Pass would continue to be congested during peak periods but would continue to provide a range of services to the visitor, including book sales, restrooms, exhibits, and shelter from the elements.

Preservation of the Going-to-the-Sun Road — Continued maintenance of the Going-to-the-Sun Road would spread the repair work out over a 50-year period. This long-term repair process would be less of a disruption to visitor use during any one year than a large reconstruction project. However, disruption in visitor use would continue over a much longer time than in the other alternatives. It is also expected that there would be periodic unscheduled closures of the road resulting from failures such as the collapse of retaining walls and damage due to poor drainage. Visitor safety would be at risk.

Preservation of Historic Hotels and Visitor Services — Overnight lodging would continue to be available, but in the long term the closure of some facilities might become necessary for safety reasons. The scope of the impact would depend on the scale of the inventory lost but could be significant. Bioeconomics, Inc., has characterized the closures as a potential major negative impact on the numbers of visitors attracted to Glacier National Park.

Scenic Air Tours — Increased scenic air tours would have an adverse impact on many visitors to Glacier National Park because of the increased noise levels and the visual effects of the machines in an area that is valued for its quality wilderness experiences. These impacts would be especially severe for backcountry users.

Personal Watercraft — Under the no-action alternative the use of personal watercraft would again be permitted where other motorized craft of more than 10 hp are allowed. This would benefit visitors who want this form of recreation. For others seeking a quieter experience, there would be a negative impact. Continued PWC use also would cause safety problems. While personal watercraft make up only about 11 percent of the watercraft registered in the United States, they comprise over 35 percent of the vessels involved in accidents; 44 percent of boating injuries reported in 1996 involved personal watercraft (National Association of State Boating Law Administrators 1996).

Winter Use — Winter use would not affect local or national visitors.

Divide Creek Flood Hazard — There would be no impact on local or national visitors as result of no action at Divide Creek except during floods when access would be temporarily limited or removed.

West Side Discovery Center and Museum — Visitors would continue to experience difficulties with information services and orientation due to the lack of an adequate west side visitor center. The current conditions would continue, and the Apgar visitor contact station would remain inconvenient and congested.

Conclusion. Local and national visitors would be significantly adversely affected by increased scenic air tours, extended delays due to long-term construction on the Going-to-the Sun Road, and eventual loss of the hotels and lodges in the park. Local and national visitors would also be significantly adversely affected by continuing the use of the inadequate and poorly located visitor contact station in Apgar. Allowing personal watercraft in the park would adversely affect local and national visitors seeking a traditional experience in Glacier.

Cumulative Impacts. Glacier National Park would continue to be a significant attraction in the mix of resources of northwestern Montana. The potential loss of lodging capacity in the park would be expected to have only a modest impact on the regional tourism industry given the quantity of lodging available near the park. Long-term reconstruction of the Going-to-the Sun Road and potential catastrophic failure, combined with the reconstruction of major roads outside the park, would cumulatively adversely affect local and national visitors as they visit the region.

Impacts on Energy Consumption

Methods for Analyzing Impacts. A causal relationship was examined to determine changes in energy consumption as a consequence of development actions.

Existing Management Zoning. Continued use of the management zones as described in the 1977 *Master Plan* for Glacier National Park would not affect energy consumption in the park.

Visitor Use on the Going-to-the-Sun Road — No change in energy consumption would result from the no-action alternative. The Going-to-the-Sun Road would continue to be the principal travel corridor for visitors, and personal vehicles would continue to be the primary transportation method.

Preservation of the Going-to-the-Sun Road — Reconstruction of the Going-to-the-Sun Road would not significantly increase energy consumption in the park.

Preservation of Historic Hotels and Visitor Services — Since the lodging inventory would not change in the short term, there would not be any impact on energy consumption. In the long term, if lodges were closed for safety reasons, there would be a net reduction in energy consumption.

Scenic Air Tours — Anticipated increased scenic air tour activity would impact energy consumption and result in an increase over time.

Personal Watercraft — The use of personal watercraft would again be permitted on certain lakes and would modestly increase energy use.

Winter Use — The winter use component of the no-action alternative would not impact energy consumption.

Divide Creek Flood Hazard — Divide Creek would have no effect on energy consumption under this alternative.

West Side Discovery Center and Museum — No action would be taken on the west side discovery center and museum, so there would be no change on energy consumption.

Conclusion. Energy consumption would increase slightly from the anticipated increases in scenic air tours and from allowing personal watercraft in the park.

Cumulative Impacts. While visitation continued to grow with time, the cumulative impact of the no-action alternative would be negligible.

Impacts on Environmental Justice

Existing Management Zoning. Continued use of the management zones as described in the 1977 *Master Plan* for Glacier National Park would not adversely affect environmental justice because no actions are called for that would affect minority populations disproportionately. The no-action alternative would not disproportionately adversely affect minority or low income populations because the actions recommended would affect all populations equally.

Conclusion. Little impact would result in regard to day use and the ability of visitors to gain access to the attractions of Glacier. The significant impact would

relate to overnight use in the park and would depend on the extent of lodging closures.

Cumulative Impacts. There would be no cumulative impacts on environmental justice.

Impacts on Landowners in the Park and Adjacent to the Boundary

Method for Analyzing Impacts. The 1985 *Land Protection Plan* for the park was consulted, as were maps showing private land in and adjacent to the park.

Existing Management Zoning. Continuing to use the management zones as described in the 1977 *Master Plan* would not adversely affect private landowners in or outside the park. The zoning scheme does not call for any action that could affect landowners in the park.

Visitor Use on the Going-to-the-Sun Road — Owners of private lands in or adjacent to the park would not be adversely affected by increased visitor use of the Going-to-the-Sun Road, but increased congestion could slow access to private properties in the park.

Preservation of the Going-to-the-Sun Road — Reconstruction of the Going-to-the-Sun Road would not adversely affect owners of land in or adjacent to the park because most construction would take place in the higher elevations where there is no private land.

Preservation of Historic Hotels and Visitor Services — Landowners in and outside the park would not be adversely affected by continued maintenance of the hotels and lodges and other visitor services.

Scenic Air Tours — Owners of land inside the park boundary and adjacent to the boundary would be adversely affected by anticipated increases in scenic air tour activity because of increased noise levels and visibility of aircraft.

Personal Watercraft — People who own land on Lake McDonald would be adversely affected by personal watercraft use due to the increased noise on the lake. Landowners who want to use personal watercraft would not be adversely affected and lifting the ban would have a positive impact.

Winter Use — Owners of lands inside or outside the boundary would not be affected by continuing levels and types of winter use.

Divide Creek Flood Hazard — Owners of land inside or outside the boundary would not be affected by continued use of the development adjacent to Divide Creek.

West Side Discovery Center and Museum — Owners of land inside or outside the boundary would not be affected by continued use of the visitor contact station in Apgar.

Conclusion. Owners of land in the park would be adversely affected by increased scenic air tours in the park and by personal watercraft on Lake McDonald. Owners of land outside the park adjacent to the boundary would be adversely affected by increased scenic air tours.

Cumulative Impacts. There would be no cumulative impacts.

Impacts of All the Preferred Alternatives

IMPACTS ON THE NATURAL ENVIRONMENT

Impacts on Water Resources, Including Water Quality, Floodplains, and Wetlands

Management Strategy. Implementation of the management strategy would have a positive effect on water resources because approximately 95 percent of the park would be managed as a wild area. Therefore, the majority of water resources in the park would be managed in their natural state with no disturbance or development. Water reservoirs located in visitor service zones (less than 5% of the park) would be protected from adverse effects by the use of state of the art technology and mitigate any ground disturbance. The major developed areas would not be expanded beyond their zones.

Visitor Use on the Going-to-the-Sun Road — Further analysis would be conducted as part of the comprehensive use plan for the Going-to-the-Sun Road. If the study recommended additional pullouts, the following effects could occur. Modification of existing or construction of additional pullouts, picnic areas, short trails, and interpretive sites at such areas as Moose Country, Lunch Creek, Logan maintenance pit, Sunrift Gorge, Sun Point, and Packers Roost would result in minimal short-term adverse impacts on water quality from construction activity in the area. Mitigating measures such as silt fencing and revegetation would prevent sediment from entering the adjacent creeks and rivers. After construction was complete, there could be minimal direct and indirect adverse impacts on water quality from sheet drainage from the road, which would release contaminants such as oil from vehicles into the creek and rivers adjacent to the road and pullouts.

Development would not occur in wetlands near Moose Country and Avalanche to avoid adversely affecting wetlands. There would be no direct or indirect adverse impacts from dredging or filling wetlands or water bodies associated with this alternative. Restroom facilities, roads, trails, and picnic areas are allowed in floodplains and are excepted from compliance with Executive Order 11988. If the study recommended visitor use limits, there would be no additional effects on water resources, water quality, floodplains, or wetlands.

Preservation of the Going-to-the-Sun Road — Construction activities would disturb soils, which could affect water resources. Riparian wetlands adjacent to the road could also be affected by construction activity. Without mitigation to protect streams, wetland lakes, and rivers adjacent to the Going-to-the-Sun Road, water quality would be adversely affected by increased sediment and turbidity. With mitigation in place, water quality would be protected. Prior to road construction an Army Corps of Engineers 404 permit as defined by the Clean Water Act and state permits would be obtained. Compliance with section 401 of the Clean Water Act would be conducted to determine appropriate mitigation to protect water quality. These permits define the activity to take place and the mitigation that would be required to protect water quality.

Preservation of Historic Hotels and Visitor Services — These actions could have short-term impacts on the water quality of lakes and creeks from sedimentation as a result of ground disturbance. These impacts would be mitigated by the installing erosion control devices (such as hay bales and plastic barriers) before construction could begin and by revegetation following construction. No known wetlands would be adversely affected by this action.

Scenic Air Tours — The ban would have no impact on water resources, including water quality, floodplains, and wetlands, because there would be no new ground disturbance.

Personal Watercraft — Making the temporary ban on personal watercraft permanent would protect water resources from accidental spills of petroleum products and emissions by removing a potential source of contamination. Wetlands associated with the large lakes in the park would also be protected from adverse effects by permanently banning personal watercraft. Floodplains would not be affected by this ban because personal watercraft are not used in floodplains.

Winter Use — This alternative would have no significant adverse effect on water quality, floodplains, or wetlands because there would be no new ground disturbance.

Divide Creek Flood Hazard — Relocating the administrative, maintenance, and housing facilities out of the Divide Creek flood hazard zone in St. Mary would have a positive impact on water quality and the flood hazard area because flood abatement measures would no longer be necessary. Relocating the maintenance facility would remove the hazardous and toxic substances now located in the 100-year floodplain and would eliminate the danger of contamination by these substances during a flood. NPS policy requires that these facilities be located outside 500-year floodplains. Relocating employee housing and administrative facilities would remove household and office contaminants and sewerlines from the floodplain and would eliminate the possibility of their being released into the water during a flood.

West Side Discovery Center and Museum — There would be no adverse impacts on water quality, floodplains, or wetlands from the construction of a west side discovery center and museum near the T-intersection because the proposed location is not within or near a floodplain or wetland and because erosion prevention measures would prevent siltation of nearby water bodies.

Conclusion. Overall there would be minimal adverse impacts on water quality as a result of these alternatives. There would be no adverse impacts on floodplains or wetlands. There would be benefits to water quality and floodplains.

Cumulative Impacts. Removing NPS development near Divide Creek should provide better protection of adjacent landowner property because manipulation of the streambank by the park would close. This action could also have a positive effect on adjacent landowners by reducing the danger of flooding, because if the stream is allowed to follow its natural course it would be more likely to flood inside the park boundary, and thus adjacent landowners would not have to manipulate the creek to protect their property.

Impacts on Scenic Resources

Management Strategy. Implementation of the management strategy would result in a positive effect on scenic resources because over 95 percent of the park would be managed as a wild area, and not developed. Developed areas would not expand beyond visitor use zones and any additional development would blend in and not adversely affect scenic views.

Visitor Use on the Going-to-the-Sun Road — Further analysis would be conducted as part of the comprehensive use plan for the Going-to-the-Sun Road. If the study recommended additional pullouts, the following effects could occur. There would be some change in the scenery adjacent to the road from the modification of existing or development of additional pullouts, picnic areas, trails, and interpretive sites at areas such as Moose Country, Lunch Creek, Logan maintenance pit, Sunrift Gorge, and Sun Point. Facilities would be designed to blend in with the vegetation and surrounding landscape so that they would not stand out and detract from the scenery. If the Logan maintenance pit was developed as a parking area for the public transportation system, there could be a direct adverse impact on the scenic resources in that area. However, this area is well screened from the road and site design would ensure that that this parking area would continue to be screened from the Going-to-the-Sun Road. The parking area would be visible from portions of the Going-to-the-Sun Road above the Loop, from a portion of the highline trail, and from Heaven's Peak. The Logan maintenance pit would also be visible from off-trail locations to the north, south, and east. This would result in an adverse effect on the scenic views from these locations.

Preservation of the Going-to-the-Sun Road — There could be temporary localized adverse effects on scenic resources during reconstruction, but there would not be permanent effects.

Preservation of Historic Hotels and Visitor Services — Rehabilitation of the lodges would not result in any adverse effects on scenic resources because this activity would be confined to existing, historic property and would not change their setting or character. The Many Glacier developed area is only visible from a few trail locations above the valley floor and does not dominate the view. There would be some minor localized visual disturbance in the areas where repairs were being done.

Scenic Air Tours — Aircraft are a visual intrusion into the natural scene and adversely affect the scenic resources of Glacier. Banning air tours would have a positive effect on scenic resources throughout the park because aircraft are a visual intrusion. Natural and cultural views would be restored. If air tour operators replaced tours over the park with new tours over areas adjacent to the park, there might be impacts on scenic resources over the Bob Marshall Wilderness complex, the Badger-Two Medicine area, the Blackfoot Indian Reservation, and the Whitefish Range.

Personal Watercraft — There would be no adverse impacts on scenic resources from a permanent ban on the use of personal watercraft in the park.

Winter Use — There would be no effects on scenic resources from expanded day use during the winter in Glacier.

Divide Creek Flood Hazard — Relocating development from the Divide Creek floodplain would have a positive impact on scenic resources in that area; however, further analysis would have to be completed to determine the effects on scenic resources in the areas where the development is moved.

West Side Discovery Center and Museum — Construction of a west side discovery center and museum near the T-intersection would not adversely affect scenic resources. Panoramic views would not be altered, but the views along the road would change. The facility would be designed to blend into the natural scene.

Conclusion. There would not be any permanent adverse impacts on scenic resources from these actions.

Cumulative Impacts. There would be no cumulative impacts.

Impacts on Aquatic Resources, Including Federally Listed Species

Management Strategy. The management strategy would have a positive effect on aquatic resources in the park because over 95 percent of the park would be managed as a wild area and aquatic reservoirs would not be manipulated. Aquatic reservoirs within the developed areas would be protected within that zone by mitigation. The developed areas would not be expanded beyond the visitor service zone.

Visitor Use on the Going-to-the-Sun Road — Further analysis would be conducted as part of the comprehensive use plan for the Going-to-the-Sun Road. The following effects could occur. Aquatic resources could be adversely affected by building pullouts, picnic areas, and trails in areas where there is no current use. Increasing use in these areas and increasing visitation could directly affect aquatic resources such as bull trout, westslope cutthroat trout, and the capshell limpet if people using streambank areas increased siltation. If additional pullouts, picnic areas, and short trails were constructed, mitigation to prevent increased siltation would protect aquatic resources. Without mitigation, runoff would be increased during the construction period. Small soil particles that do not settle readily reduce light penetration and hinder the growth of aquatic plants and the activities of sight-feeding fish. High concentrations can clog the gills of aquatic animals and interfere with respiration. Larger soil particles that settle in high concentrations

can smother bottom-dwelling organisms and fish eggs. Chronic low level sedimentation can have significant adverse effects on aquatic resources by reducing the diversity and amount of habitat available for aquatic insects and spawning. Mitigation such as revegetation would be conducted to prevent adverse effects on the federally listed bull trout, proposed capshell limpet, and the state-rare westslope cutthroat trout. Further consultation with the U.S. Fish and Wildlife Service during design would ensure protection of these species. Limitations on visitor use could benefit aquatic species by reducing the number of people using streamside areas, damaging vegetation and increasing sedimentation.

Preservation of the Going-to-the-Sun Road — During reconstruction of the Going-to-the-Sun Road mitigation would be used to reduce the impacts on aquatic resources. Without mitigation, aquatic resources could be adversely affected by increased sediment and accidental spills of petroleum and other chemical products. The impacts of sedimentation and increased turbidity on rivers and streams would be minimized during reconstruction by erosion control measures. Proper construction management procedures would be used to prevent contamination of adjacent rivers and streams from accidental petroleum spills by construction equipment. Revegetation following construction would reduce runoff.

Preservation of Historic Hotels and Visitor Services — Aquatic resources would be temporarily adversely affected during rehabilitation of the Many Glacier Hotel, Lake McDonald Lodge, and Rising Sun areas. Mitigation would be used to control the amount of sediment entering rivers, streams, and lakes in these areas.

Scenic Air Tours — Banning scenic air tours would have no impact on aquatic resources because the aircraft do not land in the park.

Personal Watercraft — A permanent ban on personal watercraft in the park would positively affect aquatic resources by protecting them from the adverse effects of personal watercraft.

Winter Use — Increased day use during the winter would not adversely affect aquatic resources because of the nature and extent of the activity.

Divide Creek Flood Hazard — Moving the development from the Divide Creek floodplain would have a positive effect on aquatic resources by removing activity from that area, and because flood abatement measures to control the creek would no longer be taken. This would allow the creek to be restored to its natural state and to follow its own course, which would improve habitat for aquatic resources.

West Side Discovery Center and Museum — Development of a new west side discovery center and museum near the T-intersection would not adversely affect aquatic resources because none are in the area that would be disturbed.

Conclusion. Removal of the development from the Divide Creek floodplain would all have a positive effect on aquatic resources. Construction activities could have an adverse effect, but mitigating measures would be taken to ensure protection of aquatic resources, including the bull trout, cutthroat trout, and capshell limpet. If visitor use was increased in previously undisturbed or little used areas, it could have an adverse effect. Managing visitor use through a comprehensive use plan for the Going-to-the-Sun Road would have a positive effect on aquatic resources.

Cumulative Impacts. There would be no cumulative impacts on aquatic resources.

Impacts on Soils

Management Strategy. The management strategy would not adversely affect soils throughout the park because over 95 percent of the park would be managed as a wild area. Therefore the majority of soils in the park would not be disturbed. Soils in trail corridors and backcountry campsites would be compacted due to use and primitive developments. The major developed areas would not be expanded beyond the visitor use zones. Soils in these zones have already been disturbed, so any additional use and development would not have an adverse effect on soils.

Visitor Use on the Going-to-the-Sun Road — Further analysis would be conducted as part of the comprehensive use plan for the Going-to-the-Sun Road. The following effects could occur depending on the outcome of that planning effort. The development of additional pullouts, picnic areas, restrooms, a large parking area at Logan maintenance pit, and short trails along the Going-to-the-Sun Road would result in adverse impacts on soils. There would be soil compaction at all sites developed for visitor use, and development would remove them from production of natural vegetation. Soils throughout the road corridor are moderately susceptible to weed invasion. Soils on the east side are more subject to erosion than on the west side, so during construction soils would be adversely impacted by erosion on the east side unless mats for stabilization, immediate revegetation, and other mitigation measures were used. The shallow soils in the Lunch Creek area would make revegetation and control of erosion critical during construction. These soils are suitable for trail development. The soils on the west side of Logan Pass are moderately suitable for waste disposal such as septic tanks; however, in the Road Camp area on the west side, the soils are shallow with a low water-holding capacity. On the east side of the pass soils are not suitable for waste disposal in the higher elevations due to the shallow depths and low rock content. Soils in the lower elevations on the east side around St. Mary Lake are moderately suitable for waste disposal. Limiting visitor use could benefit soils by reducing the compaction caused by visitors in areas adjacent to the road.

Preservation of the Going-to-the-Sun Road — The effects of reconstructing the Going-to-the-Sun Road would be similar to those in the no-action alternative.

Preservation of Historic Hotels and Visitor Services — Reconstruction of the hotels and visitor services in the park would have negligible impacts on soils because most of the soils in the developed area have previously been disturbed. The reconstruction work would primarily be confined to the structures themselves.

Scenic Air Tours — There would be no impacts on soils from scenic air tours because the aircraft do not land in the park.

Personal Watercraft — Banning personal watercraft permanently from all park waters would not affect soils.

Winter Use — There would be no impacts on soils as a result of expanded winter day use because soils are covered by snow in winter.

Divide Creek Flood Hazard — Removing development in the Divide Creek area would have a positive impact on soils. Previously compacted areas would be restored, increasing the ability of the soils to absorb water during floods. Seventy-seven acres of soils would be restored to productive use. Relocation of this development could adversely affect soils at the new location. Until that location can be selected, it is not known what kinds of soils would be affected. Further analysis would have to be done after the location was identified. The cessation of flood abatement activities would eliminate another cause of soil disturbance.

West Side Discovery Center and Museum — Construction of a west side discovery center and museum would adversely impact soils near the T-intersection by removing them from production. These soils are very susceptible to invasion by weeds when disturbed. If a new sewage treatment system was required to serve this facility, certain areas would not be adequate due to varying degrees of silt loam and rock content present throughout the area of the T-intersection. According to information in the 1981 Apgar Headquarters Area Environmental Assessment, soils to the west and east of the T-intersection are less suitable because they are loamy and have relatively low percolation rates and load-bearing capacities. Soils north of the T-intersection are better suited for construction of a visitor facility because of the low water table. According to the May 1995 soil survey, the area rated from low to moderate for septic systems.

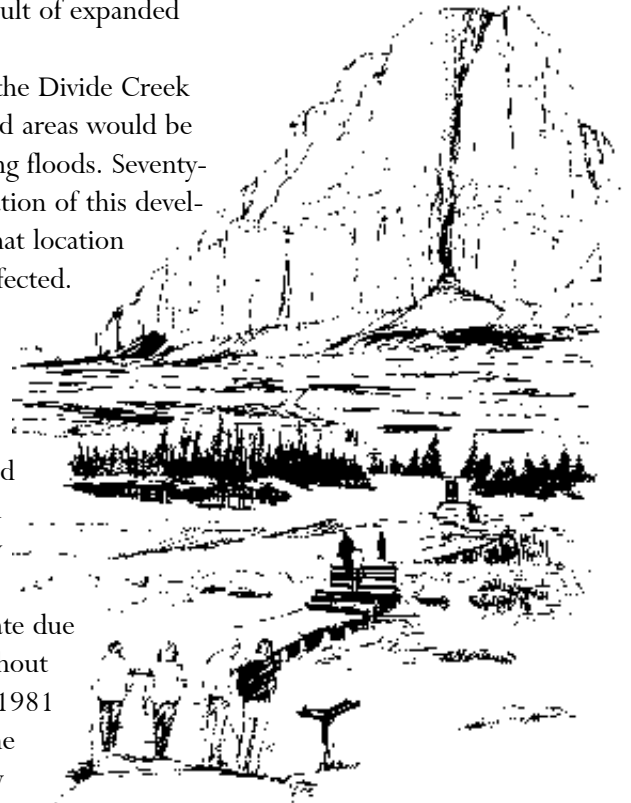
Conclusion. Impacts on soils would not be significantly adverse provided that mitigation was carried out during construction to prevent invasion by exotic species and reduce erosion and the resulting loss of soil. There would be some local disturbance if additional roadside pullouts were developed and also at the T-intersection.

Cumulative Impacts. There would be no cumulative impacts as a result of these actions.

Impacts on Vegetation, Including Species at Risk and State-Rare Plant Species

Species at Risk.

Management Strategy. The management strategy would have a positive effect on vegetation in the park because over 95 percent of the park would be managed as a wild area. Therefore the majority of the park's vegetation would not be disturbed except along trail corridors and backcountry sites. Vegetation in the areas would continue to be removed or trampled due to use and maintenance of trails and primitive developments. Developed areas would not expand beyond the visitor service zones. Vegetation in those areas would be affected by routine maintenance.



There could be adverse effects on vegetation in day use zones under the new management strategy. Some areas might change when use required widening trails and sanitation and similar facilities outside of developed areas. Further analysis would be conducted when more specific changes were identified. These would not be expected to be significant impacts.

The management strategy would not have an adverse effect on species at risk or state-rare plant species throughout the park, because actions would be taken to protect these species.

Visitor Use on the Going-to-the-Sun Road — Further analysis would be conducted as part of the comprehensive use plan for the Going-to-the-Sun Road. The effects would depend on the action chosen. If pullouts were added, modifying existing or constructing additional pullouts, picnic areas, and trails along the Going-to-the-Sun Road would not affect any known population of rare plants; however, additional use at these areas could have adverse impacts. Mitigation, such as changing the location of a pullout, modifying design, or limiting the areas open to visitors outside the developed area, would reduce adverse effects. Alpine glacier poppy and lens fruited sedge (species at risk) and three-flowered rush, little false asphodel, Mingan Island moonwort, lyre-leaf rockcress, and northern eyebright (state-sensitive species) could be affected. Each area would be surveyed prior to development of a site design to ensure that all plant locations were noted. The site design would avoid all known rare plants. As a last resort, rare plants that could not be avoided would be moved to suitable and similar habitat nearby. These actions would ensure that there would not be significant adverse impacts on rare plants. Marking the plant locations during construction would protect these species from accidental trampling. Decreasing visitor use would have beneficial effects.

Preservation of the Going-to-the-Sun Road — The same plants could be adversely affected by the reconstruction of the Going-to-the-Sun Road, as in the no-action alternative. Mitigation would be implemented to avoid adversely affecting these plants. It could include either marking the site to be avoided or, as a last resort, relocation of the plants to similar habitat. Transplanting of rare species has not been done at Glacier. The success rate of this mitigation would have to be evaluated further.

Preservation of Historic Hotels and Visitor Services — No known rare plant species would be adversely affected by the rehabilitation of the lodges. If new development was begun in the Many Glacier Valley or Lake McDonald historic district, the sites would be surveyed during the design phase to determine if any plants of concern were there. If they were found, the design would be modified or the plants would be relocated to similar habitat.

Scenic Air Tours — No species at risk or state- and park-rare plant species would be adversely impacted by banning scenic air tours.

Personal Watercraft — Rare plants would be protected from potential adverse impacts by the ban on personal watercraft. This action would contribute to protection of rare plants in the vicinity of Lake McDonald and St. Mary Lake because it would protect them from damage inflicted in shallow water by these machines.

Winter Use — No species at risk or state- and park-rare plant species would be adversely impacted by day use during the winter.

Divide Creek Flood Hazard — No species at risk or state- and park-rare plant species would be adversely impacted by the removal of the administrative, maintenance, and employee housing facilities at St. Mary in the floodplain of Divide Creek.

West Side Discovery Center and Museum — The construction of this facility could impact the rare velvetleaf blueberry. This impact would be mitigated by design or, as a last resort, relocation. No other species at risk or state- and park-rare plant species would be adversely impacted by construction of the west side discovery center and museum.

General Vegetation

Visitor Use on the Going-to-the-Sun Road — Further analysis would be conducted as part of the comprehensive use plan for the Going-to-the-Sun Road. If additional pullouts were recommended, the following effects could occur. Approximately 0.25 acre of vegetation per site along the road would be removed or adversely impacted for development (pullouts, trails, and picnic areas), but this would not be a significant adverse impact. The amount of vegetation would vary by the size of the site depending on the parking capacity, type of activity, resources at the site, the vegetation and soil conditions, and the degree of development already in place at each of the sites. Vegetation may be affected outside the immediate area as a result of social trails. Each area would be examined for trail development potential to minimize social trail development. Visitors would be instructed to remain on established trails. Vegetation along the road would be positively impacted by controlling the amount of trampling and damage that was done by visitors who stop on the side of the road. Since Logan maintenance pit is an already disturbed area and largely cleared of vegetation, vegetation would be minimally adversely impacted. Limiting visitor use would benefit vegetation by reducing the amount of roadside vegetation trampling.

Preservation of the Going-to-the-Sun Road — Some vegetation would be adversely affected along the Going-to-the-Sun Road during reconstruction, but this would probably not be significant. This loss of vegetation could be mitigated by restoration of all locations along the road that were adversely affected by construction.

Preservation of Historic Hotels and Visitor Services — Preservation of the national historic landmarks and national register properties that are operated by a concessioner should not adversely impact vegetation in the developed areas.

Scenic Air Tours — There would be no adverse impacts on vegetation as a result of banning scenic air tour activity because the aircraft do not land in the park.

Personal Watercraft — Permanently banning personal watercraft would not adversely affect rare plants or vegetation.

Winter Use — There would be no adverse impacts on vegetation as a result of providing for day use during the winter because no ground disturbance will occur and plants are dormant. The use would take place on existing roads and on snow.

Divide Creek Flood Hazard — Further analysis would have to be completed to identify new locations for the Divide Creek facilities. After the facilities were removed from the Divide Creek area, the site (approximately 77 acres) would be revegetated, resulting in a positive effect.

West Side Discovery Center and Museum — Vegetation, including lodgepole, spruce, and cedar, shrubs, forbs, and annuals would be removed to accommodate a new discovery center and museum. Ground disturbance and other construction-related activity would, for the short term, increase the chances for the introduction and spread of noxious weeds and other exotic plants. By creating new development at the site, unstable trees and hazard trees would be taken out, which would affect the diversity of the vegetation and change the forest composition and structure, possibly affecting nesting habitat.

Vegetation would be adversely affected by trampling by more visitors in the area. Construction of trails and designated viewing areas would decrease the amount of off-road trampling.

Conclusion. If the comprehensive use plan recommended the development of pullouts or modifications of existing pullout areas, this would result in loss of vegetation along the Going-to-the-Sun Road, but it would not be a significant adverse impact if the areas were already devoid of vegetation. The positive effect of this action would be a reduction of unmanaged off-road parking. By concentrating use at some of these pullouts or at a few designated trails, the proliferation of social trails would be reduced. Development in areas that have rare plant populations could adversely affect these resources. Mitigating measures such as avoiding the plants in these areas or replanting them in suitable habitat would be necessary. Where there were rare plants near or at natural stopping points for visitors, development could have a positive impact because trails would be designed to avoid the plants. Trampling of vegetation would be eliminated by providing trails to guide visitors away from rare plant locations. Any new development would result in the removal of hazard trees, which could affect forest community integrity.

Preservation of the national historic landmark overnight facilities and national register properties would not adversely impact vegetation or rare plant populations. However, if additional overnight accommodations were constructed in the Lake McDonald, Many Glacier, and Apgar areas, rare plant populations could be significantly adversely impacted. The plants would have to be relocated or the facilities would have to be sited and constructed in a way that would avoid harm to these plants.

Revegetation of 77 acres in the St. Mary headquarters area would have a positive impact on vegetation.

Cumulative Impacts. There would be no cumulative impacts.

Impacts on Wildlife, Including Federally Listed Threatened and Endangered and State-Rare Species

Management Zoning. The management strategy does not propose to expand development beyond the existing visitor service zones. The majority of the park would be maintained as a wild area. The emphasis would be on maintaining natural processes. Therefore, there would be no additional effects on wildlife, including threatened and endangered and state-rare species. Most of the valley bottoms are important habitat for wildlife, including grizzly bears. Areas adjacent to visitor service zones would be managed in favor of wildlife, resulting in a positive effect.

Bald Eagles.

Visitor Use on the Going-to-the-Sun Road — Further analysis would be conducted as part of the comprehensive use plan for the Going-to-the-Sun Road. The following effects could occur, depending on the recommendations of the comprehensive use plan. The removal of trees and other vegetation for the development of pullouts, picnic areas, and short trails along the east shore of Lake McDonald and the north shore of St. Mary Lake could result in the loss of eagle foraging habitat by removing perch trees and screening vegetation. A park wildlife biologist would participate in the site selection and design of these developments to avoid known foraging or roosting areas and minimize impacts on eagles. Informal pullouts (created by visitors without regard to potential eagle use) would be obliterated.

Operation of an expanded transportation system would not adversely affect bald eagles. Any additional parking facilities would not be located in known bald eagle nesting, foraging, or roosting areas.

As visitor use increased along the Going-to-the-Sun Road, more visitor use could occur in eagle habitat (such as along lakeshores), and the disturbance of bald eagles could increase. Nest site management plans, visitor use restrictions, and education efforts would be implemented to minimize these impacts.

Preservation of the Going-to-the-Sun Road — Reconstruction of the Going-to-the-Sun Road would primarily occur along the higher elevations outside eagle habitat. Reconstruction of the lower sections of the road could temporarily displace eagles depending on the location and the time of year of construction. No construction activity would occur within 0.5 mile of known nest sites but would occur within the larger home range of each nest as well as in foraging habitat. Restricting construction activities to certain times of the year and specific times of day would mitigate impacts. Restrictions on construction activity would be imposed during sensitive nesting periods to avoid adverse effects.

Preservation of Historic Hotels and Visitor Services — Bald eagles would not be adversely affected by the reconstruction of the Many Glacier Hotel and other visitor facilities. There are no known nest sites in the Many Glacier Valley, but bald eagles are occasionally observed in the valley, and nesting has been suspected. Should nesting be confirmed, a nest management plan would be developed to pro-

tect the site and mitigation would be developed to avert adverse impacts. Ongoing maintenance of historic visitor service facilities has the potential of disturbing eagles that are nesting and feeding in the Lake McDonald area. Monitoring would be continued and mitigation developed if necessary.

Scenic Air Tours and Personal Watercraft — Banning personal watercraft and scenic air tours throughout the park would have a positive effect on bald eagles by decreasing the potential for human disturbance.

Winter Use — Providing winter use opportunities at Lake McDonald and St. Mary Lake would increase the number of visitors in this area during the most sensitive time of the eagle nesting period (March-May) as well as during the stressful winter period. Human disruption of early nesting activity and incubation would increase the chances of nest abandonment or failure. Increased visitor use would also increase disturbance or displacement of birds during critical winter and migration periods. Visitor use restrictions, including temporary site- and time-specific closures, would be implemented.

Divide Creek Flood Hazard — Removal of the administrative and maintenance facilities and employee housing from the floodplain of Divide Creek in St. Mary could have some beneficial effects if bald eagles began to forage along Divide Creek. Depending on where the new facilities were relocated, bald eagles could be affected. Further analysis would be conducted after the potential facility relocation sites were identified.

West Side Discovery Center and Museum — Construction and operation of a west side discovery center and museum would not adversely affect bald eagles. This visitor facility would be farther away from eagle use areas along the Lake McDonald lakeshore and outlet than the current Apgar contact station. Actions would still be taken during critical use times to minimize impacts from human activity in those areas.

Gray Wolves.

Visitor Use on the Going-to-the-Sun Road — Further analysis would be conducted as part of the comprehensive use plan for the Going-to-the-Sun Road. If additional pullouts were recommended, the following effects could occur. Direct and indirect effects on wolves from increased opportunities (pullouts, short trails, picnic areas, and transportation system parking) along the Going-to-the-Sun Road in the St. Mary Valley, where there is evidence that wolves are recolonizing. Increasing development along this road could displace elk that feed in the meadows. This could in turn reduce prey availability if prey numbers declined as a result of lost foraging opportunities in productive meadow areas or if animals were displaced to areas outside the park, where they could be killed by hunters. It is anticipated that displacement effects would be minor and that elk would habituate to increased use. However, a review of case incident reports that include information about this elk population indicates that this particular population would be unlikely to habituate. If elk and deer became habituated, they might be less vulnerable to wolf predation because wolves are less likely to habituate to increased

human use; therefore, the habituation of ungulates could result in reduced prey availability.

Additional developments would be limited in their placement, would primarily use already popular use areas along the road, and would not be sited in meadows or riparian areas. A park wildlife biologist would participate in the site selection and design of these developments to minimize impacts on wildlife. Limits on visitor use could have beneficial effects on wolves.

Preservation of the Going-to-the-Sun Road — Reconstruction of the Going-to-the-Sun Road could temporarily displace wolves and prey species near construction, although most of the reconstruction would take place outside of known wolf habitat. Wolves in less used areas of the park could be adversely affected if visitors were displaced from the Going-to-the-Sun Road corridor during construction and temporarily began using other areas of the park.

Preservation of Historic Hotels and Visitor Services — Rehabilitation of the Many Glacier Hotel and other visitor facilities could temporarily displace wolves and prey species near construction sites, although most of the reconstruction would occur outside of known wolf habitat. The wolves would temporarily avoid the building areas during reconstruction.

The area surrounding the Many Glacier development is wolf habitat, and wolves frequent this area after the facilities are closed in the fall and visitation drops. Construction activity in this area in any season except summer would temporarily displace wolves.

Scenic Air Tours and Personal Watercraft — Banning scenic air tours (especially helicopters) and personal watercraft would be beneficial for wolves by decreasing the potential for human disturbance.

Winter Use — Winter day use visitation in the Many Glacier, St. Mary, and the lower portions of the North Fork Valley is generally low but is expected to increase. A larger increase would be expected than under the no-action alternative because of more consistent plowing of access roads. Wolves tend to avoid humans and areas near high use roads and development. With gradually increasing day use, primarily along roads and trails, wolves would probably avoid access roads and ski trails, at least when people were present, but would probably still use the general area if prey were available.

Ungulate wintering habitat exists in the valleys inside and outside the park. Increased human presence could affect prey species distribution and abundance. Ungulates have varied responses to human activity. In Alberta, moose numbers were negatively associated with cross-country ski trails, although elk numbers were unaffected (Ferguson and Keith 1982). Other studies found that large animals were displaced from trails or roads, but that there was a negligible effect on distributions and movements (Chester 1976; Aune 1981 in Boyle and Samson 1985; Schultz and Bailey 1978; Cole 1983). Animals would probably avoid roads and trails (at least when humans were present). With increasing but similar patterns of use concentrated along roads and trails and the availability of areas of cover and forage, human disturbance would probably have a negligible effect on ungulate distribution and movements. However, if prey species were displaced to less produc-

tive areas or to portions of their winter range outside the park (where they would be hunted), this would reduce prey availability for wolves. The severity of this reduction would depend on habitat conditions and prey population status and trends.

Wolves and prey species, even if not displaced from habitat, would be subject to additional human-induced stress during an already vulnerable time in the winter. Animals remaining in the area would expend more energy avoiding intrusion, and this could affect survival and reproduction. Potential consequences would probably be aggravated by natural effects such as severe winters.

The extent of potential impacts on wolves and prey species could be reduced through monitoring visitor use and wildlife populations and implementing visitor use restrictions as necessary. These could include restrictions on off-trail travel, specific area closures, or party size limitations, as well as visitor education and law enforcement. With these precautions it is not anticipated that wolves would be discouraged from using or establishing territories in the Many Glacier and St. Mary areas.

Divide Creek Flood Hazard — Removing facilities from the Divide Creek floodplain and restoration of the area would provide additional wintering habitat for prey species, which could have a beneficial effect on wolves. Relocation of the Divide Creek facilities could impact wolves, depending on their location. Further analysis would be conducted as part of the site-selection process.

West Side Discovery Center and Museum — Construction of the west side discovery center and museum north of the T-intersection would probably not have an adverse affect on wolves unless wolf use in the McDonald Valley increased. Wolves could be indirectly adversely affected if prey species or their habitat were lost in this area. The extent would be dependent on the specific location of the facilities. Placing these facilities close to existing development would ensure that impacts would be negligible.

Grizzly Bears.

Visitor Use on the Going-to-the-Sun Road — Further analysis would be conducted as part of the comprehensive use plan for the Going-to-the-Sun Road. If additional pullouts were recommended, the following effects could occur.

Increasing visitor use resulting in more pullouts, picnic areas, and trails along the Going-to-the-Sun Road could adversely affect grizzly bears. Impacts could include increased habituation through human contact and food attractants or displacement, which would result in an effective decrease in usable habitat. Increased habituation could lead to increased human/bear contacts and conflicts that could ultimately result in the removal or death of bears. Additionally, greater development in the road corridor could create a barrier to grizzly movement. Bears could alter their use of areas near roads from daylight to night, allowing some continued use of habitat near roads and crossing opportunities. Further analysis and studies would be completed to determine the specific locations, numbers, and sizes of

new developments based on minimizing impacts on bears and avoiding known grizzly bear crossing corridors.

Transportation system parking could indirectly affect bears if visitors used parking and bus pickup areas in the early morning or evening when bears are most active. This could result in increased encounters between people and bears. Studies on bear road crossings would be used to site the parking areas. Parking at Logan maintenance pit would result in the loss of suitable summer habitat. Bears would be displaced from this area or possibly would become habituated to visitor use. Parking at Sun Point would probably not affect bears because the area is already developed. Increasing visitor use could have an effect on bears through increased bear/human encounters. Limiting visitor use could benefit bears by decreasing bear/human encounters.

Preservation of the Going-to-the-Sun Road — Reconstruction of the Going-to-the-Sun Road would temporarily displace bears from areas under construction. Reconstruction over a shorter timeframe than in the no-action alternative would benefit bears by reducing the overall length of construction disturbance along the road. Grizzly bears in less frequented areas of the park could be adversely affected if visitors were displaced from the Going-to-the-Sun Road corridor and began to use other areas such as Many Glacier, Two Medicine, the North Fork, and Cut Bank in greater numbers.

Preservation of the Historic Hotels and Visitor Services — Rehabilitation of the Many Glacier Hotel and Swiftcurrent Motor Inn during the summer would probably not affect grizzly bears because the Many Glacier Valley is heavily used by summer visitors. Adverse effects would be more likely during the spring and fall, since bears are accustomed to decreased visitor use during these periods, and the bears are either coming out of or preparing to go into hibernation. Rehabilitation of other areas of the park would temporarily affect bears during the construction period.

Scenic Air Tours and Personal Watercraft — Banning scenic air tours (especially helicopters) and personal watercraft would benefit bears by decreasing the potential for human disturbance.

Winter Use — Increased winter use in the park would not be likely to adversely affect bears because they hibernate between December and March, although there is evidence that a few bears are active in this period. Grizzly bears might be affected if human use of the park increased, during stressful, critical periods in fall (before December) when they are preparing for hibernation or in spring (after March) when they are searching for food after emerging from their dens. Increased visitor use during these periods, which would be enhanced by road plowing, could result in more encounters or attractants, which could adversely affect bear behavior (displacement or habituation) or reproductive success. Increased encounters could also result in the removal or death of bears.

Bears in the North Fork area are active throughout the winter. Increased visitor use there would be likely to affect them adversely by increasing encounters during a stressful period of the year.

Divide Creek Flood Hazard — Removing facilities from the Divide Creek floodplain and reclaiming the area would provide additional bear habitat. Beneficial effects would extend beyond the boundaries of the reclaimed area because employee use of the surrounding area would decline. Relocation sites for the Divide Creek facilities could impact grizzly bears, depending on their location. Further analysis would be conducted as part of the site selection process.

West Side Discovery Center and Museum — Constructing the west side discovery center and museum north of the T-intersection would result in a minimal loss of habitat. Grizzly bears and other wildlife travel to and from the Apgar Mountains and Belton Hills through a valley corridor between Apgar and West Glacier. This is the primary travel corridor available because of development in and outside of the park.

Peregrine Falcons.

Banning scenic air tours, especially helicopter flights, would benefit peregrine falcons. According to Glacier National Park biologists, there have been documented migrations through the park. Although no nests have been documented in the park, there are active nests in the general area, and future nesting is anticipated due to increasing populations. Banning scenic air tours might improve high-elevation habitat for potential falcon nesting. There would be no effect from other actions in this alternative.

Federally Proposed Species

Lynx.

Visitor Use on the Going-to-the-Sun Road — Further analysis would be conducted as part of the comprehensive use plan for the Going-to-the-Sun Road. If additional pullouts were recommended, it is not known how lynx would be affected by construction of facilities in areas or corridors of development and concentrated use. There is little documentation of lynx using roadside areas in summer. Limiting visitor use would have no effects on lynx.

Preservation of the Going-to-the-Sun Road — Lynx might be temporarily adversely affected by increased visitation in less-used areas of the park during the reconstruction of the Going-to-the-Sun Road. If reconstruction was done in winter, mitigation would be required to minimize adverse effects.

Preservation of Historic Hotels and Visitor Services — Lynx would probably not be affected by construction of facilities in areas or corridors of development and concentrated use; there is little documentation of lynx using such areas.

Scenic Air Tours — Lynx could benefit from a ban on scenic air tours because the potential for human disturbance would be decreased. Lack of information about lynx numbers and distribution precludes a more thorough assessment.

Personal Watercraft — Lynx might benefit from a ban on personal watercraft on Lake McDonald, Lake Sherburne, and St. Mary Lake, though benefits might be negligible.

Winter Use — Based on very limited information on lynx use in the park, they could be adversely affected if winter use increased appreciably in areas like the Lake McDonald Valley, the east side of the park, and other suitable coniferous forest habitats. Most lynx sightings in winter have been along park roads.

Divide Creek Flood Hazard — Removing facilities from the Divide Creek flood hazard zone and reclaiming the area could provide additional suitable habitat for lynx. Relocation sites for the Divide Creek facilities could impact lynx depending on their location. Further analysis would be conducted as part of the site selection process.

West Side Discovery Center and Museum — Construction of the west side discovery center and museum north of the T-intersection could remove suitable lynx habitat. By placing these facilities close to existing development, there would be negligible effects.

State-Listed Rare Species

Common Loon.

Loons would benefit from a ban on personal watercraft on Lake McDonald, Lake Sherburne, and St. Mary Lake. Loons would also benefit from a ban on scenic air tours because the potential for human disturbance would decrease. Construction of pullouts, trails, or picnic areas along lakeshores could affect loons, depending on location. Further analysis would be conducted as part of the site selection process to mitigate impacts on nesting areas.

Harlequin Duck.

Harlequin ducks could be adversely affected by construction of pullouts, trails, or picnic areas along McDonald Creek depending on location. Further analysis would be conducted as part of the comprehensive use plan for the Going-to-the-Sun Road. The use of the Logan maintenance pit for transportation system parking could affect harlequin ducks because it is a breeding area, and runoff from the parking area could negatively affect water quality. Parking lot design would include mitigation of water quality degradation. Limiting visitor use would benefit harlequin ducks by decreasing disturbance in their habitat.

Osprey.

Osprey would benefit from a ban on personal watercraft on Lake McDonald, Lake Sherburne and St. Mary Lake. Osprey would also benefit from a ban on scenic air tours because the potential for human disturbance would decrease.

Northern Goshawk, Cooper's Hawk, Golden Eagle, Merlin, and Prairie Falcon.

These birds would not be adversely affected by the preferred alternative. They would benefit from a ban on scenic air tours because disturbance would decrease.

Trumpeter Swan, Northern Pygmy Owl, Barred Owl, Great Gray Owl, Long-Eared Owl, Boreal Owl, Northern Saw-Whet Owl, Northern Hawk-Owl, Pileated Woodpecker, Olive-Sided Flycatcher, Western Bluebird, LeConte's Sparrow, Clay-Colored Sparrow, Brewer's Sparrow, and Gyrfalcon.

There is not a great deal of information available about these species, so it is not possible to predict the full effects of the actions. All of the species could be affected to a limited degree by loss of habitat from construction and disturbance from increased visitor use if additional pullouts were constructed. Placing limits on visitor use would benefit these species by decreasing disturbance in their habitat. They also could benefit from a ban on scenic air tours because human disturbance could be decreased. Further analysis would be conducted as part of the comprehensive use plan for the Going-to-the-Sun Road.

Northern Bog Lemming.

Northern bog lemming would probably not be adversely affected by any of the preferred alternatives. Impacts are not expected to occur in lemming habitat.

Marten, Fisher, and Wolverine.

Development and visitor use would continue to reduce the habitat suitability for these species. Further analysis would be conducted as part of the comprehensive use plan for the Going-to-the-Sun Road. Increasing winter use by visitors could further disturb these species, although even the current, generally low levels of visitor use may have already resulted in some displacement. This probably would be most likely for wolverines, which are very sensitive to human presence. If increasing winter use extended into higher elevations, wolverines could be affected by disturbance at late winter den sites; animals could abandon dens when disturbed during this sensitive period.

Conclusion. Bald eagles could be negatively impacted by increasing levels of human use near Lake McDonald, St. Mary Lake, and other lakes where they nest. Some of these impacts could be mitigated by temporary area closures around nest sites. Monitoring would continue and additional mitigation would be designed and implemented if necessary to protect the species. As use increased during winter months, wolves and their prey could be displaced in the Many Glacier and St. Mary Valleys and in the lower portion of the Lake McDonald Valley. Grizzly bears could be negatively impacted by increasing levels of visitor use, by visitor center construction, and by reconstruction along the Going-to-the-Sun Road. Impacts would include habituation of some bears, disruption of travel patterns, and displacement. Many other species would be affected to some degree by increased

visitor use in the Going-to-the-Sun Road corridor and by increased winter use. Grizzly bears, wolves, eagles, loons, osprey, and other species would benefit from the reduced human disturbance resulting from bans on personal watercraft and scenic air tours and from limits on visitor use, if implemented.

In accordance with section 7 of the Endangered Species Act, the National Park Service has determined that the preferred alternatives for visitor use on the Going-to-the-Sun Road, preservation of the Going-to-the-Sun Road, preservation of historic hotels and visitor services, winter use and the Divide Creek flood hazard probably would not likely adversely affect any federally listed species and that the preferred alternatives for scenic air tours and personal watercraft would have no effect on federally listed species. This determination was reached because most of the reconstruction would take place in already developed areas inside the park. Additional plans would be developed in more detail and submitted to the U.S. Fish and Wildlife Service for that agency's review, and additional mitigation would be identified in consultation with the U.S. Fish and Wildlife Service. The *Draft Environmental Impact Statement* was submitted to the U.S. Fish and Wildlife Service for concurrence with the determinations of the National Park Service.

Cumulative Impacts. The *Grizzly Bear Recovery Plan* for the Northern Continental Divide Grizzly Bear Ecosystem Management Area, as developed by the U.S. Fish and Wildlife Service and the Interagency Grizzly Bear Committee (in which the park staff participates), outlines the park's responsibility for actions that are necessary for the conservation and recovery of the grizzly bear. Implementation of this plan would result in cumulative benefits for the recovery of the grizzly bear.

The actions called for in the *Montana Bald Eagle Management Plan*, completed by state and federal agencies and some private landowners, would result in positive cumulative impacts on the recovery of the bald eagle in the ecosystem. The management goal for Montana is to provide secure habitat for bald eagles and to maintain a viable, healthy, and self-sustaining population as close to peak level as possible. However, productivity (the number of young produced and fledged) of eagle nests in the park is poor and below the level established for recovery of the species. The low productivity is attributed to a relatively short nesting season, decline in native fish populations, and recreational facility development and associated use in the nesting territories.

The implementation of actions called for in the *Northern Rocky Mountain Wolf Recovery Plan* would result in positive cumulative impacts for the recovery of the gray wolf. A viable prey base in the park and secure denning areas are particularly important. Disruption of prey, particularly on winter range, coupled with continued development outside the park and problems with landowners, could have adverse cumulative effects.

Management actions as proposed in the preferred alternative and actions outside the boundary such as coal mining and logging in British Columbia and on national forest land in the U.S., increasing private development in the North and Middle Fork Valleys and in the corridor between West Glacier and Columbia Falls, increasing train traffic and trains carrying hazardous materials, and recent gas and

oil leases and private development on the Blackfeet Indian Reservation could cumulatively affect wildlife populations and habitat. Because the park is not large enough to support sustainable populations of all these species, the impacts could be cumulative and adverse. Cumulative impacts on fall, winter, and spring habitat and use could be greater in this alternative than in the no-action alternative. Monitoring of all these species would continue, and mitigation would be developed if necessary to reduce cumulative adverse impacts.

Impacts on Wildlife Other than Listed Species

Visitor Use on the Going-to-the-Sun Road — Further analysis would be conducted as part of the comprehensive use plan for the Going-to-the-Sun Road. Depending on the recommendations, the following effects could occur. Increased use of the Going-to-the-Sun Road and the new pullouts, trails, and picnic areas along the road would result in further loss of habitat and disturbance of various wildlife species that live or travel close to the road. Ungulates would probably be displaced from areas adjacent to the road, but their distribution would probably not be affected. There would be minor displacement of ungulates along roadsides. Habituated ungulates might have to be trapped and relocated from some roadside areas. Limiting visitor use might benefit wildlife by decreasing encounters and disturbance of habitats.

Preservation of the Going-to-the-Sun Road — Reconstruction of the Going-to-the-Sun Road would temporarily adversely affect wildlife species that live or travel near or cross the road. Wildlife would be temporarily displaced during construction. No long-term negative effects are expected. Wildlife could be temporarily adversely affected by potential increased visitation in other areas of the park during reconstruction.

Preservation of Historic Hotels and Visitor Services — Rehabilitation of visitor facilities in the park would have temporary adverse effects on wildlife during construction, temporarily displacing wildlife from these areas or causing increased habituation. Construction during the summer would be less likely to adversely affect wildlife. Adverse effects would be more likely during the spring and fall because wildlife are accustomed to decreased visitor use during these periods, and many are more vulnerable to disturbance. For example, bighorn sheep migrate through the valley during spring and fall, using the same routes to reach seasonal range each year. Bighorns have difficulty locating alternate routes, so if these routes were restricted or closed, use of traditional ranges would be reduced or eliminated. Some seasonal and time-of-day limitations on construction could be implemented.

Scenic Air Tours — Banning scenic air tours could benefit wildlife by reducing the potential for disturbance.

Personal Watercraft — Wildlife, particularly waterfowl, shorebirds, and other animals that use shorelines would benefit from banning personal watercraft because the ban would reduce disturbance.

Winter Use — Increased winter use in the lower elevations of the park would adversely affect wildlife that are active in the winter, displacing them from areas near roads, ski trails, and developed areas. It could also result in habituation and could lead to more conflicts with habituated wildlife such as white-tailed deer, bighorn sheep, or mountain lions. Consistent plowing of access roads could increase illegal hunting in the park. Wildlife would be subject to additional human-induced stress during an already vulnerable time in the winter. Animals remaining in the area expend more energy avoiding intrusion, and this can affect survival and reproduction. Potential effects would probably be compounded by natural stresses such as severe winters. This alternative would have a greater potential to impact wildlife than the no-action alternative because human activity would increase during winter when many animals are vulnerable to disturbance. The extent of impacts on wildlife could be reduced through monitoring of visitor use and wildlife populations. Restrictions on off-trail travel, closures of specific areas, and limitation of party sizes, as well as visitor education and law enforcement, would also reduce impacts.

Divide Creek Flood Hazard — Removing facilities from the Divide Creek flood hazard area and reclamation of the area would provide additional habitat for wildlife species that are currently excluded or have limited use of the area. Impacts on wildlife would depend on the sites chosen for relocation. Further analysis would be completed as part of the site selection process.

West Side Discovery Center and Museum — Construction of the west side discovery center and museum north of the T-intersection would result in the loss of wildlife habitat. The extent of the loss would be dependent on the specific location of the facility. The general area is used as an elk calving ground, and it is a foraging area or travel corridor for many other species such as mule deer, white-tailed deer, black bears, and mountain lions. By placing these facilities close to existing development, the impacts would be negligible.

Conclusion. Construction associated with expanding day use opportunities, visitor center construction, and road rehabilitation would result in the temporary disturbance and displacement of many species and a small amount of habitat loss for some species. Increasing winter use could cause displacement and stress to such animals as deer, elk, and mountain lions that concentrate in lower elevation valleys during the winter. Many species, especially those using lake and lakeshore areas or that summer in high elevations, would benefit from the reduced human disturbance resulting from the banning of personal watercraft and scenic air tours.

Cumulative Impacts. Management actions as proposed in the preferred alternative and actions outside the boundary such as timber harvest activities on Forest Service lands, coal mining in British Columbia, increasing private development in the North and Middle Fork Valleys and in the corridor between West Glacier and Columbia Falls, increased train traffic carrying hazardous materials, and gas and oil leases and private development on the Blackfeet Indian Reservation, could cumulatively affect wildlife populations and habitat. Because the park is not large enough to support sustainable populations of all these species, the impacts could be cumulative and adverse. Cumulative impacts on fall, winter, and spring habitat could be greater in this alternative than in the no-action alternative.

Impacts on Air Quality

Management Zoning. The management strategy would not adversely affect air quality throughout the park because 95% of the park would be managed as a national area and no actions would occur that would permanently decrease air quality.

Visitor Use on the Going-to-the-Sun Road — According to the *Transportation Plan* (NPS 1990d), traffic forecasting was done for the Going-to-the-Sun Road. “Based on data, trends, and forecasts reviewed to date, traffic forecasts for various segments of the Going-to-the-Sun Road have been developed. . . . Based on these forecasts, high use period average daily traffic (ADT) is projected to reach 6,080 per day by year 2007 from the west entrance to Camas Road. Peak day volumes may be between 7,200 to 7,800 vehicles per day” (p. 26 of the *Final Transportation Plan*). However, auto emissions are not good for the park’s air quality, but over the last 20 years emissions from vehicles have improved due to EPA standards and requirements. If auto use increases in the park, and emissions continue to decrease, the net result would be a “no net gain” in auto pollutants to the environment. Present monitoring does not indicate an increase in nitrous oxide. Although the amount of carbon monoxide emitted would continue to increase as visitation increased, this would not affect the state’s ability to maintain conformity with the required air quality standards. The effects on air quality from the projected increase in visitor traffic after the major rehabilitation of the Going-to-the-Sun Road were analyzed. Emissions estimates for nitrogen oxides (NO_x) and carbon monoxides (CO) from vehicles were calculated for four different scenarios to demonstrate that the projected increase in traffic would not have a significant effect on air quality in the park.

The emissions of NO_x and CO for the different traffic volume scenarios were calculated with the Environmental Protection Agency’s MOBILE-5b emissions model. Daily emissions were calculated for three different years: 1989, 1998, and 2007. The average daily traffic volumes for the different years are as follows: 1989, 5,040 vehicles; 1998, 5,500 vehicles, and 2007, 6,080 vehicles. Emissions from a projected peak daily traffic of 7,800 vehicles in 2007 were also calculated. It was assumed that traffic on the lower elevation parts of the road traveled at 40 miles per hour (mph) for 31 miles and that traffic on the upper parts of the road traveled at 25 mph for 21 miles. The mix of the different types of vehicles using the Going-to-the-Sun Road was supplied from traffic surveys conducted for the park in 1992.

It was assumed that 74.2 percent of the vehicles were automobiles; 7.9 percent, vans; 7.8 percent, light duty gas trucks; and 4.4 percent, heavy-duty gas RVs. It also was assumed that 0.9 percent were heavy-duty diesel buses and 4.4 percent were motorcycles. The emission calculations are considered “worst case” because it was assumed that no vehicle was in an emissions testing program; thus, the anti-tampering and inspection/maintenance (I/M) options in the model were not engaged. The reformulated gas option was not employed, because the fuel for the vehicles was assumed to have been purchased locally.

The analysis indicates that despite the increased volume in traffic, for an average day, the emissions would decrease in the future years. This is due to the increased emission control devices on vehicles, which reduce total emissions despite the increased traffic, as shown in table 5.

Additional analysis would be completed as part of the comprehensive use plan for the Going-to-the-Sun Road.

TABLE 5: EMISSIONS CALCULATIONS

Year	Vehicles per Day	No _x Tons per Day	CO — Tons per Day
1989	5,040	0.64	9.58
1998	5,500	0.58	5.64
2007	6,080	0.56	2.61
2007	7,800	0.71	3.35

Preservation of the Going-to-the-Sun Road — Road construction would be done in accordance with guidelines and regulations to ensure continued maintenance of national air quality standards for motor vehicle-related pollutants such as ozone and carbon monoxide. Operation of a batch plant in or near the park during repaving would contribute to the increase in particulate matter on the west side of the park. Consultation and approval by the state would be required prior to placement and operation of a batch plant.

Preservation of Historic Hotels and Visitor Services — Air quality would not be adversely affected by rehabilitation or new construction associated with the historic hotels and visitor services inside the park. Air quality could be temporarily adversely affected during construction, but this would be of a short duration and would not have permanent effects.

Scenic Air Tours — Banning scenic air tours parkwide would have a positive effect on air quality in the park.

Personal Watercraft — Banning personal watercraft throughout the park would help to protect air quality in localized areas.

Winter Use — Under certain atmospheric conditions air quality might decrease as the result of a buildup of ozone and particulate matter, but overall there would be no significant impact.

Divide Creek Flood Hazard — Relocation of the development in the Divide Creek floodplain would not adversely affect air quality. There could be temporary adverse effects while the development was being removed from the area.

West Side Discovery Center and Museum — Construction of a new west side discovery center and museum would have temporary adverse effects on air quality during construction due to the operation of construction equipment and movement of soils. This would be of a short duration and would not have long-term adverse effects on air quality.

Conclusion. The increased traffic due to the major rehabilitation of the Going-to-the-Sun Road would not have a significant effect on air quality in the park and would preserve the park's attainment status of the National Ambient Air Quality Standards for NO₂ and CO and the Prevention of Significant Deterioration class I increment for NO₂. Overall the effects on air quality would be minor. No state or federal air quality standards would be expected to be exceeded. There might be temporary adverse impacts during construction because of dust, but they would not be significant.

Cumulative Impacts. Increases in park visitation combined with projected increases in the population on the west side of the park could cumulatively affect air quality in the region by increasing total vehicle emissions regionally.

Impacts on Natural Sounds

Management Strategy. The management strategy would have an indirect beneficial impact on natural sounds because over 95 percent of the park would be managed as a wild area and actions taken within that area would not interfere with the ability to hear natural sounds. The developed areas would not be expanded beyond the visitor service zones. Within these areas, noise levels may at times interfere with the ability to hear natural sounds due to the high numbers of visitors and vehicle traffic.

Visitor Use on the Going-to-the-Sun Road — Further analysis would be conducted as part of the comprehensive use plan for the Going-to-the-Sun Road. The following effects could occur. Modification of existing and construction of additional pullouts would temporarily increase noise levels in the park, reducing the natural quiet in the park. Limiting visitor use would decrease noise in the park.

Preservation of the Going-to-the-Sun Road — Noise levels would temporarily increase in the park along the road corridor and adversely affect natural sounds.

Preservation of Historic Hotels and Visitor Services — Rehabilitation of the historic hotels and potential new development would increase noise levels in the park from construction activity. This would be of a short duration, would take place over a number of years, and would not result in permanent adverse impacts on natural sounds and the ability to hear them.

Scenic Air Tours — This action would have a positive effect on natural sounds in Glacier National Park, removing a source of noise that is now common during the summer, spring, and fall due to engine and rotor noise. Natural sounds would indirectly be adversely affected by increased air tour activity outside the park and might be directly affected over adjacent areas such as the Bob Marshall Wilderness complex and the Blackfeet Indian Reservation.

Personal Watercraft — Permanently banning personal watercraft would protect natural sounds.

Winter Use — Natural sounds could be adversely affected, but due to the nature of the activities and locations of the use, the effects of increased noise would be negligible.

Divide Creek Flood Hazard — Removing facilities from the Divide Creek floodplain would increase noise levels and affect natural sounds temporarily. Restoration of the area would restore natural sounds that are no longer heard. Relocation of the facilities and their effects on natural sounds in the new areas would have to be assessed after locations were selected.

West Side Discovery Center and Museum — Development of a west side discovery center and museum would temporarily affect natural sounds during construction. Operation of the facility and resulting visitor use in the area would increase noise levels in an area that is now undeveloped.

Conclusion. Noise levels would increase in the park during reconstruction of the Going-to-the-Sun Road, rehabilitation of the historic hotels, and construction of new developments. Noise levels would also increase while the development near Divide Creek was removed. However, all of these activities would be of a short duration and would not permanently adversely affect natural sounds in the park. Banning scenic air tours and personal watercraft would have a significant positive effect on natural sounds in the park.

Cumulative Impacts. Natural sounds would be indirectly adversely affected by increased air tour activity outside the park as the result of the banning of scenic flights over the park. There would be no other cumulative impacts.

Impacts on Biological Diversity

Management Strategy. The management strategy would have an indirect beneficial impact on biological diversity because over 95 percent of the park would be managed as a wild area, and the major developed areas would not be expanded beyond the visitor service zones.

Visitor Use on the Going-to-the-Sun Road — Further analysis would be conducted as part of the comprehensive use plan for the Going-to-the-Sun Road. If additional pullouts were recommended, the following effects could occur. The modification of existing or development of additional pullouts, picnic areas, parking, and trailheads along the Going-to-the-Sun Road might not adversely affect biodiversity by contributing to additional habitat fragmentation. The vegetation disturbance or removal that often accompanies construction could also provide optimal conditions for exotic species to grow and spread if not contained by aggressive management actions. The presence of exotic species reduces biodiversity in plant communities.

Biological diversity could also be reduced if new roadside facilities result in damage to or removal of portions of sparsely distributed plant communities such as the mature cedar-hemlock forests in the McDonald Valley.

The development of additional pullouts, picnic areas, and trailheads along the Going-to-the-Sun Road has the potential to disturb feeding, nesting, or roosting bald eagles and to reduce the chances for reproductive success. Similarly the development of new trails along the Going-to-the-Sun Road has the potential to displace grizzly bears and to increase human-bear encounters. These actions could adversely affect biodiversity in the long run. Wildlife travel corridors could be dis-

rupted and the use of feeding areas could be precluded. Limiting visitor use could benefit biodiversity by limiting habitat disturbance and reducing the number of encounters.

Preservation of the Going-to-the-Sun Road — Reconstruction activities could have a minor impact on biodiversity by displacing wildlife from the reconstruction areas and by obstructing wildlife movement and migration. This could be especially true for grizzly bears that use high elevation habitat along the road during the time when reconstruction would occur. Diversity of roadside plant communities could also be slightly impacted because ground disturbance provides optimal growing conditions for exotic plants. Impacts on plant biodiversity would be partially mitigated by aggressive management actions, including prompt revegetation with native species and the use of selective herbicides.

Preservation of Historic Hotels and Visitor Services — Plant community diversity should not be impacted by preservation activities associated with the maintenance of the hotels and lodges. The construction of new lodging facilities could indirectly impact plant community diversity by removing vegetation during construction and by trampling resulting from increasing numbers of people using areas adjacent to these facilities.

Scenic Air Tours — The cessation of scenic air tours would have no impact on vegetation community biodiversity in or near the park. Such cessation could have a positive impact on populations of certain animals, especially ungulates (such as elk) and carnivores (such as grizzly bears) that feed at high elevations during the summer, and nesting raptors. Another positive benefit would be that the movement patterns of eagles, ducks, and other species that move in and out of the park along the Middle Fork of the Flathead River would not be interrupted by low-flying aircraft.

Personal Watercraft — The permanent ban on PWC use in the park would benefit park biodiversity by eliminating a potential source of wildlife harassment and a form of recreation that could be destructive to aquatic ecosystems (see description of PWC impacts under no action).

Winter Use — Increased and more dispersed winter use would have little impact on the diversity of plants or plant communities in the park because of the protection snow provides and because plants are dormant during winter. The proposed changes could result in long-term impacts on animal biodiversity. Expansion of plowing during the winter in some of the lower valleys could affect species that concentrate where there is less snow and where food is more likely to be found. This is especially true for ungulates such as elk and deer and their predators, such as wolves and cougars. The increased human presence that would result from the additional plowing could result in temporary displacement of the animals from their winter ranges and additional energy consumption at a time when the animals are already under climatic stress and when food is limited. For threatened and endangered species such as the wolf and for species of concern such as the wolverine and lynx (numbers of which are already very low) the additional stress caused by increased human presence during the winter could cause a decrease in population.

Divide Creek Flood Hazard — Implementation of this alternative could result in long-term improvements to the health of the aquatic ecosystems of Divide Creek and its associated wetlands and to the biodiversity in the area.

There could be impacts on biological diversity from the construction of new facilities to replace those removed from the Divide Creek floodplain. Impacts would depend on their location and the magnitude of disturbance. These impacts would be evaluated later.

West Side Discovery Center and Museum — There would be negligible impacts on biodiversity because this area is already surrounded by development.

Conclusion. It is unlikely that any plant or animal species would be eliminated as a result of implementing any of the preferred alternatives. There would, however, be some impact on individual species and to biological communities in the park if the preferred alternatives were implemented. Some of these impacts could weaken biological diversity by damaging community integrity or by preventing species numbers from naturally expanding.

Cumulative Impacts. Biodiversity would probably be impacted both positively and negatively in a cumulative sense if all seven of the preferred alternative actions were implemented.

A number of the preferred alternatives have the potential for displacing wildlife. These include increased winter use and fast-track road reconstruction. A possible cumulative impact to biological diversity would be displacement and habitat fragmentation in important wildlife habitat on the west and south sides of the park as the result of residential and commercial development. These impacts would probably be most severe during the winter.

Biological diversity in a regional context could be positively impacted by banning scenic air tours over the park. This ban, if combined with a lessening of such flights externally, could enhance wildlife movements between the park and adjacent land and lessen the impacts on all species that feed at higher elevations or that use the Middle Fork of the Flathead River as a migratory corridor. Conversely, if air tour activity increased over adjacent land after the park ban is implemented, wildlife movement and feeding activity outside the park could be negatively impacted.

IMPACTS ON THE CULTURAL ENVIRONMENT

Impacts on Cultural Resources

Management Strategy. The management strategy would have an indirect beneficial impact on cultural resources by providing a tool to manage and provide for a quality visitor experience while protecting resources. All actions taken within the zones would protect and preserve cultural resources in the park.

Visitor Use on the Going-to-the-Sun Road — Further analysis would be conducted as part of the comprehensive use plan for the Going-to-the-Sun Road. Depending on the recommendations, the following effects could occur. The 15 features along the Going-to-the-Sun Road that have been identified as defining its

historic character could be adversely affected by the development or modification of the road. These features are the road, the Sprague Creek culvert, the Snyder Creek culvert, the horse trail underpass (west), the Avalanche Creek bridge, the Logan Creek bridge, the west side tunnel, the Granite Creek culvert, the Haystack Creek culvert, Triple Arches, the east side tunnel, the Siyeh Creek culvert, the Baring Creek bridge, the St. Mary River bridge, and the Divide Creek bridge. Cultural resource values would be directly impacted by modifying existing and constructing new pullouts and visitor use areas along Going-to-the-Sun Road and by the expanded transportation system, but those effects could be mitigated through good design. A pullout at Sunrift Gorge might allow the national register site nearby to be interpreted. Indirectly, these facilities would increase the visitor parking capacity, which would increase wear and maintenance needs.

A patrol cabin near Sunrift Gorge has been listed on the National Register of Historic Places. Development in the area would increase the danger of vandalism.

Careful review during design would allow avoidance of all known archeological resources near parking lots, trails, the discovery center and museum, and road reconstruction areas. Visitor use would have no effect on cultural resources because it is not the cause of the deterioration of these features.

Preservation of the Going-to-the-Sun Road — This alternative would preserve the cultural resources and significance of the Going-to-the-Sun Road because the reconstruction work would be done before major failure could occur.

Preservation of Historic Hotels and Visitor Services — Direct impacts would include an improvement in the condition of the historic structures used for visitor services. Continued use would be a positive impact. Some remodeling and adaptive use would be necessary to continue to maintain the buildings in desirable condition for use as visitor facilities, and impact on historic values would not necessarily be adverse. Newer structures added to historic groupings would not be adverse if the new structures were designed and placed sensitively. Indirect impacts on park historic values would include the continuance of visitors' options to enjoy the park's historic facilities in a traditional manner. Use of the facilities could increase, which would necessitate an increased maintenance schedule. If a deteriorated structure was removed or replaced, this would constitute an adverse effect. The National Park Service would consult with the state historic preservation officer, as required by section 106 of the National Historic Preservation Act.

Scenic Air Tours — There would be no effects on cultural resources, including archeological resources, because there would be no ground-disturbing activities.

Personal Watercraft — This action would have no known direct effect on cultural resources. Indirectly, park visitors would be able to enjoy historic activities (launch tours, fishing, scenic viewing) and historic settings such as Lake McDonald Lodge without the intrusion of noise from personal watercraft.

Winter Use — There would be no effects on cultural resources, including archeological resources, because there would be no ground-disturbing activities. More activity in the area might mean that some resources such as Lake McDonald

Lodge would be subject to vandalism; however, more activity could serve to deter acts of vandalism.

Divide Creek Flood Hazard — Removal and relocation would adversely affect all historic resources in the St. Mary maintenance area historic district. Removal of the maintenance area would negatively impact the historic structures. Mitigation would be conducted, including Historic American Building Survey documentation. Removal of the administrative and maintenance facilities and employee housing in the Divide Creek floodplain in St. Mary would have no effect on archeological resources. The new location for these facilities would require extensive archeological investigation and mitigation to avoid the loss of unknown archeological resources. This work would be completed before construction in accordance with cultural resource laws and policies. The possibility of disturbing archeological resources that were not discovered during preconstruction investigation would continue. Monitoring would be required during construction.

West Side Discovery Center and Museum — A new discovery center and museum near the T-intersection would have no adverse effect on known archeological resources. The area near the T-intersection has been surveyed for archeological resources, and none were found. Consultation with American Indian tribes would help to avoid impacts on resources they may deem culturally significant at this location. A new discovery center and museum could benefit archeological resources indirectly through interpretation. The associated museum would be of great benefit to preservation and any future expansion of the museum collection.

Conclusion. All actions would have positive effects on cultural resources with the exception of removal of the St. Mary maintenance area historic district, which would result in an adverse effect and would require mitigation and further consultation with the state historic preservation officer and the advisory council.

Cumulative Impacts. Actions taken in the park to preserve historic resources combined with actions taken by other land managing agencies and the state would result in a positive effect on preservation of historic resources throughout the surrounding region.

Impacts on the Blackfeet and Salish and Kootenai Tribes

Regular consultation with the Blackfeet Tribal Business Council and the Flathead Cultural Protection Office would ensure that the tribes would not be adversely affected by any of the alternatives.

IMPACTS ON THE SOCIOECONOMIC ENVIRONMENT

Impacts on Regional and Local Communities

Management Strategy. The management strategy would have an indirect beneficial impact on regional and local communities by providing a tool to manage and provide for a quality visitor experience while protecting resources.

Local and regional economies would benefit from the federal funds spent on resource preservation and protection. This would result in direct, indirect, and cumulative positive impacts on the regional and local economies.

Visitor Use on the Going-to-the-Sun Road — Further analysis would be conducted as part of the comprehensive use plan for the Going-to-the-Sun Road. If additional pullouts were recommended, the following effects could occur. There could be positive economic benefits to the local and regional economies. Visitor expenditures and expenditures for rehabilitation and maintenance of the road would also continue. Expansion of opportunities along the Going-to-the-Sun Road would probably have a positive economic benefit. Improving the public transportation system would also be expected to have a positive economic benefit. Limiting visitor use might adversely affect the economic environment because it might limit the number of visitors to the area.

Preservation of the Going-to-the-Sun Road — A loss in visitor spending throughout the state would result during construction, but there would be a contribution to the local and regional economies associated with the construction spending.

According to a study conducted by Bioeconomics, Inc., in 1997, it is estimated that park visitation would be reduced by 12-20 percent each year throughout the reconstruction period, which would be a reduction of 1.5-1.8 million visitors distributed over the construction period. The 12 percent average reduction in use under this alternative is well within the 9 percent positive to 19 percent negative range in fluctuation of Glacier's visitation due to other factors such as weather, fees, and previous road reconstruction projects over the past 10 years. The higher range is slightly more than the largest annual decrease in park visitation in the last 10 years, which was 18 percent (recorded in 1985).

The Institute for Tourism and Recreation Research at the University of Montana School of Forestry conducted an analysis in June 1998 in which it was concluded that the reconstruction actions would result in a substantial negative economic impact from to loss of tourism. It is estimated that the direct tourism dollar loss to the state would be \$81-\$84 million, with total losses of \$129-\$135 million. When anticipated economic gains due to construction expenditures are accounted for, the expected net direct loss to the state would be \$99-\$105 million. The report also estimated direct tourism losses in the Glacier area (including Waterton, Alberta) of \$63-\$65 million. The estimated losses for specific industries are as follows:

Lodging	\$15-\$16 million
Retail	\$20-\$21 million
Restaurants and bars	\$14 million
Gasoline and oil	\$16-\$17 million
All others	\$15-\$16 million

It should be noted that these estimated losses would be for the entire reconstruction period. If considered on an annual basis, the loss would be approximate-

ly one-tenth of the above totals depending on the length of time required to complete the reconstruction and assuming equal increments of construction annually.

Based on *Estimated Economic Impacts of the Going-to-the-Sun Road Closure and Reconstruction* (Duffield 1997) there would be negative and positive impacts on the economy of the state of Montana. There would be reductions in visitor expenditures to varying degrees for each of the years that the Going-to-the-Sun Road was under construction. This could be offset by support services (housing, food) required by the construction labor force. Visitor expenditures and personal income in the state would be reduced. Montana contractors would have the opportunity to compete for approximately \$70 million-\$100 million in road reconstruction contracts.

It is expected that the anticipated 12 percent reduction in annual visitation to Glacier National Park would have a disproportionately negative effect on businesses in the gateway communities.

By spreading the construction out over a longer period of time, less money would be invested during any particular year. Consequently, events such as unusually heavy snow, floods, and particularly rainy summers would have less of an effect on the overall reconstruction program. New economic data would be forthcoming from additional economic studies of the reconstruction of the Going-to-the-Sun Road.

Preservation of Historic Hotels and Visitor Services — Preservation activities would be an economic benefit to the regional economy. An analysis by Bioeconomics using cost figures of \$50-\$80 million made the following assumptions in order to estimate the extent of the impact. First, funding would come from outside the local area. Second, reconstruction would be spread over a five- or ten-year period. And third, all construction contracts would be won by Montana-based businesses. The regional economic impact on personal income has been estimated at \$3.4-\$5.4 million annually for a ten-year scenario and \$6.8-\$10.9 million annually for a five-year construction program. The total employment impact has been estimated at 137-219 full- and part-time jobs in the ten-year scenario and 273-437 full- and part-time jobs in the five-year scenario. The regional impact on total industrial output would be \$7.9-\$12.7 million for the ten-year construction period and \$15.9-\$25.4 million for the five-year scenario. In the short term, phasing of rehabilitation might require closure of all or part of the facilities during the summer. The concessioner would suffer loss of revenue during this period. Fewer employees would be hired by the concessioner, but more construction jobs would counter this loss. In the long term the concessioner would have improved facilities with lower maintenance expenses and the potential for lower operational costs and increased revenue.

Scenic Air Tours — According to Bioeconomics, Inc., air tours are not expected to completely disappear from the area, since operators would still be able to conduct air tours around the park and would have the option to develop tours in the adjacent Bob Marshall Wilderness complex.

Personal Watercraft — This action would have a negligible impact on expenditures due to the temporary ban on personal watercraft that has been in effect

since 1996. Although there are local businesses that cater to PWC users, a ban should not significantly affect them because there are many locations outside the park for the use of these watercraft.

Winter Use — Bioeconomics, Inc., concluded that if winter visitation levels increased, the surrounding communities could expect spending impacts from these additional visitors.

Divide Creek Flood Hazard — In 1992 it was estimated that this action would cost \$20-\$40 million. According to the analysis of Bioeconomics, Inc., this would benefit the regional economy by adding \$6.5-\$13 million annually, increasing total personal income \$3.3-\$6.5 million per year, and adding 130-260 jobs during a five-year construction period. If facilities were moved out of the St. Mary area there would be a small adverse effect on businesses in St. Mary because a source of income would be removed, particularly during the winter.

West Side Discovery Center and Museum — Construction of a west side discovery center and museum was estimated at \$1,091,000 in 1981. Today it would be expected to cost at least \$1,883,000. The model run by Bioeconomics, Inc. indicated a positive economic benefit to the region of \$3,058,000. Personal income would increase \$1,536,000, and employment would increase by 61 jobs during construction. These benefits are expected to be largely felt in the region rather than the state as a whole.

Conclusion. The overall beneficial contribution that Glacier National Park makes to the local and regional economies would continue in the long term. The rehabilitation of historic hotels and the Going-to-the-Sun Road would result in significant positive contributions to both the local and regional economies. There would be short-term adverse impacts on local businesses and the concessioner as a result of the rehabilitation of the historic hotels and the Going-to-the-Sun Road. Smaller expenditures for the west side discovery center and museum and the Divide Creek relocation would also benefit the region.

Cumulative Impacts. The preferred alternative would have a positive economic benefit on the local and regional economies and would add to an already robust economy.

Impacts on Local and National Visitors

Management Strategy. The management strategy would not adversely affect local and national visitors. It would benefit them by providing a very clear message about which areas are developed, which would accommodate higher levels of use, and which would accommodate lower levels of use.

Visitor Use of the Going-to-the-Sun Road — Further analysis would be conducted as part of the comprehensive use plan for the Going-to-the-Sun Road. Depending on the recommendations, the following effects could occur. The expanded and improved transportation system would enhance visitor use for those who would like to experience Glacier National Park and the Going-to-the-Sun Road through the use of a shuttle system. If the transportation system provided more parking opportunities along the road, visitors in private vehicles would have

an improved experience. Expanding opportunities along the corridor would enhance use, provide access to different resources, and improve appreciation for the park's various attractions. Limiting visitor use could benefit local and national visitors by improving their experience and ensuring access to park areas.

Preservation of the Going-to-the-Sun Road — Reconstruction would have a positive effect on local and national visitors in the long term. During the reconstruction period, all visitors would be temporarily adversely affected. After the reconstruction was completed, visitor safety would be improved.

This alternative would have the positive effect of getting the reconstruction work done in the shortest amount of time. Visitor use would be disrupted during the reconstruction effort. Delays in cross-park travel, one-way traffic, and other possible means of control necessary during reconstruction of the road would inconvenience visitors to Glacier during the project. The impact would be worse for national visitors than for local visitors because more detailed knowledge of construction activity would allow local visitors to adjust their travel patterns. This effect would be mitigated by increased information and communication with the visiting public outside the area. However, during the reconstruction, traffic probably would increase on other roads surrounding the park, such as Highways 2 and 49.

Preservation of Historic Hotels and Visitor Services — Rehabilitation would have a positive impact on visitors because it would ensure that a traditional overnight experience would continue to be available in the park. There would be a temporary adverse effect during the reconstruction, because it is likely that these facilities would be closed to visitors.

Scenic Air Tours — Banning scenic air tours parkwide would benefit local and national visitors by providing more opportunities for solitude and quiet in the park, but visitors who desire this experience would be disappointed. The local community might be adversely affected if scenic air tour activity concentrated outside the park over populated areas.

Personal Watercraft — The ban would deny the use of personal watercraft to visitors who might enjoy that use. Reduced noise would benefit other visitors who seek a quiet experience in the park. The ban would also improve safety on park lakes. Personal watercraft make up only about 7 percent of the watercraft registered in the United States, but they are involved in nearly 50 percent of boating accidents and a disproportionate percentage of injuries and deaths.

Prior to the imposition of the temporary ban in 1996, a limited number of personal watercraft were operated in the park. Numbers were small, however, and users were often repeat visitors. With such low demand, only a few users would be negatively impacted by the ban and a great number would be affected positively. PWC users could be directed to other more appropriate lakes in the region.

Winter Use — Expansion would have a positive effect on local and national visitors by providing enhanced winter experiences in Glacier National Park that cannot be found elsewhere in the region. Plowing out existing parking lots would provide greater capacity without increasing development. Safer, skiable terrain would be made available by plowing the Going-to-the-Sun Road only to the Lake

McDonald Lodge on the west side and to the 1913 ranger station on the east side and then closing the road to vehicles beyond those points.

Divide Creek Flood Hazard — There would be no impact on national or local visitors.

Construction of a West Side Discovery Center and Museum — The new discovery center and museum would enhance visitor experience by improving information, orientation, and interpretation. Improved information services could reduce congestion along the Going-to-the-Sun Road (including Logan Pass) by diverting visitors to other attractions during periods of peak traffic.

Conclusion. The preferred actions would be expected to significantly enhance visitor use and experience at Glacier National Park. An improved transportation system, the west side discovery center and museum, winter use opportunities, and continued access to overnight accommodations would all contribute to improved experiences for local and national visitors.

Cumulative Impacts. The actions outlined for Glacier National Park taken in context with the already high quality recreational environment of northwest Montana would be expected to further the region as a world-class visitor destination.

Impacts on Energy Consumption

Management Strategy. The management strategy would not adversely affect energy consumption in the park because developed areas would remain but would not be expanded beyond the visitor service zones.

Preservation of the Going-to-the-Sun Road — Reconstruction of the Going-to-the-Sun Road would increase consumption of energy temporarily during the reconstruction period because traffic could be rerouted to Routes 2, 49, and 89, which would increase the distance traveled. Energy consumption would also be increased by idling vehicles that had been delayed by construction. Traffic delays would result in increased energy consumption because vehicles would spend additional time idling during the delays.

Visitor Use on the Going-to-the-Sun Road — The preferred actions for the Going-to-the-Sun Road would continue to offer the road corridor as the primary visitor attraction of Glacier National Park. There would be no significant change in energy consumption. The improved transportation system might reduce use of private vehicles, which would reduce consumption. Further analysis would be conducted as part of the comprehensive use plan for the Going-to-the-Sun Road.

Preservation of Historic Hotels and Visitor Services — The rehabilitation of the lodges would incorporate many energy conserving technologies and would result in a net reduction in energy consumption in the park.

Scenic Air Tours — Banning scenic air tours would reduce the amount of energy consumed in the park, but this would probably be a negligible effect since air tours would be expected to increase outside the park.

Personal Watercraft — Banning use of personal watercraft on the waters of Glacier National Park would reduce energy use.

Winter Use — Increased winter use would result in an increase in energy consumption due to the operation and heating of campstores and increased NPS patrols. The increase would be negligible.

Divide Creek Flood Hazard — Removal of the facilities near Divide Creek would not result in a significant change in energy use since the facilities would be replaced. The new structures would probably be more energy efficient than the old structures, which would result in a modest reduction in energy consumption.

West Side Discovery Center and Museum — The west side discovery center and museum would be heated and air conditioned, which would increase energy consumption. The scale of the increase would depend on the size of the facility and length of time it remained open. Energy saving technologies would be incorporated into the design.

Conclusion. Most of the actions proposed in the preferred alternative would reduce energy use due to new technologies. The winter use actions would, however, result in a net increase in consumption.

Cumulative Impacts. No cumulative impact on energy consumption would result from the preferred alternative.

Impacts on Environmental Justice

Management Strategy. The management strategy would not adversely affect environmental justice because no actions are recommended that would disproportionately affect minority or low income populations. All the actions retain and rehabilitate existing services and structures.

Conclusion. There would be no effect on minority or low income populations.

Cumulative Impacts. There would be no cumulative impacts.

Impacts on Owners of Land in the Park and Adjacent to the Boundary

Management Strategy. The management strategy would not adversely affect the owners of land in the park and adjacent to the boundary because existing developed areas would be retained and private land would not be affected.

Visitor Use on the Going-to-the-Sun Road — Further analysis would be conducted as part of the comprehensive use plan for the Going-to-the-Sun Road. If additional development was recommended, landowners would not be adversely affected by the development of new pullouts, trails, and picnic areas or an expanded transportation system because the developments would not occur near private land. However there might be temporary delays for landowners trying to reach their property in the park. Owners of land in and adjacent to the park would not be affected because they are guaranteed access to their property.

Preservation of the Going-to-the-Sun Road — Reconstruction of the Going-to-the-Sun Road could adversely affect landowners in the park, by temporarily delaying access to their properties during reconstruction. Although the road reconstruction is past any private property in the park, landowners could be tem-

porarily delayed by construction equipment and increased congestion. The effects would be temporary and would last only until reconstruction was complete. Owners of land adjacent to the park would not be adversely affected.

Preservation of Historic Hotels and Visitor Services — Landowners in and outside the park would not be adversely affected by rehabilitation of the park's historic hotels and visitor facilities, including new development in some areas.

Scenic Air Tours — Owners of land in the park and adjacent to the boundary would be positively affected by the removal of a source of unnatural noise and the intrusions into the natural scene.

Personal Watercraft — The ban would adversely affect those landowners who would like to use personal watercraft in the park. The ban would have a positive effect on those landowners who object to personal watercraft in the park.

Winter Use — Landowners in the park could be adversely affected by increased winter use of the park, which could increase the risk of vandalism. However, increased activity in the area might discourage acts of vandalism. Increased winter use would have no effect on owners of land adjacent to the park.

Divide Creek Flood Hazard — Landowners in the park would not be affected by removal of the Divide Creek facilities because there is no private land within the park in that area. However, depending on where the facilities are relocated, landowners in and outside the park could be affected. Further analysis would have to be conducted after selection of potential locations.

West Side Discovery Center and Museum — Landowners would not be adversely affected by a new west side discovery center and museum because it would not be constructed on private land.

Conclusion. Landowners would not be adversely affected overall by any of the above actions except expanded day use during the winter, which could increase the risk of vandalism to their properties.

Cumulative Impacts. There would be no cumulative impacts.

The Relationship between Short-Term Uses of the Environment and the Maintenance and Enhancement of Long-Term Productivity

Visitor Use on the Going-to-the-Sun Road — Additional analysis would be conducted; however, if existing pullouts were modified or new pullouts constructed, with associated picnic areas and short trails, it could result in an increased density of development along the Going-to-the-Sun Road, which could have adverse effects on wildlife, particularly grizzly bears, and (in the worst case) it could affect their long-term productivity. For these reasons, the park staff would proceed very cautiously with implementation of this alternative and would conduct studies and analyses as outlined in this document. Further analysis would be conducted as part of the comprehensive use plan for the Going-to-the-Sun Road. Limiting visitor use might benefit the enhancement of long-term productivity.

The Logan maintenance pit is an already disturbed area but provides undeveloped habitat for wildlife, including grizzly bears and the state-sensitive harlequin

ducks. Development of this site would adversely affect long-term productivity for this area.

Winter Use — Glacier National Park provides important habitat for wildlife, particularly prey species, during the winter in the lower elevation valleys throughout the park. Increasing visitor use could have adverse effects on wildlife that depend on these low elevation valleys to survive in the winter. In turn, the predators in the park depend on these prey species for food. Because of these important relationships, the park staff would proceed very cautiously with implementation of this alternative. Wildlife and visitors would be monitored during the winter and if adverse impacts began to occur, management actions would be taken.

Irreversible or Irrecoverable Commitments of Resources Should the Alternative Be Implemented

Preservation of the Going-to-the-Sun Road — A huge financial commitment would be required to implement this alternative. Current funding levels would have to be substantially increased and would probably require a special appropriation from Congress. Expenditures would be an irretrievable commitment of resources.

Preservation of Historic Hotels and Visitor Services — A significant amount of funding would be required to implement this alternative. Expenditures of \$80-\$100 million would be an irreversible and irretrievable commitment of resources.

Divide Creek Flood Hazard — It has been estimated that removal and relocation of facilities would cost be \$10 million. Expenditure of this amount of money would be an irreversible and irretrievable commitment of resources.

West Side Discovery Center and Museum — Development of a westside discovery center and museum would cost approximately \$15 million dollars. This would be an irreversible and irretrievable commitment of resources. Furthermore, although the area north of the T-intersection is surrounded by development and is essentially within a developed area, construction of the visitor center would remove this area as wildlife habitat and revegetation and would be an irretrievable commitment of natural resources.

Adverse Impacts that Cannot be Avoided Should the Action Be Implemented

West Side Discovery Center and Museum — Vegetation would be removed from the site resulting in an unavoidable adverse effect. Vegetation would also be removed from these areas were new pullouts and associated development was constructed. This would be an unavoidable adverse effect.

Impacts of All Other Alternatives

Up to this point, all the preferred alternative impacts have been analyzed as a group, and all the no-action alternative impacts have been analyzed as a group. That format would not be effective for the analysis of the remaining alternatives, which are analyzed under each impact topic below. However, the reader should not consider these actions as a package. For instance, the reader should not assume in this section that the Going-to-the-Sun Road would be reconstructed in $10 \pm$ years and that a discovery center and museum would be built outside the park. The impacts of the management strategy would be the same as stated under the preferred alternative. They are not repeated under each alternative.

IMPACTS ON THE NATURAL ENVIRONMENT

Impacts on Water Resources, Including Water Quality, Floodplains, and Wetlands

Impact Analysis.

Visitor Use on the Going-to-the-Sun Road — If the size of the Logan Pass parking area was increased, groundwater resources could be at risk for direct adverse impacts. If underground parking was created, blasting, digging, and clearing of debris could cause a large amount of erosion during construction and could contaminate water downstream as well as groundwater. If the Logan Pass parking lot was increased horizontally, streams in the immediate area might have to be rerouted, depending on the size of the increase. Rerouted streams would continue to drain into their original drainages. Erosion could also occur during construction to increase the surface area of the lot, which would result in sedimentation of the streams and drainages in the area. This would have adverse direct impacts on water quality. Mitigation measures would be used to protect water quality as much as possible during construction.

If the parking lot was tiered, there would be minimal impacts on water resources and those would occur mostly during construction. After construction was completed, sheet flow from the parking areas carrying oils and antifreeze could adversely affect the quality of both surface water and groundwater. Consultation and a “404 permit” (as required by the Clean Water Act) would be required from the Army Corps of Engineers to implement this alternative.

There are no floodplains and wetlands known in the immediate Logan Pass area. However, if any were discovered, all attempts would be made to avoid these areas.

Modification of existing or construction of additional pullouts, picnic areas, short trails, and interpretive sites at such areas as Moose Country, Lunch Creek, Logan maintenance pit, Sunrift Gorge, Sun Point, and Packers Roost would result in minimal short-term adverse impacts on water quality from construction activity in the area. Mitigating measures such as silt fencing would prevent sediment from entering the adjacent creeks and rivers. After construction was complete, there could be minimal direct and indirect adverse impacts on water quality from sheet drainage from the road, which would release contaminants, such as oil from vehicles, into the creek and rivers adjacent to the road and pullouts. Development would not occur in wetlands near Moose Country and Avalanche to avoid adversely affecting wetlands. There would be no direct or indirect adverse impacts on floodplains associated with these areas. Restroom facilities, roads, trails, and picnic areas are allowed in floodplains and are excepted from compliance with Executive Order 11988.

Preservation of the Going-to-the-Sun Road — (4-6 year and 10± year)

Construction activities would disturb soils, which could affect water resources. Riparian wetlands adjacent to the road could also be affected by construction activity. Without mitigation to protect streams, wetland lakes, and rivers adjacent to the Going-to-the-Sun Road, water quality would be adversely affected by increased sediment and turbidity. With mitigation in place, water quality would be protected. Prior to road construction an Army Corps of Engineers 404 permit as defined by the Clean Water Act and state permits would be obtained. Compliance with section 401 of the Clean Water Act would be conducted to determine appropriate mitigation to protect wetlands. These permits define the activity to take place and the mitigation that would be required to protect water quality.

Scenic Air Tour — This would have no effect on water quality, floodplains, or wetlands because the aircraft do not land in the park.

Winter Use — There would be minimal adverse impacts on water resources as a result of winterizing the Village Inn and Lake McDonald Lodge and opening them for year-round use. Adverse impacts could occur in the event of accidental freezing and breaking of sewerlines. No floodplains, wetlands, or other water resources would be adversely affected because no new construction would take place.

Divide Creek Flood Hazard — Hardening the banks and annually removing debris would increase turbidity (stir up sediment) and adversely affect water quality. Using bulldozers and other construction equipment to channelize the creek could also adversely affect water quality from accidental release of gas, diesel, and oil. Channelizing the creek would also create an unnatural floodplain. To prevent catastrophic flooding, annual or biannual maintenance and clearing of the creekbed and maintenance of the channelization structures would be required. The floodplain would be adversely impacted by channelization. The wetlands associated with the creek would also be adversely affected by channelization because the creek course would be controlled, and floods would be avoided.

West Side Discovery Center and Museum — At any site outside the park, careful design and use of the discovery center and control of the well-drilling process could mitigate sediment production, erosion, and other potential sources of water pollution. Construction of the facility and drilling of wells would not violate state surface water quality standards. No site with floodplains or wetlands would be considered, so the discovery center would have no effect on these lands.

Conclusion. There could be significant adverse impacts on the water quality in surface streams, wetlands, lakes, and groundwater from expansion of the Logan Pass parking area. There would be significant adverse impacts on the floodplains, wetlands, and water quality of Divide Creek from channelization. With mitigation such as silt fencing and immediate revegetation, adverse impacts could be reduced.

Cumulative Impacts. Adverse impacts on water quality in the vicinity of Logan Pass, combined with increased development outside the park, would cumulatively adversely impact water quality in the region. Expansion of parking would make it necessary to replace the current sanitation system with a new onsite system; the quality of the groundwater would be at risk of contamination due to shallow soils in the area.

Impacts on Aquatic Resources

Impact Analysis.

Visitor Use on the Going-to-the-Sun Road — Aquatic resources could be at risk if underground parking was created. Blasting, digging, and clearing of debris could cause erosion during construction, which would increase the sediment load and turbidity (stir up sediment) downstream. This would clog the gills of some fish and other aquatic organisms on the bottom of rivers and streams in the area and downstream. If Logan Pass parking lot were to be increased horizontally, streams in the immediate area might have to be rerouted. Significant erosion could result during construction, and sedimentation of the creeks in the area would follow. Mitigation measures would be used to protect aquatic resources as much as possible during construction. A tiered parking lot would have negligible effects on aquatic resources since it is likely that no streams would be disturbed.

After construction, sheet flow from the parking areas carrying petroleum products and antifreeze would adversely affect aquatic resources in the area and downstream. Mitigation would require the use of traps and revegetation.

Aquatic resources could be adversely affected by building pullouts, picnic areas, and trails in areas where there is no current use. Increasing use in these areas and increasing visitation could directly affect aquatic resources such as bull trout, westslope cutthroat trout, and the capshell limpet if people using stream-bank areas increased siltation. During construction of additional pullouts, picnic areas, and short trails, mitigation to prevent increased siltation would protect aquatic resources. Without mitigation, runoff would be increased during the construction period. Small soil particles that do not settle readily reduce light penetration and hinder the growth of aquatic plants and the activities of sight-feeding fish.

High concentrations can clog the gills of aquatic animals and interfere with respiration. Larger soil particles that settle in high concentrations can smother bottom-dwelling organisms and fish eggs. Chronic low level sedimentation can have significant adverse effects on aquatic resources by reducing the diversity and amount of habitat available for aquatic insects and spawning. Mitigation would be conducted to prevent adverse effects on the federally listed bull trout, proposed capshell limpet, and the state-rare westslope cutthroat trout. Further consultation with the U.S. Fish and Wildlife Service during design would ensure protection of these species.

Preservation of the Going-to-the-Sun Road — (4-6 years) During reconstruction of the Going-to-the-Sun Road mitigation would be used to reduce the impacts on aquatic resources. Without mitigation, aquatic resources could be adversely affected by increased sediment and accidental spills of petroleum and other chemical products. The impacts of sedimentation and increased turbidity on rivers and streams would be minimized during reconstruction by erosion control measures. Proper construction management procedures would be used to prevent contamination of adjacent rivers and streams from accidental petroleum spills by construction equipment.

(10± years) During reconstruction mitigation would reduce the impacts on aquatic resources. Without mitigation in place, aquatic resources would be adversely affected by increased sediment and accidental spills of petroleum and other chemicals. The impacts of sedimentation and increased turbidity on rivers and streams would be minimized by effective erosion control. Construction management procedures would be used to prevent contamination of adjacent rivers and streams caused by accidental petroleum spills from construction equipment.

Scenic Air Tours — This would have no effect on aquatic resources because no flights would land in the park.

Winter Use — There would be no additional adverse impacts on aquatic resources as a result of winterizing the Village Inn and Lake McDonald Lodge and opening them for year-round use because the buildings already exist. Some disturbance could result in Snyder Creek if utility lines were buried deeper.

Divide Creek Flood Hazard — Hardening the banks and annually removing debris would increase turbidity and adversely affect aquatic resources by reducing light penetration. This would hinder the growth of aquatic plants and the activities of sight-feeding fish. Although there is unlikely to be a great deal of sediment in Divide Creek, it could have significant adverse impacts on aquatic resources. Chronic low level sedimentation could reduce the diversity of aquatic biota and the habitat for aquatic insects and fish spawning. Using bulldozers and other construction equipment could also adversely affect aquatic resources due to accidental releases of petroleum products.

West Side Discovery Center and Museum — Since the facility would be outside the park, it would not have effects on aquatic resources in the park. If a site was selected adjacent to a river or stream outside the park, aquatic resources could be temporarily adversely affected during construction by increased sediment entering the water course. Mitigation measures would be taken to protect these resources.

Conclusion. There would be significant adverse impacts on aquatic resources from expansion of Logan Pass parking area and from channelizing Divide Creek.

Cumulative Impacts. Channelization of Divide Creek, combined with the flood control activities of private landowners adjacent to the creek outside the park and by the Blackfeet tribe, could result in significant adverse impacts on aquatic resources.

Impacts on Scenic Resources

Impact Analysis.

Visitor Use on the Going-to-the-Sun Road — If the Logan Pass parking area was expanded by adding parking underground, scenic resources would not be adversely impacted. There would be direct, short-term impacts on scenic resources during construction due to the visibility of equipment, waste material, and associated construction activities.

If the Logan Pass parking area was expanded by adding parking horizontally, the scenic resources would be adversely impacted by enlarging the area of asphalt and cars and turning a natural looking area into a developed and hardened area. This would result in an adverse impact on the scenic appeal of Logan Pass. Although the view from Logan Pass would remain unchanged, views of the pass from surrounding peaks and trails would be adversely impacted by an expanded parking lot, associated cars, and more people.

There would be some change in the scenery adjacent to the Going-to-the-Sun Road from the modification of existing or development of additional pullouts, picnic areas, trails, and interpretive sites at areas such as Moose Country, Lunch Creek, Logan maintenance pit, Sunrift Gorge, and Sun Point. Facilities would be designed to blend in with the vegetation and surrounding landscape so that they would not stand out and detract from the scenery. Development of Logan maintenance pit as a parking area for the public transportation system could have a direct adverse impact on the scenic resources in that area. However, this area is well screened from the road and site design would ensure that that this parking area would continue to be screened from the Going-to-the-Sun Road. The parking area would be visible from portions of the Going-to-the-Sun Road above the Loop, from a portion of the highline trail, and from Heaven's Peak. The Logan maintenance pit would also be visible from off-trail locations to the north, south, and east. This would result in an adverse effect on the scenic views from these locations.

Preservation of the Going-to-the-Sun Road —(4-6 years) There could be some localized effects on scenic resources, but panoramic views would not be affected. Construction activity would not be visible to those driving the road if it was closed at Avalanche and at Rising Sun.

(10± years) There would be temporary adverse impacts on scenic resources during construction along the Going-to-the-Sun Road due to construction equipment, but scenic resources would not be permanently affected.

Scenic Air Tour — Allowing the tours in some areas of the park and not in others would adversely affect scenic resources. The visual intrusions would be restricted to certain areas, so the effect would be minimized.

Winter Use — This would not adversely affect scenic resources because no new development is proposed.

Divide Creek Flood Hazard — Channelizing Divide Creek would adversely affect scenic resources by creating a very unnatural appearing creekbed. The presence of equipment in the creekbed once or twice a year and the construction of a permanent access point into the creek would adversely affect scenic resources in the area.

West Side Discovery Center and Museum — This would not have an adverse impact on scenic resources inside the park. Scenic resources outside the park could be adversely affected if the facility was located in an undeveloped area, which would contribute to the strip development occurring outside the park. That development is of a different character than was traditional for the area. Locating the center in an already developed area outside the park would not adversely affect scenic resources.

Conclusion. Expansion of the Logan Pass parking lot aboveground (horizontally or tiered) would have a significant adverse impact on the scenic resources in the area. Expansion of the Logan Pass parking lot below ground would have a temporary adverse impact on the scenic resources of the area during construction. After construction was complete, there would not be an adverse impact on scenic resources. The design would have to be compatible with other development in the park. There are no other underground parking structures in the park.

Channelizing Divide Creek would have an adverse impact on scenic resources in the immediate area because it would be unnatural in appearance, but it could be an improvement on the existing flood abatement structures.

Cumulative Impacts. Channelizing Divide Creek could have a positive cumulative effect on scenic resources when combined with actions taken by private landowners adjacent to the park and the Blackfoot Tribe. Currently, the tribe and the adjacent landowners take actions to control the flooding of the creek. These actions and associated developments create an unnatural looking landscape that adversely affects scenic resources in the area. Channelization of the creek near St. Mary could result in decreased flood control measures by others.

Development of a west side discovery center and associated parking outside the park combined with development by other landowners adjacent to the park, could have a cumulative adverse impact on scenic resources. It would increase the density of development along Highway 2 and contribute to the change of a relatively natural view with scattered developments to continual development from West Glacier to Hungry Horse.

Impacts on Air Quality

Impact Analysis.

Visitor Use on the Going-to-the-Sun Road — Expanding the Logan Pass parking lot above or below ground would temporarily adversely affect air quality, releasing more particulates into the air from construction equipment and dust. Flathead County is currently out of compliance with state air standards for particulate emissions, and this activity would contribute to the inability of the county to comply with the standard. Impacts would be similar to those described under the preferred alternative, “Environmental Impacts on Air Quality.”

Although the amount of carbon monoxide emitted would continue to increase as visitation increased, this would not affect the state’s ability to maintain conformity with the required air quality standards.

Preservation of the Going-to-the-Sun Road — (4-6 year and 10±) Road construction would be done in accordance with guidelines and regulations to ensure continued maintenance of national air quality standards for motor vehicle-related pollutants such as ozone and carbon monoxide. Operation of a batch plant in or near the park during repaving would contribute to the increase in particulate matter on the west side of the park. Consultation and approval by the state would be required prior to placement and operation of a batch plant.

Scenic Air Tours — This would have a negligible adverse impact on air quality, because aircraft emissions are very slight compared to the total air mass.

Winter Use — Increased traffic in the valley in winter could increase air pollution in the McDonald Valley. In winter, inversions cause air to settle for longer periods in the valleys rather than being blown away. However, it is unlikely that air quality standards set by the state of Montana in accordance with the Environmental Protection Agency would be violated. Localized air quality could be degraded for longer periods than under the no-action alternative. Smoke from lodging facilities could be present on a year-round basis. Impacts could be more severe if winter inversions trap particulates in lower air layers for extended periods of time.

Divide Creek Flood Hazard — Air quality would be temporarily adversely affected by vehicle emissions if heavy equipment was used to clear the creekbed. These impacts would not be significant.

West Side Discovery Center and Museum — During construction, air quality would be temporarily adversely affected by the operation of heavy equipment. Diesel fumes and particulates would be released into the air. It is unlikely that this activity would cause a violation of state air quality standards. Operation of a discovery center would not adversely impact air quality in the park or in the surrounding area.

Conclusion. Air quality would not be significantly adversely affected by any of these alternatives. Temporary impacts on air quality would occur during reconstruction of the Going-to-the-Sun Road and expansion of Logan Pass parking lot.

Cumulative Impacts. Actions taken in the park would not cause or contribute to poor air quality in the region; there would be no cumulative impacts.

Impacts on Wildlife, Including Federally Listed Threatened and Endangered, Federally Proposed, and State Rare Species

Bald Eagles.

Visitor Use on the Going-to-the-Sun Road — The Logan Pass parking lot is not in bald eagle habitat. Expansion of the parking lot would not adversely affect bald eagles.

The removal of trees and other vegetation for the development of pullouts, picnic areas, and short trails along the east shore of Lake McDonald and the north shore of St. Mary Lake could result in the loss of eagle foraging habitat by removing perch trees and screening vegetation. A park wildlife biologist would participate in the site selection and design of these developments to avoid known foraging or roosting areas and minimize impacts on eagles. Informal pullouts (created by visitors without regard to potential eagle use) would be obliterated.

Operation of an expanded transportation system would not adversely affect bald eagles. Any additional parking facilities would not be located in known bald eagle nesting, foraging, or roosting areas.

As visitor use increased along the Going-to-the-Sun Road, more visitor use could occur in eagle habitat (such as along lakeshores), and the disturbance of bald eagles could increase. Nest site management plans, visitor use restrictions, and education efforts would be implemented to minimize these impacts. Providing additional designated pullouts along the road that were sited to avoid preferred eagle use areas would reduce the creation of informal pullouts and direct visitors to more appropriate and less sensitive locations.

Preservation of the Going-to-the-Sun Road — (4-6 year and 10± year) Reconstruction of the Going-to-the-Sun Road would primarily occur along the higher elevations outside eagle habitat. Reconstruction of the lower sections of the road could temporarily displace eagles depending on the location and the time of year of construction. No construction activity would occur within 0.5 mile of known nest sites but would occur within the larger home range of each nest as well as in foraging habitat. Timing construction activities to take place only during certain times of the year and during specific times of day would mitigate impacts. Most construction would occur during the summer. Restrictions on construction activity would be imposed during sensitive nesting periods to avoid adverse effects.

Scenic Air Tours — Bald eagles would probably benefit if scenic air tours were restricted near eagle habitat, because human disturbance would be reduced. However, increased low level flights in the Going-to-the-Sun Road corridor could adversely affect nesting and migrant eagles in that area in ways similar to the no-action alternative.

Winter Use — Expanding winter use opportunities including overnight accommodations at Lake McDonald, would increase the numbers of visitors and

their lengths of stay in this area during the most sensitive time of the eagle nesting period (March-May) as well as during the stressful winter period. Disruption of early nesting activity and incubation caused by human activity would increase the chances of nest abandonment or failure. Increased visitor use would also increase disturbance or displacement of birds during critical winter and migration periods. Visitor use restrictions, including site-specific closures during specific time periods, would be implemented; however, this alternative would have the most potential for disturbance to eagles.

Divide Creek Flood Hazard — Channelizing Divide Creek to protect the existing development would not affect eagles because there is no known nesting or other eagle use in that area.

West Side Discovery Center and Museum — Development of a west side discovery center outside of the park would not affect bald eagle use in the park. Depending on where the facilities were relocated, bald eagle habitat and use outside of the park could be affected. Further analysis would be completed as part of the site selection process.

Gray Wolves.

Visitor Use on the Going-to-the-Sun Road — Expansion of the Logan Pass parking area would not affect wolves because it is not in wolf habitat. Increasing use in the Going-to-the-Sun Road corridor would have similar effects as under the no-action alternative.

Wolves could be indirectly affected by increasing the number of developments (pullouts, short trails, picnic areas, and transportation system parking) along the Going-to-the-Sun Road in the St. Mary Valley, where there is evidence that wolves are recolonizing. Increasing development along the Going-to-the-Sun Road could displace elk that feed in the meadows. This could in turn reduce prey availability if prey numbers declined as a result of lost foraging opportunities in productive meadow areas or if animals were displaced to areas outside the park where they could be killed by hunters. It is anticipated that displacement effects would be minor and that elk would habituate to increased use. However, habituated elk and deer might be less vulnerable to wolf predation because wolves are less likely to habituate to increased human use; habituation of ungulates could result in reduced prey availability.

Additional developments would be limited in their placement, would primarily use already popular use areas along the road, and would not be sited in meadows or riparian areas. A park wildlife biologist would participate in the site selection and design of these developments to minimize impacts on wildlife.

Preservation of the Going-to-the-Sun Road — (4-6 year and 10 ± year) Reconstruction of the Going-to-the-Sun Road could temporarily displace wolves and prey species near construction, although most of the reconstruction would take place outside of known wolf habitat. Wolves in less used areas of the park could be adversely affected if visitors were displaced from the Going-to-the-Sun Road corridor during construction and temporarily began using other areas of the park.

Scenic Air Tours — Wolves would probably benefit in the areas where scenic air tours were restricted by decreasing the potential for disturbance. However, wolves could be adversely affected in the areas where flights were allowed (see the no-action discussion of effects).

Winter Use — Expanding winter opportunities would have the same effects as under the proposed action for plowing roads and parking areas. Wildlife could be displaced and feeding activity could be disrupted in some areas, especially with increased use. Overnight accommodations at Lake McDonald and Apgar would have no effect unless wolf activity increased in these areas.

Divide Creek Flood Hazard — Channelization of Divide Creek would not affect wolves because wolves do not use this developed area.

West Side Discovery Center and Museum — Development of a west side discovery center outside of the park would not affect wolf use in the park. Depending on where the facilities were located, wolf habitat and use outside of the park could be affected. Further analysis would be completed as part of the site-selection process.

Grizzly Bears.

Visitor Use on the Going-to-the-Sun Road — The Logan Pass area is high-quality summer habitat for grizzly bears because of the availability of preferred foods. Currently bears either are displaced from the area or become habituated to visitors. An expanded parking lot would have a temporary adverse impact on grizzly bears because bears could be further displaced from the area by construction activity and blasting. Expanded visitor use at Logan Pass could also lead to further habituation for some bears, increasing human/bear conflicts that can ultimately result in bear removal or death.

Grizzly bears could be indirectly adversely affected if increased visitor use caused people to disperse into other areas around Logan Pass, especially off-trail areas. Grizzly bears tend to habituate to predictable patterns of use in location and time. They learn that people frequent developed areas and trails, and they tend to avoid such areas. Because people do not normally frequent off-trail areas, bears do not expect to find them there and may be startled and react aggressively when encountered. Expanded visitor use at Logan Pass could also result in the displacement of bears to less productive habitat, thus negatively affecting their survival and reproduction.

Increasing visitor use resulting in more pullouts, picnic areas, and trails along the Going-to-the-Sun Road could adversely affect grizzly bears. Impacts could include increased habituation through human contact and food attractants or displacement, which would result in an effective decrease in usable habitat. Increased habituation could lead to increased human/bear contacts and conflicts that could ultimately result in the removal or death of bears. Additionally, greater development in the road corridor could create a barrier to grizzly movement. Bears could alter their use of areas near roads from daylight to night, allowing some continued use of habitat near roads and crossing opportunities. Further analysis and studies

would be completed to determine the specific locations, numbers, and sizes of new developments based on minimizing impacts on bears and avoiding known grizzly bear crossing corridors.

Transportation system parking could indirectly affect bears if visitors used parking and bus pickup areas in the early morning or evening when bears are most active. This could result in increased encounters between people and bears. Studies on bear road crossings would be used to site the parking areas. Parking at Logan maintenance pit would result in the loss of suitable summer habitat. Bears would be displaced from this area or possibly would become habituated to visitor use. Parking at Sun Point would probably not affect bears because the area is already developed. Increasing visitor use could have an effect on bears through increased bear/human encounters.

Preservation of the Going-to-the-Sun Road — (4-6 years) Reconstruction of the Going-to-the-Sun Road would temporarily displace bears from areas under construction. Closure to through-traffic could benefit bears by effectively closing part of one side of the park to vehicles for two years. This would reduce disturbance to bears and the potential for bear/human encounters. Reconstruction over a shorter timeframe would also benefit bears by reducing the overall length of construction disturbance along the road. Grizzly bears in less frequented areas of the park could be adversely affected as visitors displaced from the Going-to-the-Sun Road corridor began to use other areas such as Many Glacier, Two Medicine, the North Fork, and Cut Bank in greater numbers.

(10 ± years) The effects of accelerated reconstruction of the Going-to-the-Sun Road would be similar to those described under the no-action alternative because construction methods would be similar. However, construction would be completed in a shorter time frame than the no-action alternative, which would have fewer adverse effects on bears.

Scenic Air Tours — Bears would probably benefit where scenic air tours are restricted because of decreased disturbance. However, concentrated operations or increased frequencies in other areas could adversely affect bears, (see discussion under the no-action alternative).

Winter Use — Winter or year-round operation of the Village Inn and Lake McDonald Lodge could result in increased human/bear conflicts in the spring and fall. Repeat encounters would result in hazing or relocation. Survival and reproduction can be affected by displacement to less productive habitat. Increased visitor use in spring, summer, and fall would result in greater potential for human/bear conflicts in areas surrounding developed sites in the park.

Divide Creek Flood Hazard — Channelization of Divide Creek would not affect bears because bears do not frequent this developed area.

West Side Discovery Center and Museum — Depending on where the new west side discovery center was located, bear habitat and use outside the park could be affected. Further analysis would be completed as part of the site selection process.

Peregrine Falcons.

Although suitable habitat exists in many locations throughout Glacier, this species is rarely recorded in the park and there are no known park nest sites. No effect on this species would be expected.

Federally Proposed Species*Lynx.*

Expansion of the Logan Pass parking area or channelization of Divide Creek would not affect lynx because the actions would not affect suitable habitat. Based on very limited information on lynx use in the park, it is believed that they could be adversely affected if winter use increased significantly in areas such as the McDonald Valley, the east side of the park, and other suitable coniferous forest habitats. Lynx could benefit from restrictions on overflights by decreasing the potential for human disturbance. Lynx would probably not be affected by development of a west side discovery center outside of the park, depending on its location. Further analysis would be completed as part of the site selection process.

Visitor Use on the Going-to-the-Sun Road — Lynx would probably not be affected by construction of facilities in areas or corridors of development and concentrated use because there is little documentation of lynx using roadside areas. This would include construction of additional pullouts, picnic areas, trails, and transportation system parking along the Going-to-the-Sun Road, or the reconstruction of overnight facilities at Many Glacier, Rising Sun, and Swiftcurrent and other visitor facilities.

State-Listed Rare Species*Marten, Fisher, and Wolverine.*

Increasing day and overnight winter use in the lower elevations of the park would further reduce habitat suitability and use (see no-action alternative discussion).

There would be no effect on the other state-listed species, although these species could benefit from restrictions on overflights.

Conclusion. Bald eagles could be negatively impacted by increasing levels of human use near Lake McDonald and St. Mary Lake. Of particular concern are impacts on eagles associated with increased levels of human use in the Lake McDonald Lodge area during the eagle nesting period. Some impacts on eagles could be mitigated by area closures around nest sites. As overnight use increased during winter, wolves and their prey could be displaced in the Many Glacier and St. Mary Valleys and in the lower North Fork Valley. Grizzly bears could be negatively impacted by parking lot expansion, increasing levels of visitor use at Logan Pass and the reconstruction of the Going-to-the-Sun Road. Grizzly bear impacts

include habituation for some bears, displacement, disruption of travel patterns, and increased frequency of bear/human encounters. Bears and eagles would benefit from reduced human disturbance if scenic air tours were banned over selected portions of the park; however, impacts on bears and eagles would continue in areas where scenic air tours were allowed.

Cumulative Impacts. *The Grizzly Bear Recovery Plan* for the Northern Continental Divide Grizzly Bear Ecosystem Management Area, as developed by the U.S. Fish and Wildlife Service and the Interagency Grizzly Bear Committee (in which the park staff participates), outlines the park's responsibility for actions necessary for the conservation and recovery of the grizzly bear. Implementation of this plan would result in positive cumulative benefits for the recovery of the grizzly bear.

The actions called for in the *Montana Bald Eagle Management Plan*, completed by state and federal agencies with private landowners, would result in positive cumulative impacts on the recovery of the bald eagle in the ecosystem. The management goal for Montana is to provide secure habitat for bald eagles and to maintain a viable, healthy, and self-sustaining population. However, productivity (the number of young produced and fledged) of eagle nests in the park is poor and is below the level established for recovery of the species. The low productivity is attributed to a relatively short nesting season, a decline in native fish populations, and recreational facility development and associated use in the nesting territories.

The implementation of actions called for in the *Northern Rocky Mountain Wolf Recovery Plan* would result in positive cumulative impacts for the gray wolf. A viable prey base and secure denning areas are particularly important. Disruption of prey, particularly on winter range, coupled with continued development outside the park, could have adverse cumulative effects.

Management actions as proposed in these other alternatives and actions outside the boundary, such as coal mining and logging in British Columbia and on national forest lands in the United States, increased private development in the North and Middle Fork Valleys and the corridor between West Glacier and Columbia Falls, increased freight train traffic carrying hazardous materials and grain, and gas and oil leases and private development on the Blackfoot Indian Reservation, could cumulatively affect wildlife populations and habitat. Because the park is not large enough to support sustainable populations of all these species, the impacts could be cumulative and adverse. Cumulative impacts on fall, winter, and spring habitat could be greater for the winter use proposal in these alternatives than in the no-action alternative or the preferred

Impacts on Wildlife Other than Listed Species

Impact Analysis

Visitor Use on the Going-to-the-Sun Road — Expanding parking at Logan Pass would remove habitat and displace bighorn sheep, mountain goats, and white-tailed ptarmigan that inhabit the area. Those species that were not displaced would

habituate to increased numbers of people. Habituated ungulates might have to be trapped and relocated. Expansion of the parking lot underground would remove less habitat than expanding the lot aboveground.

Increased use of the Going-to-the-Sun Road and the new pullouts, trails, and picnic areas along the road would result in further loss of habitat and disturbance of various wildlife species that live or travel close to the road. Ungulates would probably be displaced from areas adjacent to the road, but their distribution would probably not be affected. There would be minor displacement of ungulates along roadsides. Habituated ungulates might have to be trapped and relocated from some roadside areas.

Preservation of the Going-to-the-Sun Road — (4-6 years) Reconstruction of the Going-to-the-Sun Road would temporarily adversely affect wildlife species that live or travel near or cross the road. Wildlife would be temporarily displaced during construction. No long-term effects are expected. Closing one side of the road during reconstruction for about two years would benefit wildlife because there would be less human activity in the closed area. However, wildlife could be temporarily affected by increased visitation in other areas of the park during reconstruction.

(10± years) Reconstruction of the Going-to-the-Sun Road would temporarily adversely affect wildlife species that live or travel adjacent to or across the road. Wildlife would be temporarily displaced during construction. No long-term effects are expected.

Scenic Air Tours — Wildlife in the areas where air tours were restricted would benefit from the reduction in disturbance. Wildlife in the areas where scenic air tours concentrated or operated more often would be disturbed and possibly displaced.

Winter Use — Continued and increased winter use in the lower elevations of the park would adversely affect wildlife that are active in the winter, potentially displacing them from areas near roads, trails, and developed areas. It could also result in habituation and could lead to more conflicts with habituated wildlife. Plowing access roads into the park could increase illegal hunting. Wildlife would be subject to additional human-induced stress during an already vulnerable time in the fall, winter, and spring. Animals remaining in the area would expend more energy avoiding intrusion, and this could affect survival and reproduction. Potential effects would probably be accentuated by naturally difficult times such as severe winters. This alternative would have a greater potential to impact wildlife than the other alternatives because the degree of human activity would increase and the timeframe of that activity would be extended to day and night and into the winter and shoulder seasons.

Divide Creek Flood Hazard — Channelization of Divide Creek and continued use of the developed area would not have any additional effects on wildlife. Animals would continue to avoid this area of concentrated human activity.

West Side Discovery Center and Museum — Development of a west side discovery center outside of the park could affect wildlife habitat depending on where

the facilities were relocated. Further analysis would be completed as part of the site selection process.

Conclusion. Construction associated with expansion of Logan Pass parking lot and road reconstruction would result in temporary disturbance and displacement for many species and a small amount of habitat loss for some species. Increasing winter use could cause displacement and stress for such animals as deer, elk, and mountain lions that concentrate in lower elevation valleys during the winter. Many species, especially those that summer at higher elevations, would benefit from reduced human disturbance by the banning of scenic air tours over selected portions of the park; however, wildlife impacts would continue in areas of the park where scenic air tours were still allowed.

Cumulative Impacts. Management actions as proposed in these other alternatives and actions outside the boundary, such as coal mining and logging in British Columbia and on national forest lands in the U.S., increased private development in the North and Middle Fork Valleys and the corridor between West Glacier and Columbia Falls, increased freight train traffic carrying hazardous materials and grain, and gas and oil leases and private development on the Blackfoot Indian Reservation, could cumulatively affect wildlife populations and habitat. Because the park is not large enough to support sustainable populations of all these species, the impacts could be cumulative and adverse. Cumulative impacts on fall, winter, and spring habitat could potentially be greater for the winter use proposal included in these alternatives than the no-action alternative or the preferred.

Impacts on Vegetation, Including Species at Risk and State and Park-Rare Plant Species

Impact Analysis.

Visitor Use on the Going-to-the-Sun Road — Expanded development in the Logan Pass area would completely destroy vegetation in the area to be paved. Construction inside the current footprint would cause short-term impacts on vegetation in the surrounding area from trampling. Groundbreaking and other construction-related activity would, for the short-term, increase the chances for the introduction and spread of noxious weeds and other exotic plants. Construction areas would be limited to the minimum necessary to complete the project.

Expanding Logan Pass parking lot could have a direct adverse impact on one species at risk, the lens-fruited sedge (*Carex lenticularis* var. *dolia*) and one state-rare plant, the Mingan Island moonwort (*Botrychium minganense*). These two plant populations would be avoided or, as a last resort, moved to similar habitat to avoid adversely affecting them. Survival rates for transplanted populations are unknown.

An indirect adverse effect of expanding Logan Pass parking lot would be increased visitation in the area. More people would be in the area at any given time, which could cause management problems, including overloaded facilities. With the increase in numbers, people might be less likely to stay on the boardwalk and other designated trails. Off-trail use in the area has the potential to adversely

impact two species at risk, the lens-fruited sedge and alpine glacier poppy. State-rare plant species that could be adversely impacted are the three-flowered rush, little false asphodel, and Mingan Island moonwort. Management actions would be taken to protect these species.

Modifying existing or constructing additional pullouts, picnic areas, and trails along the Going-to-the-Sun Road would not affect any known population of rare plants; however, additional use at these areas could have adverse impacts. Mitigation, such as changing the location of a pullout, modifying design, or limiting the areas open to visitors outside the developed area, would reduce adverse effects. Alpine glacier poppy and lens fruited sedge (species at risk) and three-flowered rush, little false asphodel, mingan island moonwort, lyre-leaf rockcress, and northern eyebright (state-sensitive species) could be affected. Each area would be surveyed prior to development of a site design to ensure that all plant locations were noted. The site design would avoid all known rare plants. As a last resort, rare plants that could not be avoided would be moved to suitable and similar habitat nearby. These actions would ensure that there would not be significant adverse impacts on rare plants. Marking the plant locations during construction would protect these species from accidental trampling.

Preservation of the Going-to-the-Sun Road — (4-6 years and $10 \pm$ years) The same plants could be adversely affected by reconstruction of the Going-to-the-Sun Road. Mitigation would be implemented to avoid adversely affecting these plants. It could include either marking the site to be avoided or, as a last resort, relocation of the plants to similar habitat. Transplanting of rare species has not been done at Glacier. The success rate of this mitigation would have to be evaluated. There could be some adverse effects on the Cedar-devils Club habitat at Avalance from using this and as a closure point for two years during reconstruction. However, it is unknown at this time exactly how Avalance would be modified or more parking would be provided.

Scenic Air Tours — Species at risk or state-rare plant species would not be adversely affected because the aircraft do not land in the park.

Winter Use — Species at risk or state-rare plant species would not be adversely affected because they are dormant in the winter.

Divide Creek Flood Hazard — No species at risk or state rare plants are present.

West Side Discovery Center and Museum — There is one known state-listed rare plant, but there are no federally listed species at risk in the area. During design and site selection, areas would be surveyed. Any threatened or endangered species or species at risk found would be avoided or, as a last resort, moved to similar habitat to avoid adverse effects. The state-listed rare plant would be avoided, or, as a last resort, moved to similar habitat to avoid adverse effects.

Vegetation (General).

Visitor Use on the Going-to-the-Sun Road — Vegetation in the area would be adversely affected if the parking lot was expanded on the surface. It is not known

how many acres would be affected. If the parking lot is expanded underground, vegetation would be adversely affected during the construction period, but areas would be revegetated when construction was completed. Vegetation could be adversely affected by increased trampling due to the increased numbers of visitors in the area. If the parking lot was tiered aboveground, vegetation would only be adversely affected temporarily during construction. The size of the expanded parking lot would be limited to the minimum necessary. All disturbed areas not covered by development would be reseeded with native species to speed the rate of recovery and to minimize the invasion of exotic species.

Approximately 0.25 acre of vegetation per site along the Going-to-the-Sun Road would be removed or adversely impacted for development (pullouts, trails, and picnic areas), but this would not be a significant adverse impact. The amount of vegetation would vary by the size of the site depending on the parking capacity, type of activity, resources at the site, the vegetation and soil conditions, and the degree of development already in place at each of the sites. Vegetation may be affected outside the immediate area as a result of social trails. Each area would be examined for trail development potential to minimize social trail development. Visitors would be instructed to remain on established trails. Vegetation along the road would be positively impacted by controlling the amount of trampling and damage that was done by visitors who stop on the side of the road. Since Logan maintenance pit is an already disturbed area and largely cleared of vegetation, vegetation would be minimally adversely impacted.

Preservation of the Going-to-the-Sun Road — (4-6 years and 10 ± years) Some vegetation would be adversely affected along the Going-to-the-Sun Road during reconstruction, but this would probably not be significant. This loss of vegetation could be mitigated by restoration of all locations along the road that were adversely affected by construction.

Scenic Air Tours — Vegetation would not be adversely affected because the aircraft do not land in the park.

Winter Use — Vegetation would not be adversely affected because plants are dormant in the winter, the area is snow-covered, and no new facilities are contemplated.

Divide Creek Flood Hazard — Riparian vegetation would be adversely affected by channelizing the creek because the banks would be hardened and vegetation would be removed.

West Side Discovery Center and Museum — Vegetation inside the park would not be adversely affected. Vegetation outside the park would be adversely affected in the area chosen for development.

Conclusion. Expanding Logan Pass parking lot would adversely affect one species at risk and one state-rare plant. It would also affect other vegetation in the area. Areas surrounding facilities at Logan Pass could be affected by increased numbers of people and more off-trail use. This would cause soil compaction and change the amount of moisture available to plants, which in turn might alter the relative abundance of some species and affect germination. Plants that invade disturbed areas might become more common. Increased erosion might lead to expo-

sure of root systems and the subsequent loss of more mesic plants. The impacts of trampling would range from complete exclusion of vegetation to slight shifts in species composition. Eliminating the need for off-road parking would have a positive effect, decreasing trampling of vegetation.

New or expanded development in areas that have rare plant populations would adversely affect these resources unless the plants in those areas were avoided or replanted in suitable habitat.

All disturbed areas not covered by development would be reseeded with native species to speed the rate of recovery and to minimize the encroachment of invading species.

Cumulative Impacts. Several of the rare and sensitive species in the park are found in few other locations in the region, so minor impacts on a few individual plants could have serious adverse impacts on some these species.

Impacts on Soils

Impact Analysis.

Visitor Use on the Going-to-the-Sun Road — Logan Pass contains moderately deep and shallow limestone soils that are rated low for road and trail construction due to their limited depth. These soils are also rated low in productivity and low for revegetation due to their high rock content and moderate erosion potential. During construction, measures would have to be taken to prevent loss of soils and to protect surrounding streams from erosion. After construction, extra care and expense would be needed to ensure that revegetation efforts were successful. The subsoil materials just above the fractured bedrock are well suited to road and trail construction because of the high rock content and good drainage. Expanding Logan Pass parking lot below ground would not adversely affect surface soils except during construction. The subsurface soils and bedrock would be significantly adversely impacted due to blasting and removal of material. Blasting could cause increased fractures in the bedrock surrounding the developed area, adjacent to the parking lot. All of the possible effects of increased fracturing are unknown, but it could lead to instability of the road and visitor center. Expanding Logan Pass parking lot by building a tiered lot would not adversely affect soils except during construction if work was necessary beyond the parking area.

The development of additional pullouts, picnic areas, restrooms, a large parking area at Logan maintenance pit, and short trails along the Going-to-the-Sun Road would result in adverse impacts on soils. There would be soil compaction at all sites developed for visitor use, and development would remove them from production of natural vegetation. Soils throughout the road corridor are moderately susceptible to weed invasion. Soils on the east side are more subject to erosion than on the west side, so during construction soils would be adversely impacted by erosion on the east side unless mats for stabilization, immediate revegetation, and other mitigation measures were used. The shallow soils in the Lunch Creek area would make revegetation and control of erosion critical during construction. These

soils are suitable for trail development. The soils on the west side of Logan Pass are moderately suitable for waste disposal such as septic tanks; however, in the Road Camp area on the west side, the soils are shallow with a low water-holding capacity. On the east side of the pass soils are not suitable for waste disposal in the higher elevations due to the shallow depths and low rock content. Soils in the lower elevations on the east side around St. Mary Lake are moderately suitable for waste disposal.

Preservation of the Going-to-the-Sun Road — (406 years and $10 \pm$ years) The effects of reconstructing the Going-to-the-Sun Road would be similar to those in the no-action alternative.

Soils would be adversely affected during road reconstruction. Adverse effects would be temporary and most would be mitigated to reduce the amount of sediment entering water courses. All soils on which the vegetation has been removed would be revegetated, which would protect the soils from wind.

Scenic Air Tours — This would not adversely affect soils because aircraft do not land in the park.

Winter Use — Placing water and sewerlines deeper into the ground for the Lake McDonald Lodge and the Village Inn would disturb soils but would not adversely impact them, since these soils were disturbed when the lines were originally installed.

Divide Creek Flood Hazard — Rocky and sandy alluvial grassland soils would be adversely impacted by the channelization of Divide Creek. Annual work using heavy equipment and the initial construction would each have effects. These soils are highly susceptible to invasion by weeds and have a moderate erosion potential. Annual expenditures would be necessary to maintain the area, keep it free from exotics, and ensure the success of native vegetation.

West Side Discovery Center and Museum — Soils inside the park would not be adversely affected. Soils outside the park in the area to be developed could be adversely affected. Analysis would be done after a site is chosen.

Conclusion. Soils in the Logan Pass and the Divide Creek areas would be adversely affected by expanded development. Soils along the Going-to-the-Sun Road would be temporarily affected, but mitigation would reduce the effects.

Cumulative Impacts. There would be no regional cumulative impacts on soils from development in the park.

Impacts on Natural Sounds

Impact Analysis.

Visitor Use on the Going-to-the-Sun Road — During construction, noise levels would increase in the Logan Pass area, adversely affecting natural sounds. After construction was completed, the ability to hear natural sounds would be restored. During times of high visitation in the Logan Pass area, natural sounds would be adversely affected by vehicle noise and by the large numbers of people.

Modification of existing and construction of additional pullouts would temporarily increase noise levels in the park, reducing the natural quiet in the park.

Preservation of the Going-to-the-Sun Road— (4-6 years) Noise levels would temporarily increase in the park along the road corridor and adversely affect natural sounds. The effects would be negligible because only a few visitors would be in the construction area and fewer years would be spent on the construction.

(10± years) Noise levels would temporarily increase in the park along the road corridor, adversely affecting natural sounds.

Scenic Air Tours — Natural sounds would continue to be adversely affected and noise levels would increase in those areas of the park where air tours were permitted. Management of scenic air tours would increase opportunities to hear natural sounds in other areas of the park. Directing air tours over areas such as the Going-to-the-Sun Road would incrementally add to the noise in that corridor, further masking and adversely affecting natural sounds and the ability to hear them.

Winter Use — Providing more winter opportunities, including overnight accommodations, would probably have a negligible effect on natural sounds. Concentrated use would focus around existing developed areas.

Divide Creek Flood Hazard — Natural sounds would be adversely affected temporarily during construction to complete the channelization. Annual work inside the creek would be noisy and would temporarily adversely affect natural sounds.

West Side Discovery Center and Museum — Natural sounds inside the park would not be adversely affected.

Conclusion. Natural sounds would continue to be adversely affected by scenic air tours in some areas, which would worsen in areas with high concentrations and improve where the flights were restricted. Increased visitation at Logan Pass would also increase noise.

Cumulative Impacts. Limiting scenic air tours in the park might increase their frequency outside the park and the industry could expand. This could result in a cumulative impact on natural sounds.

Impacts on Biological Diversity

Impact Analysis.

Visitor Use on the Going-to-the-Sun Road — Impacts on biodiversity would include the removal of fragile alpine vegetation, which would impact a limited park ecosystem. This plant community has evolved over thousands of years to extremely harsh climatic conditions. Once disturbed, the diversity of such communities takes far longer to become reestablished than would similar disturbance at lower elevations. Wildlife, including grizzly bears, would be impacted by construction-related noise and by the expansion of the area of disturbance at Logan Pass. The Logan Pass area provides very important summer feeding areas for bears and other species and is a natural wildlife corridor.

The modification of existing or development of additional pullouts, picnic areas, parking, and trailheads along the Going-to-the-Sun Road might not adversely affect biodiversity by contributing to additional habitat fragmentation. The vegetation disturbance or removal that often accompanies construction could also provide optimal conditions for exotic species to grow and spread if not contained by aggressive management actions. The presence of exotic species reduces biodiversity in plant communities.

Biological diversity could also be reduced if new roadside facilities result in damage to or removal of portions of sparsely distributed plant communities such as the mature cedar-hemlock forests in the McDonald Valley.

The development of additional pullouts, picnic areas, and trailheads along the Going-to-the-Sun Road has the potential to disturb feeding, nesting, or roosting bald eagles and to reduce the chances for reproductive success. Similarly the development of new trails along the Going-to-the-Sun Road has the potential to displace grizzly bears and to increase human-bear encounters. These actions could adversely affect biodiversity in the long run. Wildlife travel corridors could be disrupted and the use of feeding areas could be precluded.

Preservation of the Going-to-the-Sun Road — (4-6 years) Reconstruction activities could have a minor impact on biodiversity by displacing wildlife from the reconstruction areas and by obstructing wildlife movement and migration. This could be especially true for grizzly bears that use high elevation habitat along the road during the time when reconstruction would occur. Diversity of roadside plant communities could also be slightly impacted because ground disturbance provides optimal growing conditions for exotic plants. Impacts on animal biodiversity would be partially mitigated by closures of portions of the road to visitor traffic. Impacts on plant biodiversity would be partially mitigated by aggressive management actions, including prompt revegetation with native species and the use of selective herbicides.

Impacts under a 10± year would be the same as those from the 4-6 year reconstruction alternative.

Scenic Air Tours — The noise of scenic air tours indirectly impacts biological diversity. Specific impacts include dispersal, interruption of courtship behavior, disturbance during critical feeding periods (early spring and fall), and increased energy expenditure.

Excluding scenic air tours from the North Fork, Middle Fork, Two Medicine, Goat Haunt, and Belly River areas should result in less impact on biodiversity.

Winter Use — Increased and dispersed winter use should have little or no impact on the diversity of plants or plant communities in the park. The proposed changes could, however, result in long-term impacts on animal biodiversity.

During the winter many species concentrate in lower valleys where there is less snow and where food is more likely to be found. This is especially true for ungulates such as elk and deer and for the wolves and cougars that prey on them. Keeping selected lodges open in the winter or plowing additional roads could result in temporary displacement of such species from their winter ranges. This would cause additional energy consumption at a time when the animals are already

under climatic stress and when food is limited. For threatened and endangered species such as the wolf and for species of concern such as the wolverine and lynx (species whose numbers in the park are already very low [Yates 1994]) the additional stress caused by increased human presence during the winter could cause such populations in the park to decrease.

Divide Creek Flood Hazard — Channelization impacts the biological diversity of aquatic ecosystems by preventing the periodic flooding of adjacent wetlands, speeding water flow, and replacing irregular streamside habitat with a hardened bank. Channelization of lower Divide Creek would have adverse impacts on the aquatic and wetland ecosystems associated with this drainage and to the biodiversity in this area because aquatic resources would be destroyed or displaced.

West Side Discovery Center and Museum — Impacts on the biological diversity of the park and the surrounding area would depend upon the location of the facility and the magnitude of the disturbance. Location of the facility along Highway 2 near the park could impact the migration of species between park and adjacent wildlands.

Conclusion. Implementation of any one or all of these additional alternatives would not result in the elimination of any plant or animal species from the park. There would, however, continue to be impacts on individual species and on some of the biological communities. Some of these impacts could weaken biological diversity by damaging community integrity and habitat use, by preventing species numbers from naturally expanding, or by interfering with genetic interchange.

Cumulative Impacts. Regional threats to biological diversity would result from habitat fragmentation and degradation of important winter range areas outside the park on the east and south sides as these areas continue to be developed for residential and commercial use and by plowing park roads (particularly on the east side) in or near wildlife wintering areas.

IMPACTS ON THE CULTURAL ENVIRONMENT

Impacts on Cultural Resources

Impact Analysis.

Visitor Use on the Going-to-the-Sun Road — The Going-to-the-Sun Road is a national historic landmark. The expansion of the Logan Pass parking lot would be designed to avoid impacts on any of the features that contribute to the significance of the road. The parking lot area is not historic in surface, size, shape, or appearance. There are archeological resources in the Logan Pass area, which would be avoided or the effects of construction mitigated. Consultation with American Indian tribes would ensure protection of the resources that they deem culturally significant in this area.

The Going-to-the Sun Road has 15 features that have been identified along its length that define its historic character and that could be adversely affected by development or modification of the road. These features are: the road, Sprague

Creek culvert, Snyder Creek culvert, the horse trail underpass (west), Avalanche Creek bridge, Logan Creek bridge, the west side tunnel, Granite Creek culvert, Haystack Creek culvert, Triple Arches, east side tunnel, Siyeh Creek culvert, Baring Creek bridge, St. Mary River bridge, and Divide Creek bridge. Modification of existing and construction of new pullouts and visitor use areas along Going-to-the-Sun Road and the expanded transportation system would directly impact cultural resource values, but that effect could be mitigated through good design. A pullout at Sunrift Gorge might allow the national register site nearby to be interpreted. Indirectly, these facilities would increase the visitor parking capacity, which would increase wear and maintenance needs.

A patrol cabin near Sunrift Gorge has been listed on the National Register of Historic Places. Development in the area would increase the danger of vandalism.

Careful review during design would allow avoidance of all known archeological resources near parking lots, trails, the discovery center and museum, and road reconstruction areas.

Preservation of the Going-to-the-Sun Road — (4-6 years) This alternative would offer the best preservation of the cultural resources of the Going-to-the-Sun Road because the reconstruction work would be done in the least amount of time, and expected structural failures would be minimized.

The 10± year timeframe would address the most serious structural retaining wall problems before the walls fail. Such failure would cause a loss of cultural resources, additional expense, and major disruption of visitor use. Timely reconstruction would result in preservation of the cultural resource values of the road.

There would be a risk that untried construction techniques such as prefabrication of stone wall segments offsite and construction of avalanche-resistant guard-walls would not work as well as is expected, and there could be delays. The 10± year timeframe would not provide for the degree of experimentation and testing of prototype designs that a 50-year construction period would allow.

Scenic Air Tours — The tours would not affect cultural resources because the aircraft do not land in the park. However, American Indian cultural activities could be disturbed and adversely affected by noise and visual intrusions.

Winter Use — Winter use of historic buildings would not affect historic buildings adversely and could benefit them because a constant temperature would be maintained. Modifications of the buildings to allow for winter use, such as the addition of insulation, would be done in accordance with the “Secretary of the Interior’s” Standards and Guidelines for the Treatment of Historic Properties.

Divide Creek Flood Hazard — There would be no effects on cultural resources.

West Side Discovery Center and Museum — There would be no effects on cultural resources.

Conclusion. Impacts on cultural resources in the Logan Pass area could be avoided through careful design and review. No cultural resources would be adversely affected by any of the other actions.

Cumulative Impacts. There would be no cumulative impacts on cultural resources as a result of any of these actions. Regular consultation with the

Blackfeet Tribal Business Council and the Flathead Cultural Protection Office would ensure that they would not be adversely affected by any of the alternatives. American Indian cultural use of areas in the park could be adversely affected by noise from scenic air tours.

IMPACTS ON THE SOCIOECONOMIC ENVIRONMENT

Impacts on Regional and Local Economies

Impact Analysis

Visitor Use on the Going-to-the-Sun Road — Expanding the parking lot would benefit the local economy because the construction project would create jobs and generate income. A definitive cost estimate is not yet available, but expanding the parking lot is not anticipated to be a major contribution to the local economy. However, during construction of the parking lot, Logan Pass would be closed, which would adversely affect the local and regional economies. Visitors have indicated that they would be less likely to visit the park if the pass were closed. This would be a short-term effect.

The positive economic benefits to the local and regional economies would continue. Visitor expenditures and expenditures for rehabilitation and maintenance of the road would also continue. Expansion of opportunities along the Going-to-the-Sun Road would probably have a positive economic benefit. Improving the public transportation system would also be expected to have a positive economic benefit.

Preservation of the Going-to-the-Sun Road — (4-6 years) The reconstruction of the Going-to-the-Sun Road would require closure of half of the road for a time. A loss in visitor spending throughout the state would result during construction, but there would be a contribution to the local and regional economies associated with the construction spending.

According to a study conducted by Bioeconomics, Inc., in 1997, it is estimated that park visitation would be reduced by 20 percent each year throughout the 4-6 year reconstruction period, which would be a reduction of 1.5 million visitors distributed over the 4-year construction period. This is slightly more than the largest annual decrease in park visitation in the last 10 years, which was 18 percent and was recorded in 1985.

Construction costs, estimated at \$70 million, are the lowest of any of the alternatives considered, well below the \$100 million estimated for the accelerated construction alternative and the \$150 million for the no-action alternative. It is less expensive to use larger contracts, and the absence of visitors in the construction zone would decrease the cost of reconstruction because contractors would not have to manage traffic while working on the road.

This alternative would have less negative overall effects on the economy of the state of Montana than the 10 ±-year reconstruction alternative. Reductions in visitor expenditures and the income of business owners, including the Blackfeet tribe,

would total \$48 million over the 4-year period. Montana contractors would have the opportunity to compete for approximately \$70 million in road reconstruction contracts.

It is expected that the 20 percent reduction in overall visitation to Glacier National Park would have an adverse effect on businesses in the gateway communities, but by delaying construction until 2006, time would be provided for local businesses to plan for the reduction. Gateway communities would be adversely affected during the time that the road was closed on the side where they operate. After the road opened, business would resume and could increase while the other side was closed.

(10 ± years) Since cross-park traffic would continue on a somewhat restricted basis, visitor spending would continue and local businesses would continue to benefit. Only a negligible change would be expected to the local and regional economies and would be substantially offset by the beneficial impacts associated with the construction project for the road.

Throughout the 10 ± year reconstruction period, it is estimated that visitation to the park would be reduced by an average of 12 percent each year. This amounts to a reduction of 1.8 million visitors over the 10 ±-year period with slightly larger reductions in the years when sections of the road would be closed completely. The 12 percent average reduction in use under this alternative is well within the 9 percent positive to 19 percent negative range in fluctuation of Glacier's visitation due to other factors such as weather, fees, and previous road reconstruction projects over the past 10 years.

Based on *Estimated Economic Impacts of the Going-to-the-Sun Road Closure and Reconstruction* (Duffield 1997) there would be negative and positive impacts on the economy of the state of Montana. There would be reductions in visitor expenditures to varying degrees for each of the eight years that the Going-to-the-Sun Road was under construction. This could be offset by support services (housing, food) required by the construction labor force. Visitor expenditures and personal income in the state would be reduced by \$51.5 million over the reconstruction period. Montana contractors would have the opportunity to compete for approximately \$100 million in road reconstruction contracts.

It is expected that the anticipated 12 percent reduction in annual visitation to Glacier National Park would have a disproportionately negative effect on businesses in the gateway communities.

By spreading the construction out over a longer period of time, less money would be invested during any particular year. Consequently, events such as unusually heavy snow, floods, and particularly rainy summers would have less of an effect on the overall reconstruction program. Because of the longer time frame the probability of scheduling conflicts (one portion not being finished causing a delay in a subsequent portion) would be reduced.

This alternative would cost approximately \$31 million more than the preferred alternative. This would be due largely to the expense of accommodating visitor traffic through the construction zones during the primary visitor use season, when most of the construction activity would have to take place. There would also

be cost increases during the four additional years that it would take to accomplish the work, or double the amount of time. Visitor use would be disrupted, but the disruption would be limited to short-term daytime closures for critical construction operations during the primary visitor use periods. Closure of the road at night and during spring and fall would impact fewer visitors because use of the road at night in the shoulder seasons is lower than summer day time use.

Scenic Air Tours — The economic impact of a regulated scenic air tour industry is difficult to predict and would depend largely on the effects that regulations had on industry growth. The anticipated impact would be similar to the impacts expected under the no-action alternative. There could be some loss in industrial output if regulation constrained industry growth.

Winter Use — This alternative would generate additional visitor spending and the construction spending necessary to convert the lodges for winter use. Bioeconomics, Inc., recognized a potential negative impact of accommodating winter use in Glacier National Park. They suggested that a shift away from out-of-park hotels to inside the park lodging would negatively impact some individual hotels outside the park. Traditional winter occupancy rates in the region are approximately 33 percent. Bioeconomics, Inc., suggests that the rate could be higher in the park, just as summer occupancy rates are higher in the park than they are outside.

Divide Creek Flood Hazard — The cost of channelizing Divide Creek has been estimated at \$800,000-\$6 million depending upon the design solution chosen. The construction project would contribute to the local and regional economy to a minor degree. An estimate of income and employment is not available for the channelization alternative.

West Side Discovery Center and Museum — The economic impact of constructing outside the park would be the same as constructing in the park in terms of the economic contribution to the local and regional economies. The estimated cost of constructing outside would be \$1.9 million. The model run by Bioeconomics Inc. suggested that an increased industrial output of \$3.06 million, a personal income increase of \$1.54 million, and an employment increase of 61 jobs would result from the discovery center project. Businesses in Apgar could be adversely affected if the visitor contact station were closed and the discovery center and museum were opened outside the park.

Conclusion. The contribution that Glacier National Park makes to the local and regional economies would continue with temporary disruptions during construction of an expanded Logan Pass parking lot. Visitor spending would remain substantially unchanged and the construction projects would benefit employment and income levels of northwestern Montana over time.

Cumulative Impacts. There would be no cumulative impacts.

Impacts on Local and National Visitors

Impact Analysis.

Visitor Use on the Going-to-the-Sun Road — The expansion of the Logan Pass parking area would accommodate more visitors using private vehicles and allow more visitors to experience this feature of Glacier National Park. Logan Pass is a destination for both local and national visitors. Adding more parking spaces would serve visitor needs until visitation increased to overflow the available spaces as has happened over time since the original construction. More crowding at the current facilities and on the trails in the area might be an indirect effect. During construction visitors would be temporarily adversely affected because they would not be able to stop at Logan Pass.

The expanded and improved transportation system would enhance visitor use for those who would like to experience Glacier National Park and the Going-to-the-Sun Road through the use of a shuttle system. If the transportation system provided more parking opportunities along the road, visitors in private vehicles would have an improved experience. Expanding opportunities along the corridor would enhance use, provide access to different resources, and improve appreciation for the park's various attractions.

Preservation of the Going-to-the-Sun Road — A 4-6-year construction period would have a positive effect on local and national visitors in the long term. During the reconstruction period, visitors on both sides of the park would be temporarily adversely affected; however, they would not be affected at the same time. The reconstruction period would be of short duration, limiting the time visitors would be adversely affected.

This alternative would have the positive effect of getting the reconstruction work done in the shortest amount of time. Visitor use would be disrupted for a total of only 4-6 years, but during that time travelers would not be able to go from one side of the park to the other on the Going-to-the-Sun Road. Logan Pass Visitor Center would remain open. The most likely closure points would be at the Avalanche and Rising Sun developed areas. This would disrupt the sightseeing and trail access that is normally available at these points.

Delays in cross-park travel, one-way traffic, and other possible means of control necessary during reconstruction of the road would inconvenience visitors to Glacier during the project. The impact would be worse for the national visitor than the local visitor because more detailed knowledge of construction activity would allow local visitors to adjust their travel patterns. This effect would be mitigated by increased information and communication with the visiting public outside the area.

(10± years) This alternative would keep the entire critical alpine section of the Going-to-the-Sun Road open to the public for the primary visitor use season throughout the time that the road would be under construction. The Logan Pass area would be open throughout the reconstruction period. There would be traffic delays and inconvenience associated with one-way use of the road, closures at

night, and closures during spring and fall. But the closures would be relatively short and would not affect large numbers of visitors since use is low during these times. The road could continue to be used as a way to get from one point in the park to another. However, use of the 10-mile section during construction would be limited to driving through a construction zone, use of the Logan Pass visitor center, or access to designated trailheads.

This alternative would cost about \$31 million more than the preferred alternative because of the expense of accommodating visitor traffic and cost increases during the additional years that it would take to accomplish the work. This alternative would double the time of disruption; however, the disruption would be limited to short-term daytime closures for critical construction operations. The road would be closed only at night and during spring and fall when not as many visitors would be affected.

Scenic Air Tours — Regulating scenic air tours would improve the backcountry experience of many visitors. By controlling flight locations and elevations, backcountry experiences in the North Fork, Middle Fork, Two Medicine, Goat Haunt, and Belly River areas would not be adversely impacted by mechanized sounds and visual intrusions. At the same time a regulated industry would continue to provide an experience for those visitors who prefer to fly over the park.

Winter Use — Accommodating increased day and overnight use, including lodging, would provide a visitor experience that is not now available. By providing winterized accommodations, plowed roads, and campstores, a new visitor experience would be available (see preferred alternative for other impacts).

Divide Creek Flood Hazard — Channelizing Divide Creek would have a positive effect on visitor use because road closure due to flooding would be less likely and better protection would be provided for facilities and visitors.

West Side Discovery Center and Museum — An adequate discovery center on the west side of the park would enhance information services, interpretation, and orientation. The west side discovery center would provide information about traffic congestion and might allow for better distribution of travelers to other areas of Glacier.

Conclusion. Providing overnight accommodations and enhancing access for day users would increase the range of experiences available for park visitors in the winter. More parking at Logan Pass would accommodate more private vehicles, which could lead to more crowding in the surrounding area. Visitors would be temporarily adversely affected during construction of the larger Logan Pass parking lot.

Cumulative Impacts. Regulation of scenic air tours would improve visitor experiences in the North Fork, Middle Fork, Two Medicine, Goat Haunt, and Belly River areas. Channelizing Divide Creek could have a beneficial effect on visitors in the St. Mary area.

Impacts on Energy Consumption

Impact Analysis.

Visitor Use on the Going-to-the-Sun Road — Beyond the energy necessary to construct the expanded parking lot, no increase is anticipated in energy consumption. The Going-to-the-Sun Road would continue to offer the road corridor as the primary visitor attraction of Glacier National Park. There would be no significant change in energy consumption. The improved transportation system might reduce use of private vehicles, which would reduce consumption.

Preservation of the Going-to-the-Sun Road — (4-6 years) Reconstruction of the Going-to-the-Sun Road would increase consumption of energy temporarily during the reconstruction period because traffic would be rerouted to Routes 2, 49, and 89, which would increase the distance traveled.

(10± years) Traffic delays would result in increased energy consumption because vehicles would spend additional time idling during the delays.

Preservation of Historic Hotels and Visitor Services — The rehabilitation of the lodges would incorporate many energy conserving technologies and would result in a net reduction in energy consumption in the park.

Traffic delays would result in increased energy consumption because vehicles would spend additional time idling during the delays.

Scenic Air Tours — Allowing scenic air tours over some parts of the park and not others would not change the energy use in Glacier National Park.

Winter Use — The expansion in winter use would result in more visitors and a modest increase in energy consumption. The numbers of visitors attracted are expected to be small (Bioeconomics Inc.). The addition of overnight accommodations would increase consumption. However, the lodges open for use would be winterized and would incorporate energy saving technologies. This action would result in an overall increase in consumption.

Divide Creek Flood Hazard — There would be no impact on energy consumption beyond the energy needs of the channelization project itself and annual maintenance.

West Side Discovery Center and Museum — Air conditioned and heated spaces would increase energy consumption modestly. Energy saving technologies would be incorporated into the design.

Conclusion. For the most part no impact on energy consumption would result from implementation of the above actions. Winter use would increase energy use, but new energy saving technologies would be employed to limit the increase.

Cumulative Impacts. No cumulative impact on energy consumption of any magnitude would result.

Impacts on Environmental Justice

Impact Analysis. None of the actions would adversely affect environmental justice because no actions would affect minority populations disproportionately. The alternatives would not disproportionately adversely affect minority or low income populations because the actions recommended would affect all populations equally.

Conclusion. There would be no effects on minority or low income populations.

Cumulative Impacts. There would be no cumulative impacts.

Impacts on Owners of Land in the Park and Adjacent to the Boundary

Impact Analysis.

Visitor Use on the Going-to-the-Sun Road — Owners of land in the park or adjacent to the boundary would not be adversely affected by development of new pullouts, trails, and picnic areas, an expanded transportation system or an expanded Loagn Pass because development would not occur near private land.

Preservation of the Going-to-the-Sun Road — (4-6 years) Reconstruction of the Going-to-the-Sun Road could adversely affect landowners by temporarily delaying access to their properties during reconstruction. Although the road reconstruction and closure at Avalanche is past any private property in the park, landowners could be temporarily delayed by construction equipment and increased congestion. The effects would be temporary and would last only until reconstruction was complete.

(10± years) Reconstruction of the Going-to-the-Sun Road could adversely affect landowners by temporarily delaying access to their property during reconstruction.

Scenic Air Tours — There would be no adverse impacts on landowners. Regulating scenic air tours might improve the experience of some landowners by controlling the mechanized noise and intrusions of scenic air tours. It could increase the amount of scenic air tour activity in the Going-to-the-Sun corridor, increasing the noise levels and disturbance for visitors around Lake McDonald.

Winter Use — Landowners inside the park boundary could be affected by increased winter use of the park, which could increase the risk of vandalism. However, increased visitor activity might also discourage acts of vandalism. Access could become more difficult for landowners who live in the park in the winter due to a change in plowing.

Divide Creek Flood Hazard — There are no private landowners in the park at St. Mary.

West Side Discovery Center and Museum — Landowners in the park would not be adversely affected since the structure would not be constructed in the park. Landowners outside the park would not be adversely affected because if private

land was purchased, the landowner would be a willing seller and would receive market value for the property.

Conclusion. Landowners inside the park would not be adversely affected by any of the above actions. They would benefit from the removal of air tours from the park. Landowners in the vicinity of Lake McDonald would be more affected by scenic air tours if they were restricted to the Going-to-the-Sun corridor. Channelization of Divide Creek would have a positive impact, providing protection of adjacent private property.

Cumulative Impacts. Cumulative adverse impacts on landowners outside the park would occur from increased scenic air tour activity combined with increased development and growth in the areas surrounding the park.

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Public Involvement

Public involvement was extensive during the general management planning process at Glacier National Park. As part of the process six newsletters were distributed and two series of public meetings were held.

The National Park Service sought public input throughout to help refine the planning process, to scope the issues to be addressed in the plan and environmental impact statement, and to identify alternatives for the future of Glacier.

Public involvement activities provided a means for people at the local and the national level to comment on the plan. Each phase of the process featured a variety of events and meetings that provided forums for public expression and opportunities for dialogue between the National Park Service and the public as well as written comments.

SCOPING

The planning process officially began with a notice of intent to prepare an environmental impact statement for Glacier National Park general management plan in the Federal Register (vol. 60, no. 67, of April 7, 1995, p.17804-17805). Public involvement began with the distribution of a one-page mailer in March 1995 to introduce the general management plan and to invite the public to attend open houses.

PUBLIC MEETINGS

Nine open houses were held in the spring 1995. In Montana, there were meetings in Browning, Great Falls, Helena, Kalispell, Missoula, St. Mary, and West Glacier. In Canada meetings took place in Lethbridge, Alberta, and Fernie, British Columbia.

Newsletter 1

Sent to the public in June 1995, *Newsletter 1* included draft park purpose and significance statements, planning issues, a description of the planning process, and a schedule for the general management plan. A comment form was included to request comments on park purpose and significance and issue statements. Prior to *Newsletter 1*, the park had received 2,000 individual comments from the open

houses and letters. In response to *Newsletter 1*, approximately 300 letters were received.

Newsletter 2

Newsletter 2, sent in November 1995, presented the revised purpose, significance, and planning issues. Revisions were made based on park staff and public comments. The newsletter also included an update on the planning process and schedule and described what the public could expect next.

ALTERNATIVE DEVELOPMENT

Newsletter 3

In July 1996 *Newsletter 3* was distributed to the public, presenting preliminary draft alternatives. Glacier's role in the ecosystem was also included. Also included in *Newsletter 3* was a comment form. Comments were due by August 30, 1996. Due to the high level of public interest the deadline was extended to October 1, 1996.

Public Meetings

Twelve public meetings were held between August 12 and August 25, 1996. The meetings were held in Montana in Browning, St. Mary, West Glacier, Pablo, Missoula, Columbia Falls, Helena, Great Falls, and Kalispell. In Canada, the meetings were held in Fernie, British Columbia, and Lethbridge and Waterton Townsite, Alberta. A total of more than 1,300 people attended the 12 meetings.

In general, the preliminary draft alternatives were not well received by the public as evidenced by the written responses and testimony received at the public meetings.

Content Analysis

In September, October, and November of 1996, an analysis of comments on *Newsletter 3* was conducted under contract by the Flathead National Forest. A team of Glacier National Park and Flathead National Forest employees entered comments from approximately 1,600 written comments (letters and the response sheet included in *Newsletter 3*), petitions, and the 12 public meetings into a computerized database. Comments were classified into more than 100 different subjects. The database allowed searches by subject, word, and individual letter so that park managers could easily refer to public comments as they proceeded with the planning effort.

The content analysis was one of the tools that the planning team used to understand how the public felt about *Newsletter 3*. Responses came in the form of letters and petitions, over the Internet, on a newsletter response sheet, through

public meetings, and through comments from park staff. Respondents included people who attended public meetings, Glacier National Park staff, university staffs, professional societies, recreational/multiple use organizations, local community officials, businesses, conservation and preservation groups, elected officials, county representatives, and other federal agencies. There were 826 individuals from Montana and 603 people from other states who commented. Six petitions were received with more than 1,400 signatures. There were 22 individuals from foreign countries who responded. Many people wrote more than one letter.

The deadline for public comment in response to *Newsletter 3* was October 1, 1996. However, the park continued to receive comments on a daily basis after October 1. Those comments were not recorded in the database/content analysis but were considered as the park staff moved forward with new alternative development.

Newsletter 4

The purpose of *Newsletter 4*, distributed in December 1996, was to update the public and maintain a dialogue as the comments continued to be analyzed.

Newsletter 5

Sent to the public in April 1997, *Newsletter 5* presented a summary of the content analysis of public comment on *Newsletter 3*, letting the public know who responded and what was heard. Also included was a postage paid mailer for people to use to request a copy of the Synopsis of Public Comment on *Newsletter 3*. Among others, one of the comments heard frequently from the public was “leave it like it is” and “why fix something that isn’t broken?” For this reason, the planning team decided to present some of the issues facing park managers. In *Newsletter 5*, the four issues presented were “Deterioration of Historic Park Lodges and Other Buildings,” “Commercial Helicopters and Fixed-Wing Air Tours,” “Increasing Park Visitation,” and “Rehabilitation of the Going-to-the-Sun Road.” Because a general management plan is supposed to provide a framework for making decisions into the future, the planning team began working on defining future management goals and objectives for the six commonly known areas or geographic areas introduced in *Newsletter 5* (Goat Haunt, Many Glacier, Two Medicine, Middle Fork, North Fork, and Going-to-the-Sun Road).

Newsletter 6

Sent in August 1997, *Newsletter 6* presented an overall park management philosophy and guiding philosophies for each of the six geographic areas in the park (Goat Haunt, Many Glacier, Two Medicine, Middle Fork, North Fork and Going-to-the-Sun Road corridor). As in *Newsletter 5*, some of the many challenges facing the park were presented in more detail. The issues mentioned were regional challenges, visitor use on Going-to-the-Sun Road, heritage and lodging, and scenic air

tours over Glacier National Park. The public was encouraged to continue sending any comments they might have.

Focus Groups on Issues

Between September 2 and October 15, 1997, focus group meetings were held on the issues described in Newsletter 6: heritage and lodging, regional challenges, increasing use on the Going-to-the-Sun Road and scenic air tours over Glacier National Park. The purpose for these groups was to gather ideas for resolving these issues while discussing them in more depth. To ensure that a range of ideas would be heard, people with varying expertise and viewpoints were invited to each meeting. The ideas from the focus groups, as well as all the ideas and comments received from the park staff and public since the project began, were used by the planning team to develop new GMP alternatives.

The groups were constantly reminded that they were not there to reach consensus or give advice on what should and should not be considered. The groups were not asked to meet again.

SPEAKING ENGAGEMENTS

Various groups requested that park staff speak with them during the planning process. These included:

- Friends of Glacier
- Montana Wilderness Association
- Columbia Falls Chamber of Commerce
- Flathead Area Associated Chamber of Commerce
- Shelby Chamber of Commerce
- Kalispell Chamber of Commerce
- Glacier-Waterton Visitor Association
- Hungry Horse Ranger District, Flathead National Forest
- University of Montana (individual classes)
- Iowa State University (individual classes)

American Indian Consultation

Two local American Indian Tribes (Blackfeet and the Confederated Salish and Kootenai tribes) have been involved throughout the planning process. The Blackfeet Indian Reservation borders the east boundary of Glacier National Park. The Confederated Salish-Kootenai tribes reside on the Flathead Reservation, southwest of Glacier National Park. Ongoing informal discussions are taking place with both tribes.

PUBLIC INVOLVEMENT ON THE DRAFT GENERAL MANAGEMENT PLAN AND ENVIRONMENTAL IMPACT STATEMENT

The *Draft General Management Plan and Environmental Impact Statement* was released to the public in August 1998 for a 90-day review period that ended November 30. A total of 26 public open houses and hearings were held between September 1 and October 22, 1998, with approximately 370 members of the public attending. Open houses were held throughout Montana (Kalispell, Helena, West Glacier, Billings, Browning, Great Falls, Missoula, and Pablo), in Waterton and Lethbridge, Alberta, and in Denver, Colorado, Seattle and Spokane, Washington, and St. Paul Minnesota. Public hearings were conducted at Lethbridge, Alberta, and in Montana at Kalispell, Missoula, Helena, Great Falls, Bozeman, Browning, and West Glacier. There also were public hearings at St. Paul, Denver, Spokane, Seattle,

During the comment period, the park received 2,709 comments on the draft plan. Comments came in the form of individual letters, form letters, public hearing testimony, petitions and over the Internet. Volume 2 contains copies of letters received from federal agencies and elected officials, state and local agencies and elected officials, organizations, and businesses, as well as copies of comments received at public hearings and in letters from businesses and organizations. The responses of the National Park Service responses to those comments are also included in volume 2. Many other comments that were received from individuals have been summarized in volume 2 by topic.

PUBLIC OFFICIALS, AGENCIES, AND ORGANIZATIONS THAT RECEIVED THE DRAFT OR FINAL GENERAL MANAGEMENT PLAN / ENVIRONMENTAL IMPACT STATEMENT OR THE DRAFT GMP/EIS SUMMARY

Elected Officials

Max Baucus, United States Senate
 Conrad Burns, United States Senate
 Rick Hill, United States House of Representatives
 Mickey Pablo, chair, Confederated Salish and Kootenai Tribal Council
 Earl Old Person, chair, Blackfeet Tribal Business Council
 Marc Racicot, governor of Montana
 Howard Gipe, chair, Flathead County Board of Commissioners
 Dan Geer, chair, Glacier County Board of Commissioners
 Gary Hall, mayor of Columbia Falls
 William Morris, mayor of Browning
 Bill Boharski, mayor of Kalispell
 Mike Jenson, mayor of Whitefish

Federal Agencies

Advisory Council on Historic Preservation
 U.S. Army Corps of Engineers

U.S. Department of Agriculture
Forest Service, Flathead National Forest
Forest Service, Lewis and Clark National Forest
U.S. Department of the Interior
U.S. Fish and Wildlife Service
U.S. Geological Survey, Biological Resources Division
U.S. Department of Transportation
U.S. Environmental Protection Agency

Canadian Government Agencies

Waterton Lakes National Park

State and Provincial Agencies

British Columbia Ministry of Environment, Lands and Parks
British Columbia Ministry of Forests
Montana Department of Commerce
Montana Department of Environmental Quality
Montana Department of Fish, Wildlife and Parks
Montana Department of Natural Resources and Conservation
Montana Department of Transportation
Montana State Historic Preservation Office

Local Governments

Carlston, Town of

Organizations

Action Travel
Adventure Cycling
Alliance for the Wild Rockies
American Lands Alliance
American Resource Management, Inc.
American Whitewater
American Wildlands
Alliance for the Wild Rockies
Backcountry Horsemen of the Flathead
Beartooth Backcountry Horsemen
Bicycle Federation of America
Big Wild Advocates
Burlington Northern Santa Fe
Canyon RV and Campground
Castle Crown Wilderness Coalition
Center for Wildlife Information [0263]
Coalition for Canyon Preservation
Cold Mountain, Cold Rivers
Columbia Falls Area Chamber of Commerce

Community Development Services of Montana
Concerned Pikuni Committee
Conference of National Park Concessioners
Continental Divide Trail Society
East Glacier Chamber of Commerce
The Ecology Center
The Equinox
F. H. Stoltze Land and Lumber Co.
Flathead Basin Commission
Flathead Business and Industry Association
Flathead Economic Policy Center
Flathead Fishing Association
Flathead Resource Organization
Flathead Valley Community College
Flathead Wildlife, Inc.
Friends of the Bitterroot
Friends of the Earth
Friends of Glacier
Friends of the West
Friends of the Wild Swan
Glacier Action and Involvement Now, Inc.
Glacier Country Regional Tourism Commission
Glacier Mountain Shadows Resort and Western Inns
Glacier Natural History Association
Glacier Park Boat Company
Glacier Park Foundation
Glacier Park, Inc.
Glacier Park International Airport
Glacier Park Ski Tours
Glacier Raft Company
Glacier-Two Medicine Alliance
Glacier-Waterton Visitors Association
Glacier Wilderness Guides
Good Medicine Lodge
Great Bear Foundation
Great Falls Chamber of Commerce
Great Northern Railroad Historical Society
Hugh Black-St. Mary Enterprises, Inc.
Inland Empire Public Lands Council
John L. Clarke Western Art Gallery and Memorial Museum
Kalispell Area Chamber of Commerce
Last Chance Backcountry Horsemen
The Lodge at Waterton Lakes
Mission Valley Backcountry Horsemen
Montana Aviation Trades Association

Montana Computer Wholesalers
Montana Historical Society
Montana Innkeepers Association
Montana Nature Conservancy
Montana River Action Network
Montana Pilots' Association
Montana Wilderness Association
Montanans for Multiple Use
National Parks and Conservation Association
National Trust for Historic Preservation
National Wildlife Federation
Nature Conservancy, Montana Chapter
North Fork Preservation Association
Northern Rockies Natural History
People for Elk
Purdy Ranches
Restaura
Rotary International
The Sierra Club, Bitterroot Mission Group
Silver Wolf Log Chalet Resort
St. Mary Lodge and Resort
Swan View Coalition
University of Montana Institute for Tourism and Recreation Research
U.S. Air Tour Association
Wascana Centre Authority
Waterton-Glacier Visitor Association
West Glacier Village
Wild Wilderness
Wildlands Center for Preventing Roads
The Wilderness Society, Northern Rockies Region
Wilderness Watch
Wildlife Biology Program, University of Montana
Yeager Enterprises Motel
Z Air, Inc.

A complete listing of agencies, organizations, public officials, and individuals to whom a copy of the *Draft General Management Plan and Environmental Impact Statement* and the *Final General Management Plan* or the *Overview* were sent is on file at Glacier National Park.



IN REPLY REFER TO

United States Department of the Interior

FISH AND WILDLIFE SERVICE

ECOLOGICAL SERVICES
100 N. PARK, SUITE 320
HELENA, MT 59601
(406) 449-5225

H.25 Glacier NP (T)

August 14, 1995

Mr. David A. Mihalic, Superintendent
Glacier National Park
West Glacier, Montana 59936

Dear Mr. Mihalic:

This is in response to your letter received June 19, 1995 regarding your species list request for the Environmental Impact Statement on the proposed General Management Plan for Glacier National Park.

In accordance with Section 7(c) of the Endangered Species Act (ESA) of 1973, as amended, we have determined that the following listed, proposed and category 1 candidate threatened or endangered (T/E) species may be present in the project area.

<u>Listed Species</u>	<u>Expected Occurrence</u>
grizzly bear (<u>Ursus arctos horribilis</u>)	resident
gray wolf (<u>Canis lupus</u>)	resident
peregrine falcon (<u>Falco peregrinus</u>)	transient
bald eagle (<u>Haliaeetus leucocephalus</u>)	resident
water howellite (<u>Howellia aquatilis</u>)	below 5000'
<u>Proposed Species</u>	
None	
<u>Category 1 Candidate Species</u>	
bull trout (<u>Salvelinus confluentus</u>)	resident

Section 7(c) of ESA requires that Federal agencies proposing major construction activities complete a biological assessment to determine the effects of the proposed actions on listed and proposed species and use the biological assessment to determine whether formal consultation is required. A major construction activity is defined as "a construction project (or other undertaking having similar physical impacts) which is a major Federal action significantly affecting the quality of the human environment as referred to in the National Environmental

Policy Act" (50 CFR Part 402). If a biological assessment is not required (i.e. all other actions), the Federal agency is still required to review their proposed activities to determine whether listed species may be affected. If such a determination is made, formal consultation with the Fish and Wildlife Service (Service) is required.

For those actions wherein a biological assessment is required, it should be completed within 180 days of initiation, but can be extended by mutual agreement between the Federal agency or its designated non-Federal representative and the Service. If the assessment is not initiated within 90 days, the list of T/E species should be verified with the Service prior to initiation of the assessment. The biological assessment may be undertaken as part of the Federal agency's compliance of Section 102 of the National Environment Policy Act (NEPA) and incorporated into the NEPA documents. We recommend that biological assessments include the following:

1. A description of the project.
2. A description of the specific area that may be affected by the action.
3. The current status, habitat use, and behavior of T/E species in the project area.
4. Discussion of the methods used to determine the information in Item 3.
5. An analysis of the effects of the action on listed species and proposed species and their habitats, including an analysis of any cumulative effects.
6. Coordination/mitigation measures that will reduce/eliminate adverse impacts to T/E species.
7. The expected status of T/E species in the future (short and long term) during and after project completion.
8. A determination of "is likely to adversely affect" or "is not likely to adversely affect" for listed species.
9. A determination of "is likely to jeopardize" or "is not likely to jeopardize" for proposed species.
10. Citation of literature and personal contacts used in developing the assessment.

If it is determined that the proposed program or project "is likely to adversely affect" any listed species, formal consultation should be initiated with this office. If it is concluded that the project "is not likely to adversely affect" listed species, we should be asked to review the assessment and concur with the determination of no adverse effect.

Pursuant to Section 7(a) (4) of ESA, if it is determined that any proposed species may be jeopardized, the Federal agency should initiate a conference with us to discuss conservation measures for those species. Although candidate species have no legal status and are accorded no protection under ESA, they are included here to alert your agency of potential proposals or listings.

A Federal agency may designate a non-Federal representative to conduct informal consultation or prepare biological assessments. However, the ultimate responsibility for section 7 compliance remains with the Federal agency and written notice should be provided to the Service upon such a designation. We recommend that Federal agencies provide their non-Federal representatives with proper guidance and oversight during preparation of biological assessments and evaluation of potential impacts to listed species.

Section 7(d) of ESA requires that the Federal agency and permit/license applicant shall not make any irreversible or irretrievable commitment of resources which would preclude the formulation of reasonable and prudent alternatives until consultation on listed species is completed.

Please contact us by mail at the above-referenced letterhead address or call Kevin Shelley at (406) 758-6881 if we can be of further assistance. Your interest and cooperation in meeting our joint responsibilities under the Endangered Species Act are appreciated.

Sincerely,



Kemper M. McMaster
Field Supervisor
Montana Field Office

MGMTPLAN.DOC

cc: ES kalispell Suboffice



State Historic Preservation Office
Montana Historical Society

1410 8th Avenue • PO Box 201202 • Helena, MT 59620-1202 • (406) 444-7715 • FAX (406) 444-6575

July 25, 1995

Mr. David A. Mihalic, Superintendent
Glacier National Park
West Glacier, Montana 59936

Re: Task Directive: General Management Plan/Environmental Impact Statement

Dear Mr. Mihalic:

Thank you for a copy of the above cited document for our review and comment.

From the standpoint of cultural resources, I believe the recent studies underway in the areas of archaeological survey, ethnographic overview, and addendums to the nomination of historical resources in the Park will be valuable tools in the development of the GMP/EIS. I encourage you to integrate this information in your development of a GIS.

I have no questions or comments to make on the Task Directive. Our office looks forward to our future involvement in the EIS process.

Sincerely,

Mark F. Baemler, Ph.D.
Interim State Historic Preservation Officer

File: NPS/Glacier NP/1995

Compliance with Federal and State Laws, Executive Orders, and Regulations

In implementing the *General Management Plan* by Glacier National Park, the National Park Service would comply with all applicable laws and executive orders. Some of the more pertinent ones are discussed below.

The National Environmental Policy Act — NEPA is the basic national charter for environmental protection. It establishes policy, sets goals, and provides means for carrying out the policy. The act contains an “action-forcing” provision to ensure that federal agencies act according to the letter and spirit of the law. It requires a systematic analysis of major federal actions that will consider all reasonable alternatives as well as an analysis of short-term and long-term, irretrievable and irreversible, and unavoidable impacts. The act also establishes the Council on Environmental Quality.

Many of the actions discussed in this document would have to be analyzed further after specific sites were selected. Additional environmental assessments or environmental impact statements would be prepared as necessary. These include expanding visitor opportunities along the Going-to-the-Sun Road, rehabilitation of the Many Glacier Hotel and other visitor facilities, identification of alternative sites for Divide Creek development, and reconstruction of the Going-to-the-Sun Road.

The National Parks Omnibus Management Act of 1998 (PL 105-391), Title IV, National Park Service Concessions Management Improvement Act of 1998 — This new law limits the term of concession contracts with significant capital improvement requirements to no more than 20 years. The act also limits the value of the concessioner’s leasehold surrender interest to the initial value of construction increased with the consumer price index less depreciation of the capital improvements. The act eliminates capital improvement accounts in new contracts such as the one that currently allows Glacier’s primary concessioner to expend 5 percent of its gross receipts on capital improvements to the concession facilities in lieu of franchise fees to the General Treasury. Franchise fees under new contracts would be allocated 80 percent to the park where they were earned, for visitor services and resource management, and 20 percent to support activities throughout the national park system. These provisions have the potential to affect the desirability for a private concessioner to invest the funds needed for the rehabilita-

tion efforts, as described under “Preservation of Historic Hotels and Visitor Services: Issue.”

The Architectural Barriers Act of 1968 (42 USC 4151 et seq.) and The Rehabilitation Act of 1973 (29 USC 701 et seq.) — All facilities and programs developed would be accessible to visitors and employees with disabilities to the extent possible without compromising the values for which the park was established.

The Wilderness Act — The purpose of the act is to establish enduring wilderness resources for public use and enjoyment. The act establishes a National Wilderness Preservation System to be composed of federally owned areas designated as wilderness areas, and it directs the secretaries of the interior and agriculture to study all roadless areas of 5,000 or more acres and every roadless island (regardless of size) as to suitability for inclusion in the wilderness system.

The Clean Air Act, as amended (42 USC 7401 et seq.) — The purpose of the Clean Air Act is to prevent and control air pollution, to initiate and accelerate research and development, and to provide technical and financial assistance to state and local governments in connection with the development and execution of air pollution programs. The act establishes requirements for areas failing to attain National Ambient Air Quality Standards (NAAQS) and provides for the prevention of significant deterioration of areas where air is cleaner than NAAQS.

Glacier National Park is designated as a mandatory Class I area under section 162(a) of the Clean Air Act (42 USC 7401 et seq.). This designation gives the federal land manager (the assistant secretary of the interior for fish and wildlife and parks) and the park superintendent an affirmative responsibility to protect the air quality and air quality-related values in the park. Air quality-related values are defined as visibility and those scenic, cultural, biological, and recreational resources of an area that are affected by air pollution. Section 118 of the Clean Air Act requires all federal facilities to comply with federal, state, and local air pollution control laws and regulations. The park is in two air quality control regions, the Missoula Intrastate Air Quality Control Region west of the Continental Divide and the Great Falls Intrastate Air Quality Control Region east of the divide. The Missoula Air Quality Control Region is maintaining all national air quality standards except for fine particulate matter (PM-10), while the Great Falls Air Quality Control Region is maintaining all standards except for carbon monoxide in the city of Great Falls. Glacier National Park would work with the state to ensure that all park activities meet all requirements. During the design phase for any proposed development in the park, an analysis of anticipated emissions from construction activities would be conducted to ensure conformity with federal and state air quality regulations as part of the Clean Air Act. Glacier National Park would continue to participate in the following air quality monitoring programs: the National Dry Deposition Network, the Visibility Monitoring and Data Analysis Program / Interagency Monitoring of Protected Visual Environments, the National Atmospheric Deposition Program / National Trends Network, Columbia Falls Aluminum Company baseline fluoride monitoring program, and (through the Environmental Protection Agency) the Demonstration Index Site Project.

The Safe Drinking Water Act (PL 93-523, 88 Stat. 1660, 42 USC 300 et seq., 43 SC 201; 21 USC 349) — Directs the Environmental Protection Agency to publish and enforce regulations that consist of maximum allowable contaminant levels in drinking water. Establishes the mechanisms of national drinking water standards. Regulates the underground injection of wastes and other materials.

The Endangered Species Conservation Act of 1969 — This act provides a program for the conservation, protection, restoration, and propagation of selected species of native fish and wildlife, including migratory birds that are threatened with extinction.

The Endangered Species Act of 1973, as amended (16 USC 1531 et seq.) — The *Draft General Management Plan and Environmental Impact Statement* was submitted to the U.S. Fish and Wildlife Service for concurrence with NPS determinations. Section 7 of the Endangered Species Act requires all federal agencies to consult with the U.S. Fish and Wildlife Service to ensure that any action authorized, funded, or carried out by the agency does not jeopardize the continued existence of listed species or critical habitat. The National Park Service is conducting informal section 7 consultation with the U.S. Fish and Wildlife Service. In accordance with a discussion between Glacier staff and the U.S. Fish and Wildlife Service, a biological assessment on the preferred alternative has been completed. The National Park Service determined that the preferred alternatives for visitor use on the Going-to-the Sun Road, preservation of the Going-to-the-Sun Road, preservation of historic hotels and visitor services, winter use, and Divide Creek flood hazard would not be likely to adversely affect any federally listed species. This determination was reached because of mitigation that would be implemented to ensure no adverse effects and the fact that many of these actions would occur in already developed areas in Glacier National Park. The National Park Service also determined that the preferred alternatives for personal watercraft and scenic air tours would have no effect on federally listed species. Banning both of these activities from the park would result in a beneficial effect on these species. The Draft EIS was submitted to U.S. Fish and Wildlife Service for concurrence with NPS determinations. A record of decision will not be issued until compliance with section 7 is concluded. As agreed, during development of implementation plans and further design, the National Park Service would continue to consult with the U.S. Fish and Wildlife Service. Mitigation to protect listed species and those proposed for listing would be developed through consultation. Any design would be submitted to U.S. Fish and Wildlife Service and modified if necessary to avoid adverse effects on listed species and those proposed for listing.

The Migratory Bird Conservation Act — Aids in the restoration of scarce or extinct species and regulates the introduction of American or foreign birds or other animals.

The Migratory Bird Treaty Act of 1918 — Prohibits taking, possession, and trade of migratory birds, except as permitted by regulations. The act gives search, arrest, and seizure authority to authorized USDA employees, provides for civil and criminal penalties for violation, allows states to impose more restrictive measures to protect migratory birds, and allows for taking for scientific and propagating purposes.

Section 106 of the National Historic Preservation Act of 1966, as amended (16 USC 470, et. seq.) — Section 106 requires that federal agencies having direct or indirect jurisdiction over undertakings take into account the effects of those undertakings on national register properties and allow the Advisory Council on Historic Preservation an opportunity to comment. Toward that end, the National Park Service would work with the Montana state historic preservation officer and the advisory council to meet the requirements of the July 25, 1997 programmatic agreement among the National Park Service (Glacier National Park), the advisory council, and the Montana state historic preservation officer. That agreement provides for a number of “programmatic exclusions” or actions that many be implemented without the normal review by the Montana state historic preservation officer and the advisory council. The terms of the agreement apply to planning, design, construction, and maintenance undertakings in Glacier National Park and the East Glacier administrative site. In addition to those actions listed in the plan further consultation may be undertaken during design to ensure adequate mitigation of any effects.

Archeological surveys would be conducted prior to construction on all sites and an archeologist would monitor ground-disturbing activities.

As designs are developed for the following actions proposed in this plan, Section 106 compliance would be initiated under the terms of the programmatic agreement:

- rehabilitating the Many Glacier Hotel
- rehabilitating the Swiftcurrent Motor Inn and cabins
- rehabilitating the Lake McDonald Lodge and cabins
- making structural improvements in the Rising Sun historic district
- making structural improvements to the Two Medicine campstore
- making facilities, including historic structures, accessible for people with disabilities
- relocating St. Mary administrative facilities out of the floodplain
- reconstructing the Going-to-the-Sun Road
- developing a comprehensive use plan for the Going-to-the-Sun Road

Executive Order 11593, “Protection of Historic and Cultural Properties” (36 CFR 60, 61, 63, 800; 44 FR 6068) — Instructs all federal agencies to support the preservation of cultural properties; directs them to identify and nominate to the National Register cultural properties under their jurisdiction and to “exercise caution . . . to assure that any federally owned property that might qualify for nomination is not inadvertently transferred, sold, demolished, or substantially altered.”

Executive Order 11988, “Floodplain Management” — This order requires all federal agencies to avoid the construction of certain types of facilities in the 100-year and 500-year floodplains unless no other practical alternatives exist. No new floodplains would be impacted by development. The Divide Creek development would be removed.

Executive Order 11990, “Protection of Wetlands” — This order requires federal agencies to avoid, where possible, impacts on wetlands. No known wetlands would be affected by the preferred alternatives.

The Federal Cave Resources Protection Act of 1988 — The purpose of this act is to identify and preserve significant caves on federal land and to foster increased cooperation and information exchange between government agencies and others on the use of these caves for scientific, educational, and recreational purposes.

The National Trails System Act, as amended (16 USC 1241, et. seq.) — This act establishes principles for the management of national scenic trails such as the Continental Divide National Scenic Trail, which traverses the park from the Canadian border to Maria’s Pass, a distance of approximately 100 miles.

The American Indian Religious Freedom Act — This act declares the policy to protect and preserve the inherent and constitutional rights of American Indian, Eskimo, Aleut, and Native Hawaiian people to believe, express, and exercise their traditional religions, and it calls for a now-completed evaluation of federal procedures, programmatic objectives, and policies. Religious concerns should be accommodated or addressed under NEPA or other appropriate statutes.

The Native American Grave Protection and Repatriation Act — The act assigns ownership or control of Native American human remains, funerary objects, sacred objects, and objects of cultural patrimony that are excavated or discovered on federal lands or tribal lands after passage of the act to lineal descendants or culturally affiliated Native American groups; establishes criminal penalties for trafficking in remains or objects obtained in violation of the act; provides that federal agencies and museums that receive federal funding shall inventory Native American human remains and associated funerary objects in their possession or control and identify their cultural and geographical affiliations within five years and prepare summaries of information about Native American unassociated funerary objects, sacred objects, or objects of cultural patrimony. This is to provide for the repatriation of such items when lineal descendants or Native American groups request it.

ADDITIONAL COMPLIANCE TO BE CARRIED OUT

The following additional actions would be taken to ensure compliance with federal and state laws and regulations:

To comply with the Clean Water Act, the necessary permits would be obtained and consultation conducted for each action proposed in the *General Management Plan*. This would include a 404 permit from the U.S. Army Corps of Engineers for any construction below the high water line of lakes and streams in the park. This would also include a permit from the Montana Office of Water Quality for any construction near lakes and streams, including the modification or placement of culverts.

Permits and/or a 401 certificate would also be obtained from the Montana Office of Water Quality and Department of Fish, Wildlife and Parks for actions involving streams and lakes in the park and with the Blackfoot Tribe for Divide Creek.

In situations where it is applicable, a sedimentation and erosion control plan would be submitted to the state of Montana before construction, and a permit authorizing the work would be obtained. The state of Montana would also issue stormwater management approval based on the sedimentation and erosion control plan and construction drawings. Best management practices would be developed and adhered to.

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Appendix A — Legislation and Designations

APPENDIXES

A: LEGISLATION

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LAWS FOR NAT. PARK SERVICE, PARKS, & MONUMENTS

AN Act to establish "The Glacier National Park" in the Rocky Mountains south of the international boundary line in the State of Montana, and for other purposes, approved May 13, 1910 (34 Stat 351)

Glacier Na-
tional Park,
Mont.
Legislati-
on side ac-
t description

Report of
Commissioner
Reclamation
valid title not
afforded.
Rights of way
for railroads.
Repealed by 48
Stat. 1948. See
p. 181

has indirectly
relieved con-
ditions

Regulations for
protection, etc.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the tract of land in the State of Montana particularly described by notes and bounds as follows, to wit: Commencing at a point on the international boundary between the United States and the Dominion of Canada at the middle of the Flathead River; thence following southerly along and with the middle of the Flathead River to its confluence with the Middle Fork of the Flathead River; thence following the north bank of said Middle Fork of the Flathead River to where it is crossed by the north boundary of the right of way of the Great Northern Railroad; thence following the said right of way to where it intersects the west boundary of the Blackfoot Indian Reservation; thence northerly along said west boundary to its intersection with the international boundary; thence along said international boundary to the place of beginning, is hereby reserved and withdrawn from settlement, occupancy, or disposal under the laws of the United States, 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," and all persons who shall locate or settle upon or occupy the same, or any part thereof, except as hereinafter provided, shall be considered trespassers and removed therefrom: *Provided*, That nothing herein contained shall affect any valid existing claim, location, or entry under the laws of the United States or the rights of any such claimant, locater, or entryman to the full use and enjoyment of his land: *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 acquisition of such rights over or upon the unappropriated public domain of the United States, and that the United States Reclamation Service may enter upon and utilize for flowage or other purposes any area within said park which may be necessary for the development and maintenance of a Government reclamation project: *And provided further*, That no lands within the limits of said park hereby created belonging to or claimed by any railroad or other corporation now having or claiming the right of indemnity selection by virtue of any law or contract whatsoever shall be used as a basis for indemnity selection in any State or Territory whatsoever for any loss sustained by reason of the creation of said park. (U.S.C., title 16, sec. 161.)

Sec. 2. That said park shall be under the executive control of the Secretary of the Interior, whose duty it

LEGISLATION RELATING TO NATIONAL PARKS

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shall be, as soon as practicable, to make and publish such rules and regulations not inconsistent with the laws of the United States as he may deem necessary or proper for the care, protection, management, and improvement of the same, 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. Said Secretary may, in his discretion, execute leases to parcels of ground not exceeding ten acres in extent at any one place to any one person or company, for not to exceed twenty years, when such ground is necessary for the erection of buildings for the accommodation of visitors, and to parcels of ground not exceeding one acre in extent and for not to exceed twenty years to persons who have heretofore erected or whom he may hereafter authorize to erect summer houses or cottages; he may also sell and permit the removal of such matured or dead or down timber as he may deem necessary or advisable for the protection or improvement of the park. (U.S.C., title 16, sec. 162.)

Leases for
buildings,
etc.
(This act is for
the purpose of
the National Park
land for summer
houses, and
cottages erected
by 48 Stat. 2042,
sec. 1. See
p. 131.)

Removal of
timber,
etc.

LEGISLATION RELATING TO NATIONAL PARKS

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Excerpt from "An Act To provide for uniform administration of the national parks by the United States Department of the Interior, and for other purposes," approved January 26, 1931 (46 Stat. 1943)

SEC. 3. No permit, license, lease, or other authorization for the use of land within the Glacier National Park, Montana, * * * for the erection and maintenance of summer homes or cottages shall be granted or made: *Provided, however,* That the Secretary of the Interior may, in his discretion, renew any permit, license, lease, or other authorization for such purpose heretofore granted or made. (U.S.C., 6th supp., title 16, sec. 162a.)

SEC. 5. The acquisition of rights of way through the valleys of the north and middle forks of the Flathead River for steam or electric railways in the Glacier National Park, Montana, under filings or proceedings under the laws applicable to the acquisition of such rights over or upon the unappropriated public domain of the United States is prohibited. (U.S.C., 6th supp., title 16, sec. 161.)

An Act For establishment of the Waterton-Glacier International Peace Park, approved May 2, 1932 (47 Stat. 143)

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That for the purpose of permanently commemorating the long-existing relationship of peace and good will existing between the people and Governments of Canada and the United States, and upon the enactment by the proper authority of the Canadian Government of a similar provision respecting the Waterton Lakes National Park in the Province of Alberta and upon the proclamation of the President of the United States, who is hereby authorized to issue such a proclamation, the Glacier National Park in the State of Montana shall become a part of an international park to be known as the Waterton-Glacier International Peace Park. (U.S.C., 6th supp., title 16, sec. 161a.)

SEC. 2. For purposes of administration, promotion, development, and support by appropriations that part of the said Waterton-Glacier International Peace Park within the territory of the United States shall be designated as the Glacier National Park. (U.S.C., 6th supp., title 16, sec. 161b.)

Glacier National Park, Montana. Permits for summer homes, etc., prohibited. (Repeals 26 Stat. 164, sec. 3, insofar as it relates to summer homes. See p. 143.)

Provision. Survival of present license, etc. Certain valleys of Flathead River, Glacier, Mont. (Repeals 26 Stat. 164, U.S.C., title 16, sec. 161, insofar as it relates to width of electric railway rights of way. See p. 143.)

Waterton-Glacier International Peace Park. Establishment of. Concurrent action by Canada.

Proclamation to issue.

Glacier National Park to become a part.

Designation of portion within the United States.

5. Glacier National Park

Glacier National Park to be a part of the Waterton-Glacier International Peace Park; Proclamation (No. 2003) of June 30, 1932.....	Page 27
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WATERTON-GLACIER INTERNATIONAL PEACE PARK

BY THE PRESIDENT OF THE UNITED STATES OF AMERICA

A PROCLAMATION

[No. 2003—June 30, 1932—47 Stat. 2519]

WHEREAS it being desired to commemorate permanently the long-existing relationship of peace and good will existing between the people and Governments of the United States and Canada; and

WHEREAS this desire was crystallized into law by an act of the Congress of the United States on May 2, 1932 (Public No. 116, 72d Cong., 1st sess.), said act being entitled "AN ACT For establishment of the Waterton-Glacier International Peace Park"; and

WHEREAS, as provided by section 1 of the aforementioned act, a similar provision respecting the Waterton Lakes National Park, in the Province of Alberta, has been enacted into law by Royal assent of the Canadian Government on May 26, 1932;

NOW, THEREFORE, I, Herbert Hoover, President of the United States of America, by virtue of the power and authority in me vested by section 1 of the act of Congress entitled "An Act For establishment of the Waterton-Glacier International Peace Park," approved May 2, 1932 (Public No. 116, 72d Cong., 1st sess.), do proclaim that the Glacier National Park in the State of Montana shall be, and is hereby, made part of an international park to be known as the Waterton-Glacier International Peace Park.

For purposes of administration, promotion, development, and support by appropriations, that part of said Waterton-Glacier International Peace Park within the territory of the United States shall be designated as the Glacier National Park, to be supervised, managed, and controlled by the Director of the National Park Service, under the direction of the Secretary of the Interior, as provided in the act of Congress entitled "AN ACT To establish a National Park Service, and for other purposes," approved August 25, 1916 (39 Stat., 535-536).

IN WITNESS WHEREOF, I have hereunto set my hand and caused the seal of the United States to be affixed.

DONE at the City of Washington this 30th day of June, in the year of our Lord nineteen hundred and thirty-two, and of the Independence [SEAL] of the United States of America the one hundred and fifty-sixth.

HERBERT HOOVER.

By the President:

HENRY L. STIMSON,
Secretary of State.

United Nations Educational, Scientific
and Cultural Organization



Programme on Man and the Biosphere

By decision of the Bureau of the International
Co-ordinating Council of the Programme on Man
and the Biosphere, duly authorized
to that effect by the Council

Glacier National Park

is recognized as part
of the international network of Biosphere Reserves.

This network of protected samples of
the world's major ecosystem types
is devoted to conservation
of nature and scientific research
in the service of man.

It provides a standard against which can be measured
the effects of man's impact
on his environment.

A. M. Mbow

Amadou-Mahtar M'bow

Director-General
of Unesco

Date: *17 January 1977*

COPIE POUR INFORMATION



fifty years

US Observer Mission
 American Embassy
 2 Avenue Gabriel
 75382 Paris Cedex 08

Reference: WHC/74/533.2/MR/HE

8 January 1996

**Subject: Waterton Glacier International Peace Park
 (Canada/United States of America) (354rev.)**

Dear Sir,

I have the pleasure to inform you that the World Heritage Committee at its nineteenth session held in Berlin (Germany) from 4 to 9 December 1995 inscribed the nominated property on the World Heritage List under criteria (ii) and (iii). The site has a distinctive climate, physiographic setting, mountain/prairie interface and tri-ocean hydrographical divide as well as its scenic values and the cultural importance of its International Peace Park designation.

The Committee recommended that the State Party should consider creating a single "Biosphere Reserve" from the three Biosphere Reserves already existing in the area. It furthermore recommended that the World Heritage site be eventually expanded with the cooperation of the Government of British Columbia to include the adjacent protected area in the Akamina/Kishinena. It was further agreed that the World Heritage site should be known as Waterton Glacier International Peace Park.

It is recommended to organize on the occasion of the inscription of the site on the World Heritage List, preferably jointly with the Canadian Authorities, a World Heritage dedication ceremony. You may wish to invite the World Heritage Centre to present at this occasion the World Heritage certificate. Such an event normally tends to be well covered by the media and would thus help to promote World Heritage.

*Vous remercieront

7, place de Fontenay
 75352 Paris 07 SP France
 Tel + (33.1) 45 68 10 00
 Fax + (33.1) 45 63 10 01

.../2
Canada/United States of America

8 January 1996

I would like to take the opportunity to thank you for your help in implementing the World Heritage Convention.

Please accept my best wishes for 1996.

Yours sincerely,



Bernd von Droste
Director
UNESCO World Heritage Centre

cc. Permanent Delegation of Canada
Ms. Cantin
Ms. Cleary
IUCN
SC/ECO
Superintendent Glacier National Park

Selected Portions of the Reporter's Statement of the Case and the Opinion of the Court in the Judge's Decision *Blackfeet et al. Nations v. United States*

Reporter's Statement of the Case

United States all their right, title, and interest in and to the lands embraced within the reservation, except as to three certain described tracts of land (art. 2), which, under the terms of the agreement (art. 1), were set up as separate reservations, one for the Indians then attached to and receiving rations at the Fort Peck Agency, one for the Indians then attached to and receiving rations at the Fort Belknap Agency, and one for the Indians then attached to and receiving rations at the Blackfeet Agency.

By article 3 of the agreement the United States, in consideration of the cession, agreed to advance and expend annually for a period of ten years following the ratification of the agreement, for the Fort Peck Indians, \$165,000; for the Fort Belknap Indians, \$115,000; and for the Blackfeet Agency Indians, \$150,000; or a total consideration of \$4,300,000. The obligations of the United States in this respect were fully complied with.

The area of the lands ceded to the United States under this agreement was approximately 17,500,000 acres.

XVI. Under the terms of an agreement concluded with the Indians of the Blackfeet Reservation on September 24, 1895, ratified by an act of Congress approved June 10, 1896 (29 Stat. 321, 353), the said Indians ceded to the United States all of their reservation west of a certain line, reserving the right to go upon the ceded lands "so long as the same shall remain public lands of the United States" to cut and remove wood and timber therefrom for agency and school purposes and for their personal use for houses, fences, and all other domestic purposes, and to hunt upon said ceded lands and fish in the streams thereof "so long as the same shall remain public lands of the United States." In consideration of the cession, the United States agreed to expend in the manner and for the purposes stipulated the total sum of \$1,500,000.

By an act of Congress approved May 11, 1910 (36 Stat. 354), the said tract in question was withdrawn from settlement, occupancy, or disposal under the laws of the United States and dedicated and set apart as a public park under the name of "the Glacier National Park."

Reporter's Statement of the Case

Under the terms of the act, control of the tract was placed under the Secretary of the Interior, and the duty was placed upon him to make and publish such rules and regulations as he might deem necessary for the proper care and management of the park, for its preservation in a state of nature, and for the care and protection of the fish and game within its boundaries.

Prior to the act of May 11, 1910, the Indians of the Blackfeet Reservation did not exercise to any appreciable extent the rights reserved in the aforesaid agreement of September 24, 1825, to hunt and fish in and remove timber from the land ceded in the agreement, and such rights were authoritatively terminated by the limitations of the act of May 11, 1910.

XVII. During the period from 1850 to June 30, 1927, the United States, in addition to the appropriations and disbursements therefrom made in satisfaction of treaty or other obligations, expended on behalf and for the benefit of the Blackfeet, Blood, Piegan, and Gros Ventre Tribes of Indians out of gratuity appropriations, the total sum of \$5,508,409.31.

Of the aforesaid amount \$4,039,153.81 was expended for the benefit of the Blackfeet, Blood, and Piegan Tribes, and \$1,476,253.70 was expended for the benefit of the Gros Ventre Tribe.

During the same period the United States, in addition to the appropriations and disbursements therefrom made in satisfaction of treaty or other obligations, expended on behalf and for the benefit of the Nez Perce Tribe the sum of \$1,223,421.20.

Out of the gratuity disbursements made for the benefit of the Blackfeet, Blood, Piegan, and Gros Ventre Tribes, \$1,299,463.60 was expended for the purpose of education, \$970,232.93 being for the benefit of the Blackfeet, Blood, and Piegan Tribes, and \$329,230.67 for the benefit of the Gros Ventre Tribe. By far the larger part of the aforesaid expenditures was made for the support and maintenance of agency schools located on the various reservations then occupied by plaintiffs.

XVIII. The average proportion in population of the plaintiffs, the Blackfeet, Blood, and Piegan Tribes residing upon

Findings of Court

Opinion of the Court

United States without the consent or agreement of the tribes, and for which they have not been compensated, amounting to \$24,312,733.09.

3. Claim of plaintiffs, the Blackfoot, Blood, Piegan, and Gros Ventre Tribes, for the value of 2,092,420-acres of land alleged to have been taken by the defendant in virtue of the Executive order of August 13, 1874, and for which plaintiffs have not been compensated, amounting to \$2,815,325.00.

4. Claims of plaintiffs, the Blackfoot Tribes, based on the acts of the defendant, under the act of Congress of May 11, 1910 (36 Stat. 354), in taking from them and depriving them of the right to cut and remove wood for agency and school purposes, and for their personal use for houses, fences, and all other domestic purposes, and to hunt and fish thereon, a tract of land constituting a part of Glacier National Park, which rights had been reserved by the plaintiffs in an agreement with the defendant ratified by the act of June 10, 1896 (29 Stat. 321), \$220,000.

Park

The total recovery sought in the petition on the four claims aggregates \$71,339,378.09. This demand is considerably increased in plaintiffs' requested findings of fact.

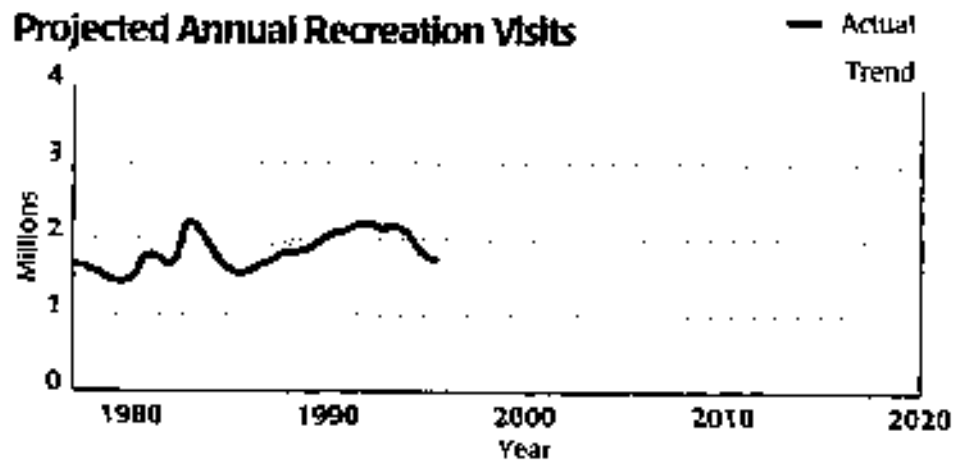
1. The Blackfoot Nation of Indians constituted a confederated tribe made up of Blackfoot, Blood, Piegan, and Gros Ventre Indians. Prior to 1856 they were "a wild, warlike, nomadic people, depending upon the buffalo for practically every want of their primitive existence", and this particular source of living was at the time not only sufficient but more than abundant. In the territory over which they roamed and hunted, i. e., the plains of the Muscle Shell, the Judith, the Missouri, the Milk and the Saskatchewan Rivers in the Rocky Mountain country, not only were buffalo in large numbers to be found, but additional small game, as well as deer, antelope, mountain sheep, and a variety of fur-bearing animals abounded in vast numbers—an area amply suited to their habits and purposes.

2. The early habitat of the Nez Perce Tribe was in what is now western Idaho, northeastern Oregon, and southeastern Washington. Unlike the Blackfeet, who relied principally upon the buffalo for living, this tribe subsisted upon salmon,

Appendix B — Visitation Statistics and Projects

What are our projections for visitor use?

Glacier's future visitation has been forecast based on data from the past 20 years. Although visitation has fluctuated over the past, it is likely that the number of park visitors will reach 2 million by the year 2020. Since 1977, Glacier's annual visitation has grown from about 1.6 million to 2.2 million. This is an increase of 37 percent. In the same period, visitation to National Parks increased approximately 28 percent. The United States population grew only about 24 percent over this same time.



Appendix C — Money Generation Model

THE MCMR GENERALIZED MODEL

CRITICAL LEARNING INFORMATION POINTS

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WHAT IT People here do not want pay to be in your favor. This is how you succeed getting in and being in a short time. That means it was someone of what the client is worth. For people who don't otherwise know what a client is about, that means a lot. The client-to-firm ratio equation is important to have for many firms to successfully operate.

DO IT There are 7 steps to calculate the MCMR. Look up correlations with days per year for your area. Look up 25 days for your state in Appendix A of your MCMR Manual. Define what area encompasses the local community and estimate the % of utilization which is NON-work (most people are not included in calculations of their own community). The last 3 steps multiply that out.

Calculation: Major Days steps = 25 days per year * NON-Work = DIRECT SPENDING

Expensive inputs involve more than DIRECT SPENDING, mainly INDIRECT SPENDING. That includes the benefits derived from the primary spender (e.g. social security or health care costs) when you do vehicle use, health, education of employees, property taxes, mortgage interest, etc. All this spending also changes jobs. Appendix B of your MCMR Manual gives the INDIRECT SPENDING rate and gives the job rate per million spent. The last step involves multiplying to get TOTAL SPENDING.

INDIRECT SPENDING steps = INDIRECT SPENDING RATE * TOTAL SPENDING

Now divide TOTAL SPENDING by 1,000,000 and multiply by the MCMR RATE.

TOTAL SPENDING / 1,000,000 * MCMR RATE = MCMR

REALITY CHECK. Do reflect your increased value decisions. Decide that is the DIRECT SPENDING steps to get on top of the cost per person for a day in the future. Second step?

CAUTION. The MCMR is a heavy economic input calculator not a substitute for the work of a professional economist. There is much more to cost analysis than what is covered here - both in economic benefits and liabilities. The final answer may be the same but you can't tell if you don't do the work and pay the price. See other financial publications for all the details.

WHAT IF? Complete the MCMR for your client. What have you got to know? It has been estimated that many MCMR rates had been in use for over 15 years. Pick a past year you had the data to get up to. If you are FIRM ADVISER, calculate the MCMR and conduct a reality check to verify the figures and make changes complete or like an economist to make the MCMR more complete.

WHO IS THE GUY ANYWAY? Detail working with 17 types of government services. Research the Chief, State Economic Studies for the National Park Service. He was Director before the first meeting for the International Trade of Contemporary Nations, teaching, consulting and advising on local economic policy for that region.

THE MCMR IS MAINTAINED AND REVISED ANNUALLY

Glacier NP - 1998 - Money Generation Model

10-Feb-99

National Park Unit:	GLACIER
Category:	NP
State:	MT
Location:	FI
Field Office:	SM
Cluster:	FM
%H/NonLocal:	0.00
1998 RVDs:	1,187,890
Cost per day:	\$72.00
Direct Spending:	\$72,055,488
Indirect and Induced Spending:	2
Total Spending:	\$144,170,876
State Tax:	0
Tax Revenue:	\$0.00
Example Income From Profits/Spending:	0.0
Combined State/Local Tax Rate:	0.11
Income Tax:	\$4,767,626.88
Total Tax:	\$4,767,626.88
Job Rate:	15.00
Jobs:	2,183
1998 Recreation Value:	304,374
Expenditure/Visit:	\$236.83

THE CHANGING SCENE, THE FUTURE, AND JOB. IT'S PAST, IT'S HERE, IT'S HERE,

NOTE:

-CONTINUED-

The Heavy Construction Model is a business estimate, a raw, rudimentary, benchmark, provisional, first-step, approximation of the relationship of the pack to the economy. It is the first and lowest rung on a ladder of greater detail, sophistication, precision, sophistication, and professional refinement that is found on higher steps where there are other economic models that are designed for and better suited to economic decision-making and policy formulation activity. The case is confirmed that other economic models exist and may be more appropriate in situations where risk is involved.

NOTE OUT:

The HEM is only designed to illustrate the role of individual packs relative to their surrounding communities. The HEM is designed to assist-estimate the probable economic conditions and, therefore, gives a conservative estimate. HEMs for individual packs have been added to periodically, at the state level, and nationally. The picture of economic reality from each group of packs becomes more distorted as it is added and, at some point, is no longer predictably conservative. Instead, the sum of HEM figures for groups of packs may be very much higher or very much lower than what may be the case.

REMARKS:

The HEM does not tell the whole story of economic impacts associated with packs. The HEM does not take into account several important characteristics:

- adjustments in real estate values,
- displacement of land use,
- modification of cultural and recreational opportunities,
- transformation of the business environment,
- shifts in population demographics,
- operation of damage or infrastructure (sanitary services or well as water treatment and road systems),
- and alteration of associated community lifestyles.

HEM USE:

Because the HEM is simple, it has been uniformly applied to all packs for several years. It has withstood the tests of time and diverse economic circumstances. Several editions of this agency have experienced with the HEM. You can get help directly from the **MARKET-RESEARCH SERVICE DIVISION**, at (303) 943-6977.

THE ONLY APPROVED USE TO DATE OF THE

OVERVIEW:

There are three kinds of impacts calculated for each of these areas of activity. They are additive. Most users start with section I.

ACTIVITY	Tourism Expenditures	Government Expenditures	Other, Non-local Expenditures
Detail Sales	I.A.	II.A.	III.A.
Gas Revenue	I.B.	II.B.	III.B.
Jobs	I.C.	II.C.	III.C.

THE BEASY GENERATION MODEL: INTRODUCTION AND BACKGROUND

The Beasy Generation Model (BGM) provides a way to estimate economic benefits of parks on nearby communities and adjacent local areas. The model provides for the following:

- . . . First, a calculation of the economic benefits to the local area resulting from expenditures by park visitors who live outside the local area (non-local tourists).
- . . . Second, a calculation of the economic benefits to the local area resulting from park-related Federal Government expenditures. (For example, FWS expenditures for park employee salaries, supplies, services, construction projects, etc.).
- . . . Third, a calculation of the economic benefits to the local area resulting from park-related expenditures by other non-local parties. (For example, State expenditures for park access roads; or capital expenditures to build wastewater facilities, such as a new septic).

In other words, the Beasy Generation Model estimates the economic benefits to the local economy resulting from monies that flow into the local economy from outside sources.

In applying the Beasy Generation Model, the following three types of economic benefits are considered: SALES BENEFITS; TAX REVENUE BENEFITS; AND JOB BENEFITS.

SALES BENEFITS consist of income to local area businesses or individuals for goods and services that these businesses or individuals provide as a result of expenditures by non-local park visitors, Federal Government expenditures, and park-related expenditures by other non-local parties such as State governments, congressional capital expenditures, etc.

TAX BENEFITS consist of increases in local area tax revenues that result from expenditures by non-local park visitors, Federal Government expenditures, and park-related expenditures by other non-local parties.

JOB BENEFITS consist of the new jobs that are created in the local area as a result of expenditures by non-local park visitors, Federal Government expenditures, and park-related expenditures by other non-local parties.

The material that follows provides a step-by-step procedure for estimating the economic benefits of parks on the local economy. Section I deals with the economic benefits resulting from expenditures by non-local park visitors.

Section II deals with the economic benefits to the local area resulting from park-related Federal Government expenditures.

Section III deals with the economic benefits to the local area resulting from park-related expenditures by other non-local parties such as State governments or outside developers.

A set of Standardized Worksheets is attached at the end of the report to facilitate carrying out the economic benefit calculations. Two examples showing completed sets of worksheets also are included, one set for a rural area national park in the Rocky Mountain Region, and one set for a urban area national historic site in the Midwest Region.

Finally, it is noted that, in most cases, year-to-year expenditures by park visitors will be considerably greater than park-related expenditures by the Federal Government or by other outside parties. Therefore, a preliminary estimate of the economic benefit of the park to the local area economy frequently

may be calculated by considering only monies spent by non-local tourists, and by ignoring, at least initially, monies spent in the local area by the Federal Government, or by other outside interests. Such a preliminary estimate will involve only SECTION I: THE ECONOMIC BENEFITS OF VISITORS, and SECTION #1: ECONOMIC BENEFITS DERIVED FROM VISITORS' EXPENDITURES. The economic contributions to the local area economy that are attributable to expenditures by the Federal Government or to expenditures by other outside parties can be calculated later utilizing the step-by-step procedures outlined in SECTION II and III respectively.

As you proceed to apply the Money Circulation Model, two points are worth noting. First, the MCM is applicable to local areas near the park. The MCM cannot be used for large areas such as statewide areas without considering very carefully additional factors such as travel time and currency expenditures.

Secondly, as you use the Money Circulation Model, you will be asked to make assumptions about certain economic functions such as tax rates or levels of indirect sales, which will be explained later. If you are uncertain as to what number to select, or if you feel that the average number suggested in the step-by-step calculation process may not be applicable for your park, you may find it helpful to choose reasonably high and low values, and then calculate a range for the variable in question.

Appendix D — Funding Rehabilitation

The National Park Service examined a variety of methods for funding the rehabilitation of historic overnight accommodations in the park. Although congressional appropriations are preferred, the National Park Service would continue to explore options; however, the ultimate solution is likely to be a combination of methods. The cost estimates vary depending on the method of funding and exactly what would be required for the approach to be economically feasible. One possibility is a phased redevelopment schedule with life safety and structural rehabilitation first, with less immediate needs to follow. Some phases would be necessary to support visitor services before facilities are addressed.

Private Investment. Funding would be from the private investment of capital by a concessioner. At present the concessioner invests 6 percent of the company's annual gross receipts in capital improvements and another 6 percent in recurring maintenance. The capital improvement expenditures are in lieu of paying fees to the General Treasury, are expended only on NPS-approved projects, and do not result in the concessioner's ownership of these improvements. These amounts are not sufficient to complete the necessary rehabilitation work. For the park to depend on private funding sources to raise the required capital (such as a concessioner funding the rehabilitation), there needs to be sufficient return on the investment to induce investors to put their money toward this venture or allow the concessioner a reasonable opportunity to make a profit. As discussed under funding methods "Considered but Rejected" this method would depend on revenue from additionally developed hotel rooms in the park, extending the seasons, and pricing accommodations beyond the reach of most park visitors. The current concessioner has said it would require a contract term of 30 years. The president signed a federal law on November 13, 1998, that limits term of contracts to no more than 20 years. For the basis for the rejection of this method see "Considered but Rejected." Private funding of the rehabilitation would still be considered if a way can be found to use it without these unacceptable effects.

Another method might be a real estate investment trust in which capital for improvements would be raised by selling stock shares in the trust to the public. Intrinsic to this method is providing for an adequate return on the investment of the capital. The return would have to be sufficient to persuade a concessioner or other investors to fund the renovations. If revenue sources could be located to

guarantee this return without having to raise rates, increase the number of rooms in the park, change ownership of the facilities, increase the term of a contract beyond what is allowed by law, or extend the lodging season, private investment would be an acceptable source of money for the rehabilitation. Some types of private investment were rejected. These are discussed in the chapter on “Alternatives, Ideas, and Strategies Considered but Rejected,” under “Funding Strategies for Rehabilitating Historic Hotels and Visitor Services.”

Public Investment. This method would be funded from tax dollars, (congressional appropriations from the federal budget). It would not require a return on the investment. The National Park Service would purchase the concessioner’s compensable interest in the facilities (possessory interest), pay for the initial rehabilitation and upgrades, and hire (through a management contract) a concessioner to manage the operations and visitor services. Annual maintenance and future capital improvements would be paid for by franchise fees from the concessioner contracted to operate the services. This method would require no return on the \$80+ million investment for the rehabilitation, eliminating the need to significantly increase rates, change the kinds of service, or add more lodging to the park to raise revenue. Rates would continue to be regulated and based on comparison with other similar operations, as current law requires. Obtaining a congressional appropriation for \$80 million would require strong public support. The National Park Service recognizes that this would be difficult.

Options for sources of public money would include federal or state tax credits for rehabilitation of historic structures. An additional method of public investment would be a private investor (such as a concessioner) obtaining federal (and possibly state) tax credits for that portion of the work that relates to rehabilitation of the historic structures. Under current federal tax law, such an investor could be eligible for a one-time 20 percent tax credit on rehabilitation work on a historic structure. Although not all of the proposed investment would qualify, this could be an incentive that would reduce the amount of return on investment that would be needed for a private investor.

Public Investment / Private Investment Combination. This method would mingle the options listed under 1 and 2 for each property or would use different methods for different properties. In addition there may be other methods that may be used to supplement the revenue stream necessary to make a private/public investment option work.

Entrance Fees — A portion of current entrance fees or an increase in entrance fees could be used to raise money to rehabilitate historic structures. Under existing laws and regulations, a portion of the park entrance fees may be expended on visitor services or the maintenance backlog. Entrance fees are set by law. Congressional legislation would be required to authorize increases. Although a small portion of these fees may be available, the funding source is unreliable. Visitation changes, laws are subject to change, national programs that dictate where the fees may be expended can change, and changes in base park operating budgets may necessitate allocation of those funds to maintain park programs.

Bond Issuance — Public or private issuance of a bond could be an additional source of funds. Ownership of facilities by the federal government and (in some cases) the concessioner could create legal complications that prohibit issuance of bonds. Bonds depend on cash flow to service the debt. Acceptable methods to create this cash flow would have to be explored.

Appendix E — Cost Estimates

The following are 1998-1999 class C gross construction estimates. The estimates include project planning, construction supervision, and contingencies. They were prepared by the Cost Estimating Branch, Denver Service Center, National Park Service.

VISITOR USE ON THE GOING-TO-THE-SUN ROAD

Alternative A1: to be determined by comprehensive use plan for the
Going-to-the-Sun Road

Alternative A: \$12,300,000 (does not include shuttle system)

Alternative B: \$13,000,000

Alternative C: Status Quo

PRESERVATION OF GOING-TO-THE-SUN ROAD

Alternative A1:	\$70,000,000 – \$210,000,000
Alternative A: 4-6 years	\$70,000,000 – \$85,000,000
Alternative B: 10± years	\$90,000,000 – \$110,000,000
Alternative C: Status Quo	\$195,000,000 – \$210,000,000

PRESERVATION OF HISTORIC HOTELS AND VISITOR SERVICES

[NOTE: The costs given in the “Preservation of Historic Hotels and Visitor Services” chapter are generally lower because they were taken from rehabilitation studies prepared at different times in the past.]

Alternative A – Rehabilitate 5 major hotels — \$100,000,000-\$135,000,000

Lake McDonald Lodge	\$34,600,000 to \$47,300,000
Many Glacier Hotel	\$52,500,000 to \$63,100,000
Swiftcurrent Motor Inn	\$4,500,000 to \$10,400,000
Rising Sun Motor Inn	\$7,500,000 to \$13,100,000
Two Medicine Chalet	\$900,000 to \$1,100,000

Alternative B – Status Quo — \$600,000 per year

WINTER USE

Alternative A – Status Quo with additional plowing — No construction costs

Alternative B – Open Lake McDonald Lodge, Village Inn, and campstore for winter use — \$6,200,000

Alternative C – Status Quo – No construction costs

DIVIDE CREEK FLOOD HAZARD

Alternative A – Relocate housing, maintenance, and administrative facilities — \$10,000,000

Alternative B – Channelize Divide Creek — \$3,000,000 TO \$6,000,000

Alternative C – Status Quo — No construction costs

WEST SIDE DISCOVERY CENTER

Alternative A - Locate in park — \$15,000,000

Alternative B - Locate outside park — \$18,000,000

Alternative C - Status Quo, Continue to Use Apgar contact station —No construction costs

Appendix F — Interpretive Themes

Interpretive themes are ideas about park resources that are so important that every visitor should have an opportunity to understand them. They are critical to the visitor's understanding of the park's significance. These interpretive themes are used to provide guidance and direction to the park's interpretive and educational programs.

- I. Past and present geological processes create the dramatic scenery readily visible at Glacier National Park.
- II. Glacier National Park offers a primitive wilderness experience complete with the risks and rewards of encountering nature on its own terms.
- III. Waterton-Glacier International Peace Park is the world's first international peace park. It commemorates lasting peace between Canada and the United States and sets an example for other nations of the world in managing resources across boundaries.
- IV. American Indians, especially the Blackfeet and Salish-Kootenai tribes, continue to have productive relationships with Glacier National Park.
- V. Glacier National Park is the core of a largely intact ecosystem called "Crown of the Continent," and it contains one of the few triple divides in the world (from the park, water flows to the Atlantic, Pacific, and Arctic Oceans).
 - A. A vital contribution that Glacier makes to the ecosystem is as a corridor through which plants and animals can move physically and genetically.
 - B. The health and sustainability of this ecosystem ultimately depends on the cooperation and commitment of us all.

- VI. The historic objects, structures, roads, and trails of Glacier National Park represent the high value that has been placed on experiencing this park and are products of westward expansion and the movement to establish a system of national parks that predominated during the 19th and 20th centuries.
- VII. Glacier's landforms, geographic location, and climate create conditions that support exceptional biological diversity.
 - A. Glacier is a melting pot of terrestrial ecosystems: Arctic, Pacific northwest, boreal, prairie, and Rocky Mountain plants are all found in the park.
 - B. Glacier is one of the few areas in the world where all native predators and most of their prey survive in the wild.

Appendix G — GMP Staffing Plan

POSITION TITLE	FTE	COSTS (salary and benefits)
New West Side Discovery Center		
Archivist	1.0	\$55,000
Park ranger naturalist	1.0	55,000
Visitor use assistant	4.0	121,000
Custodial worker	1.0	32,000
Going to the Sun Road Preservation		
Landscape architect	1.0	66,000
Mason leader	1.0	46,000
Mason	2.0	60,000
Equipment operator	1.0	42,000
Positions needed to fully implement the <i>General Management Plan</i> but not tied to a specific alternative:		
Historical architect	1.0	67,000
Natural resource interpreter	1.0	55,000
Environmental education specialist	3.0	137,000
Biological science technician	4.0	148,000
Conservation biologist	1.0	66,000
Maintenance mechanic	2.0	75,000
Equipment operator	2.0	84,000
Resource management specialist	1.0	66,000
Clerical support	2.0	50,000

Appendix H — Sources of Information Consulted Regarding Road Reconstruction

In addition to the literature about various subjects cited throughout the text and listed in the bibliography of this document, the Glacier National Park planning team consulted the following sources in developing the alternatives for the reconstruction of the Going-to-the-Sun Road.

1925	“Transmountain Road Plans and Specifications,” Bureau of Public Roads (agency that became the Federal Highway Administration)
1983	Nomination of the Going-to-the-Sun Road to the National Register of Historic Places
1984	“Parking at Trail of the Cedars,” environmental assessment, National Park Service
1984	Finding of No Significant Impact for Parking at Trail of the Cedars, National Park Service
n.d.	“Road Rehabilitation Planning Study,” Glacier National Park and Federal Highway Administration
1984	Visitor Survey for Transportation Plan, TRANSPO Group, Inc. (prepared under contract for the National Park Service)
April 1985	“Environmental Assessment for Going-to-the-Sun Road Improvements,” National Park Service
June 28, 1986	“Historical Survey of Going-to-the-Sun Road Walls,” National Park Service
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- Oct. 1987 “Going-to-the-Sun Road Guard Rail Inventory,” National Park Service
- April 1989 Draft Transportation Plan / Environmental Assessment, National Park Service
- 1990 An Engineering Feat, brochure, National Park Service
- Feb. 1990 “Biological Assessment for Transportation Plan, Glacier National Park”
- June 15, 1990 Finding of No Significant Impact for Lake McDonald Segment, Going-to-the-Sun Road Improvements, National Park Service
- Sept. 17, 1991 “Stone Sources and Need Survey, Going-to-the-Sun Road,” National Park Service
- April 1992 “Going-to-the-Sun Road Guardrail System in Avalanche Zones,” Glacier National Park
- July 1992 “Going-to-the-Sun Road: Traffic Characteristics, #1” Peccia and Associates (prepared under contract for the National Park Service)
- Sept. 1992 “Going-to-the-Sun Road: Traffic Characteristics, #2” Peccia and Associates (prepared under contract for the National Park Service)
- Nov. 5, 1992 “Draft Retaining Walls Condition Inventory,” Shannon & Wilson, (prepared under contract for the National Park Service)
- Nov. 17, 1992 “Going-to-the-Sun Road Cultural Landscape Inventory,” National Park Service
- July 1993 “Roadside Maintenance Guideline,” National Park Service
- Nov. 15, 1993 “Traffic Safety Study,” Peccia and Associates (prepared under contract for the National Park Service)
- Jan. 26, 1994 “Retaining Wall Inventory, Going-to-the-Sun Road,” Alpha Engineering, (prepared under contract for the National Park Service)
- Sept. 9, 1994 “Guardwall Crash Test Results Report,” Federal Highway Administration

- Oct. 14, 1994 “Summary Report, Retaining Wall 29G,” Alpha Engineering,
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- May 1995 “Going-to-the-Sun Road Wayside Exhibit Plan,” Glacier National
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- April 1997 “Innovative Contracting Methods,” Federal Highway
Administration
- 1997 “People Movers for Glacier National Park,” National Park Service
- May 28, 1997 “White Paper for Rehabilitation of the Going-to-the-Sun Road,”
National Park Service
- June 4, 1997 “Other Technologies for Road Construction in Alpine,” Federal
Highway Administration
- June 13, 1997 “Feasibility Report: Temporary Bridge Installation,” Federal
Highway Administration
- June 13, 1997 “Prefabrication of Components in Road Construction,” Federal
Highway Administration
- June 15, 1997 Finding of No Significant Impact, Parking Facilities, Avalanche,
National Park Service
- Sept. 1997 Draft Going-to-the-Sun Road Reconnaissance Study, National
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- Dec. 1997 “Vehicle Movement and Traffic Study,” Peccia and Associates (pre-
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- Dec. 5, 1997 Finding of No Significant Impact, Parking Facilities, Avalanche,
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- Dec. 23, 1997 “Retaining Wall Inventory Update, Going-to-the-Sun Road,”
Federal Highway Administration
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As the nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

Dear Friends,

What you have before you is the culmination of a four-year effort, in which we worked with you to determine how best to manage Glacier National Park for the future. It has been neither an easy process nor a quick one, and for good reason. Many of you wish to see little change. Many of you believe we must change to reduce impacts to natural resources. Many believe we must meet the demands of greater numbers of visitors. Many of you have actively championed various issues, be they wilderness, visitor access, research, or retaining the heritage of the past that is also the image of Glacier. And all of you feel very strongly about Glacier! I thank you all for taking the time to understand the issues and Glacier's values and for giving us your thoughts.

Glacier — a unit of Waterton-Glacier International Peace Park — is special to us all. It is the first national park in the world to be legislatively paired with another as an “international peace park.” Its cultural significance predates its national park status. To the Blackfeet Nation, Going-to-the-Sun is not just the name of a spectacular road over the “backbone” of their world.

Nowhere else in the contiguous states is found a complete complement of predators and prey that are interdependent on our ability to manage across national frontiers. Glacier's bears, wolves, and raptors are not “Glacier's” at all, but are part of a “Crown of the Continent” ecosystem that is at the core for survival of endangered species in neighboring states. If we cannot preserve these species here in the Waterton-Glacier International Peace Park with the help of Alberta, British Columbia, and Montana, then what does that mean for them in Idaho, Washington, and Wyoming?

Waterton-Glacier International Peace Park is an incredibly complex natural system of which humans are a part, even if only visiting for awhile. The challenge of preserving park resources while using them for the benefit of people is as complex as the systems themselves. The National Park Service rises to meet this management challenge every day in every way, whether funding research to better understand why bull trout in upper Kintla Lake spawn upstream, rebuilding a washed-out trail bridge, or continuing a visitor use that has become “traditional.” And, every employee — from the seasonal employee serving a first year, to the concessioner providing visitor services, to NPS employees who have served their entire careers here — is truly dedicated to doing what is best to preserve Glacier for present and future visitors.

It pleases us to know that so many of you realize that trying to keep the essence of Glacier little changed — while our world around us changes constantly — is a daunting challenge. Yet these challenges are the essence of our duty as national park managers to preserve Glacier for the benefit and use of future generations. Thus, we must actively manage this world treasure, especially where visitors and park resources meet, to meet this responsibility. This **General Management Plan** will guide our efforts.

In ten short years Glacier will begin to celebrate its centennial. We are fortunate that almost a hundred years of national park management has enabled public use of this great park to enrich the lives of so many while little changing the park. The implementation of this **General Management Plan** can help ensure a continuation of use by visitors who become dedicated, through their experience, to Glacier's preservation.



GLACIER NATIONAL PARK

Waterton-Glacier International Peace Park

Volume 1 • Final General Management Plan/
Environmental Impact Statement

TABLE 1: SUMMARY OF ALTERNATIVES

Alternative A1 – Preferred	Alternative A	Alternative B – Other	No Action – Status Quo
Visitor Use on the Going-to-the-Sun Road			
<p>Visitor opportunities would be expanded along the road to disperse use while maintaining the historic character of the road. This alternative retains the freedom of choice for visitors to drive personal vehicles and stop along the road. An expanded public transportation system would be provided. Develop a comprehensive use plan for the Going-to-the-Sun Road.</p>	<p>Visitor opportunities would be expanded along the road to disperse use while maintaining the historic character of road. This alternative retains the freedom of choice for visitors to drive personal vehicles and stop along the road. An expanded public transportation system would be provided.</p>	<p>A significantly larger parking lot would be constructed at Logan Pass to alleviate the congestion in the area.</p>	<p>Continue to manage the Going-to-the-Sun Road as the principal place where visitors experience Glacier's varied resources. Private vehicle use would continue.</p>
Preservation of the Going-to-the-Sun Road			
<p>Reconstruct the Going-to-the-Sun Road in a comprehensive manner before it fails. Conduct further study to determine how this should be done.</p>	<p>Reconstruction would take 4-6 years. The road would be closed between Avalanche and Logan Pass and then between Rising Sun and Logan Pass. The lower sections of the road would take approximately 2 years to reconstruct. Logan Pass visitor center would remain open, but it would not be possible to travel from one side of the park to the other. The total cost of this alternative would be \$70-\$85 million.</p>	<p>Reconstruction would take 10 or more years with a variety of road closures, such as night closures, daytime delays, one-way traffic, and limited day closures of certain sections and possible full closure after Labor Day. The total cost would be approximately \$90-\$105 million.</p>	<p>Retain the current (\$2 million/year) road reconstruction program. Two-way traffic on the Going-to-the-Sun Road would be retained during construction, which would consist of a series of smaller, site-specific projects. Reconstruction would take about 50 years and cost \$195-\$210 million; repairs would probably not be able to keep pace with deterioration, and the road.</p>
Preservation of Historic Hotels and Visitor Services			
<p>The National Park Service would ensure the preservation and protection of the national landmark and national register properties; \$80-100 million would be required. No significant operating season, room rate, number of rooms, or the range of lodging changes would be necessary.</p>			<p>The NPS and concessioner would continue to make repairs with available funds until such time as the deterioration of the buildings required more money than was available. Then they would close due to visitor safety concerns and lack of viability.</p>
Scenic Air Tours			
<p>The FAA would be asked to prohibit all commercial sightseeing tours over Glacier National Park.</p>		<p>The FAA would be asked to restrict commercial sightseeing tours to certain parts of the park and to impose a 2,000-foot MSL. The recommendation to the Federal Aviation Administration would be to permit scenic air tours over the Going-to-the-Sun Road and east of the divide over Many Glacier and Belly River while prohibiting tours over the North Fork, Middle Fork, and Two Medicine areas.</p>	<p>Scenic air tours would continue to proliferate in Glacier National Park. Recommendations such as flying 2,000 feet above ground level would continue, as would the FAA emphasis on safety for visitors flying over the park.</p>
Personal Watercraft			
<p>Personal watercraft would be permanently banned.</p>			<p>The temporary ban on personal watercraft would be lifted and use permitted where boats with motors of 10 horsepower or more are allowed.</p>

TABLE 1: SUMMARY OF ALTERNATIVES

Alternative A1	Alternative A – Preferred	Alternative B – Other	No Action – Status Quo
Winter Use			
	As winter visitation increases, day use would be provided for by providing some roads, providing parking. Effects on wildlife would be monitored.	Park management would seek to diversify winter use and provide a winter experience not found elsewhere in the region by planning for overnight accommodations on the west side as demand increases.	Glacier National Park would continue to offer a winter experience to day users and to those visitors who choose to go into the backcountry overnight.
Divide Creek Flood Hazard			
	Structures would be relocated out of the floodplain and flood hazard zone of Divide Creek to a location in or outside of the park.	Channelizing Divide Creek would aim or development against future floods to the extent possible.	A monitoring program would be maintained to ensure human safety and to protect park facilities at Divide Creek.
West Side Discovery Center and Museum			
	Construct a westside discovery center and museum to provide for interpretation and protection of cultural resources inside the park north of the T-intersection of the Going-to-the-Sun and Camas Roads to replace the visitor contact station in Appar.	A westside discovery center and museum would be built outside the park near the west entrance. Cultural resource protection and storage would be provided in the same location.	Visitor contact functions would remain at Appar. Cultural resource storage would remain in three different locations on the west side of the park.

TABLE 2: SUMMARY OF IMPACTS

ALTERNATIVE A1 – PREFERRED	ALTERNATIVE A	ALTERNATIVE B – OTHER	NO-ACTION ALTERNATIVE
VISITOR USE ON THE GOING-TO-THE-SUN ROAD			
Enhance Visitor Use along the Going-to-the-Sun Road	Expand Visitor Opportunities along Going-to-the-Sun Road	Expand Logan Pass	Status Quo
<p>Natural Environment: Overall, there would be minimal adverse impacts on water quality, scenic resources, aquatic resources, and soils. Vegetation would be impacted as offroad parking increased.</p> <p>This alternative would not be likely to adversely affect listed wildlife species. Further consultation with USFWS would be done on the comprehensive use plan for the Going-to-the-Sun Road.</p>	<p>Natural Environment: Overall, there would be minimal adverse impacts on water quality, scenic resources, aquatic resources, and soils. Vegetation would be impacted as offroad parking increased.</p> <p>Construction associated with expanding day use would result in temporary disturbance and displacement of many species and a small amount of habitat loss for some species.</p> <p>Many wildlife species, including federally listed and state-rare wildlife species, would be affected to some degree by increasing visitor use in the Going-to-the-Sun Road corridor.</p>	<p>Natural Environment: There would be significant adverse impacts on water resources, wetlands, aquatic resources, and groundwater. Impacts on scenic resources would be significant if parking lot expansion was aboveground.</p> <p>There are no known species at risk; state-rare plant species would be adversely impacted, and other vegetation in the area would be destroyed.</p> <p>Expanding the parking at Logan Pass would remove habitat and further displace wildlife from the area, including the federally listed grizzly bear. Those species that were not displaced would habituate to increased numbers of people. Expansion of the parking lot underground would remove less habitat than expanding the lot aboveground.</p>	<p>Natural Environment: Wetlands, aquatic resources, scenic resources, vegetation, soils, and natural sounds would be adversely affected as a result of increased use and offroad parking.</p> <p>Wildlife, including most federally listed and state-rare wildlife species, would be adversely affected by increasing traffic along the Going-to-the-Sun Road.</p>
<p>Cultural Environment: Effects on cultural resources along the Going-to-the-Sun Road would be mitigated through design. Archeological resources would be avoided.</p>	<p>Cultural Environment: Effects on cultural resources along the Going-to-the-Sun Road would be mitigated through design. Archeological resources would be avoided.</p>	<p>Cultural Environment: Effects on archeological resources in Logan Pass area could be avoided through careful design and review. Cultural resources would not be affected.</p>	<p>Cultural Environment: There would be no effects on cultural resources or archeological resources.</p>
<p>Socioeconomic Environment: There would be continued economic benefits to the local and regional communities, and the visitor experience would be enhanced.</p>	<p>Socioeconomic Environment: There would be continued economic benefits to the local and regional communities, and the visitor experience would be enhanced.</p>	<p>Socioeconomic Environment: The park's beneficial contribution to local and regional economies would continue; visitor spending would remain substantially unchanged, and construction projects would benefit employment and income levels in northwest Montana; expansion would allow more visitors to use the area.</p>	<p>Socioeconomic Environment: The contribution that the park makes to the local and regional economies and to visitor experiences would continue with temporary adverse impacts during construction of an expanded Logan Pass parking lot and reconstruction of the road.</p>
PRESERVATION OF THE GOING-TO-THE-SUN ROAD			
Reconstruction	Fast-track Reconstruction (4–6 years)	Accelerated Reconstruction (10+ Years)	Status Quo (long-term – 50 years)
<p>Natural Environment: Mitigation measures would reduce any impact of reconstruction on aquatic resources, including federally listed, proposed, and state-rare species, vegetation, and soils.</p> <p>Reconstruction of the Going-to-the-Sun Road could have adverse impacts on vegetation, including species at risk and state-sensitive species.</p> <p>Reconstruction would result in temporary disturbance and displacement of many wildlife species and a small amount of habitat loss for some species. Federally listed wildlife species probably would not be adversely affected. Additional consultation with USFWS would be done as further studies began.</p>	<p>Natural Environment: Mitigation measures would reduce any impact of reconstruction on aquatic resources, including federally listed, proposed, and state-rare species, vegetation, and soils.</p> <p>Reconstruction of the Going-to-the-Sun Road could have adverse impacts on vegetation, including species at risk and state-sensitive species.</p> <p>Fast-track road reconstruction would result in temporary disturbance and displacement of many wildlife species and a small amount of habitat loss for some species. The federally listed grizzly bear could be negatively impacted by fast-track reconstruction along the Going-to-the-Sun Road.</p>	<p>Natural Environment: Mitigation measures would reduce any impact on aquatic resources, including federally listed, proposed, and state-rare fish species, vegetation, and soils.</p> <p>Reconstruction of the Going-to-the-Sun Road could have adverse impacts on vegetation, including species at risk and state-sensitive species.</p> <p>Accelerated road reconstruction would result in temporary disturbance and displacement of many wildlife species and a small amount of habitat loss for some species. The federally listed grizzly bear could be negatively impacted by accelerated reconstruction.</p>	<p>Natural Environment: There would be long-term effects on air quality, scenic resources, vegetation (including species at risk and state-sensitive species), and natural sounds from reconstruction.</p> <p>Mitigation measures would reduce impacts on aquatic resources, including federally listed, proposed, and state-rare fish, vegetation, and soils.</p> <p>Reconstruction of the Going-to-the-Sun Road would temporarily adversely affect wildlife that live or travel adjacent to the road. No long-term effects would be expected. The reconstruction could temporarily displace bears from the area and could create unnatural attractants.</p>
<p>Cultural Environment: The timeframe would facilitate the preservation of most cultural resources.</p>	<p>Cultural Environment: The short timeframe would facilitate the preservation of most cultural resources more than any other alternative.</p>	<p>Cultural Environment: The relatively short timeframe would facilitate the preservation of most of the cultural resources.</p>	<p>Cultural Environment: The long timeframe would result in eventual loss of some cultural resources before they could be reconstructed.</p>
<p>Socioeconomic Environment: There would be positive and negative impacts on the state of Montana. The local economy would be more affected either positively or negatively.</p>	<p>Socioeconomic Environment: The local and regional communities, visitors, and landowners would be negatively affected for the short term, which would reduce visitor numbers and expenditures; however, construction costs would be less than other alternatives. Economic impacts would occur due to reduced visitation and closure of segments of the Going-to-the-Sun Road for 2–4 years (some businesses would fail and others would not). The effects would be less than under alternative B. Mitigation would ensure visitor opportunities and access during closures. Benefits to the local and regional economies would result from construction.</p>	<p>Socioeconomic Environment: The local and regional communities, visitors, and landowners would be negatively affected by the reconstruction, which would reduce visitor numbers and expenditures. Socioeconomic impacts would be greater than in alternative A because reconstruction would occur over a longer period, which would change visitor use patterns and result in more business closures than alternative A. Local and regional economies would benefit.</p>	<p>Socioeconomic Environment: The long-term construction scenario would cause less disruption to local and regional communities, visitors, and landowners at any one time, but construction would last longer than in the other alternatives. Periods of road closures would reduce park visitation and spending. Construction projects would benefit employment and income levels of local and regional economies. Catastrophic closure of the Going-to-the-Sun Road could significantly adversely affect local and regional economies and visitors.</p>

TABLE 2: SUMMARY OF IMPACTS (continued)

ALTERNATIVE A1	ALTERNATIVE A – PREFERRED	ALTERNATIVE B – OTHER	NO ACTION ALTERNATIVE
PRESERVATION OF HISTORIC HOTELS AND VISITOR SERVICES			
	Rehabilitate National Landmark and National Register Overnight and Visitor Service Facilities and Retain Lodging Mix	Not applicable	Status Quo
	<p>Natural Environment: Overall, there would be negligible adverse effects on water quality, scenic resources, aquatic resources, and soils if mitigation was carried out during construction.</p> <p>No known species at risk or state-sensitive plant species would be adversely affected by rehabilitation of the lodges.</p> <p>Rehabilitation of visitor facilities in the park would have temporary adverse effects on wildlife during construction, temporarily displacing wildlife from these areas or causing increased habituation. Adverse effects on wildlife, including the federally listed grizzly bear, would be more likely during the spring and fall because the animals are accustomed to decreased visitor use during these periods. Construction during the summer would be less likely to adversely affect wildlife. Overall, this alternative would not be likely to adversely affect listed species.</p>		<p>Natural Environment: There would be no adverse impacts on water resources, aquatic resources, vegetation, soils, or natural sounds. No known species at risk or state-sensitive species would be adversely affected by the continued maintenance of the historic lodges. Continuation of early season maintenance activity at the Many Glacier Hotel and other lodges and visitor facilities throughout the park would not have additional impacts on wildlife, including most federally listed and state-rare species. Eventual closure of facilities would result in a positive impact on wildlife species that have been displaced.</p> <p>Ongoing maintenance of historic visitor service facilities has the potential of disturbing eagles that nest and feed in the Lake McDonald area. Mitigation would continue to reduce those impacts.</p>
	Cultural Environment: Preservation of historic hotels and visitor services would have a positive effect, preserving national historic landmarks and national register sites.	Not applicable	Cultural Environment: Eventual closure of historic hotels and visitor services would have a negative impact.
	Socioeconomic Environment: Rehabilitation would have positive economic benefits on the regional economy and would ensure that visitors' traditional overnight experiences would continue.	Not applicable	Socioeconomic Environment: Eventual closure of overnight facilities, depending on the number of units lost, would have a negative effect on local and regional economies and on visitors.
AVIATION ACTIVITIES			
	Ban Scenic Air Tours over the Park	Commercial Sightseeing Tours Allowed only in Certain Parts of the Park	No Action Alternative - Status Quo
	<p>Natural Environment: There would be no adverse effects on water quality, scenic resources, aquatic resources, soils, vegetation or natural sounds.</p> <p>Many species, including federally listed and state-rare species and those that summer at high elevations, would benefit from reduced human disturbance.</p> <p>This alternative would have no effect on federally listed wildlife species.</p>	<p>Natural Environment: There would be no adverse impacts on water resources, aquatic resources, vegetation, or soils; overall, there could be adverse impacts on natural sounds, scenic resources, and air quality.</p> <p>Many species, including federally listed and state-rare species, and especially those that summer at higher elevations, would benefit from reduced human disturbance by banning scenic air tours over selected portions of the park, but wildlife impacts would continue in areas where overflights were still allowed.</p>	<p>Natural Environment: There would be no adverse impacts on water resources, aquatic resources, vegetation, air quality, or soils; overall, adverse impacts on natural sounds and scenic resources.</p> <p>Wildlife could be adversely affected by unrestricted scenic air tour activity.</p>
	Cultural Environment: There would be no effects on cultural resources.	Cultural Environment: There would be no effects on cultural resources, but there could be effects on culturally protected activities from scenic air tour noise.	Cultural Environment: There would be no effects on cultural resources. There would be adverse impacts on culturally protected activities.
	Socioeconomic Environment: There would be benefits for most visitors and landowners; air tour operators operate on the periphery of the park. There would be a positive impact for most visitors and landowners and an improved visitor experience but an adverse impact on scenic air tour operators.	Socioeconomic Environment: There would be no adverse economic impact, but there would be an adverse impact on visitors and landowners where air tours are allowed. Visitors would benefit when scenic air tours are banned.	Socioeconomic Environment: There would be no adverse economic impact, but there would be an adverse impact on most visitors and landowners.

TABLE 2: SUMMARY OF IMPACTS (continued)

ALTERNATIVE A1 – PREFERRED	ALTERNATIVE A – PREFERRED	ALTERNATIVE B – OTHER	NO-ACTION ALTERNATIVE
PERSONAL WATERCRAFT			
	Ban Personal Watercraft on all Park Waters	Not applicable	Status Quo
	Natural Environment: Banning personal watercraft would have positive effects on wetlands, water quality, scenic resources, aquatic resources, soils, and vegetation. Many species, including federally listed and state-rare species and those that use lake or lakeshore areas, would benefit from reduced human disturbance. This alternative would have no effect on federally listed wildlife species.	Not applicable	Natural Environment: Use of personal watercraft would adversely affect wetlands, aquatic resources, scenic resources, air quality, wetland vegetation, natural sounds, and soils in shallow er sections of St. Mary Lake and Lake McDonald. Wildlife would be adversely affected by the use of personal watercraft.
	Cultural Environment: There would be no effects on cultural resources.	Not applicable	Cultural Environment: There would be no direct effects on cultural resources.
	Socioeconomic Environment: Negligible effect on visitor expenditures, and action would benefit most visitors and landowners.	Not applicable	Socioeconomic Environment: There would be no effect on the local and regional economy; use of personal watercraft would adversely affect local and national visitors seeking a traditional experience in the park. Effects on landowners would be similar to those on visitors except for those landowners who owned and wanted to use a personal watercraft.
LEVEL OF WINTER USE			
	Prepare for More Winter Day Use	Increase Winter Opportunities to Include Overnight Accommodations	Status Quo
	Natural Environment: There would be no adverse effects on water quality, scenic resources, aquatic resources, soils, or vegetation. Wildlife, including some federally listed and state-rare species, could be adversely affected. However, with mitigation such as monitoring, this alternative would not be likely to have adverse effects on federally listed wildlife species.	Natural Environment: There would be no adverse effects on most natural resources, but some adverse effect on natural sounds would result from increased numbers of people in the area. Wildlife, including some federally listed and state-rare species, could be adversely affected by increased winter use.	Natural Environment: There would be no adverse effects on water quality, scenic resources, aquatic resources, air quality, soils, vegetation, or natural sounds. Wildlife, including federally listed and state-rare species, could be adversely affected by increased winter use.
	Cultural Environment: There would be no effects on cultural resources.	Cultural Environment: There would be no effects on cultural resources. Historic structures could benefit since maintaining constant temperature throughout the year would provide better protection.	Cultural Environment: There could be indirect negative effects on cultural resources from lack of maintenance during winter.
	Socioeconomic Environment: This action would stimulate some increase in visitor expenditures and provide new experiences for visitors, but increased use in the area would increase the chance of vandalism to private properties. Conversely, increased use may discourage vandalism.	Socioeconomic Environment: The park's beneficial contribution to local and regional economies would continue; visitor spending would generate additional visitor spending. Winter facilities outside the park could be adversely affected if visitors preferred to stay inside the park.	Socioeconomic Environment: There would be no effect on local and regional economies or on landowners.

TABLE 2: SUMMARY OF IMPACTS (continued)

ALTERNATIVE A1 – PREFERRED	ALTERNATIVE A – PREFERRED	ALTERNATIVE B – OTHER	NO-ACTION ALTERNATIVE
D IVIDE CREEK FLOOD HAZARD			
	Rebate Structures Out of the Flood Hazard Zone	Channelize Divide Creek	Status Quo
	<p>Natural Environment: Removing development from the Divide Creek floodplain would have a beneficial effect on water quality, scenic resources, aquatic resources, soils, and vegetation.</p> <p>Removing facilities from the Divide Creek flood hazard area and reclamation of the area would provide additional habitat for wildlife, including federally listed and state-rare species, resulting in a positive effect. Beneficial effects would extend beyond the boundaries of the reclaimed area because employment use of the surrounding area would decline. Impacts would depend on the sites chosen for rebatation. Further analysis would be completed as part of the site-selection process. This alternative would not be likely to have adverse effects on federally listed wildlife species.</p>	<p>Natural Environment: Significant adverse effects could be expected on floodplains, wetlands, water quality, aquatic resources, scenic resources, and soils.</p> <p>Channelization of Divide Creek would not have any additional effects on wildlife, including federally listed and state-rare species. Animals would continue to avoid this area of concentrated human activity.</p>	<p>Natural Environment: There would be significant adverse effects on water quality from continued development adjacent to Divide Creek, but no effects on scenic resources, air quality, soils, or natural sounds.</p> <p>Continued use of the Divide Creek facilities and Appgar visitor contact station would not result in any additional impacts on wildlife. Animals would continue to be displaced from this area of concentrated human activity.</p>
	Cultural Environment: Removal of the St. Mary maintenance area historic district would result in an adverse effect; further consultation with SHPO and ACHP would be required.	Cultural Environment: There would be no effects on cultural resources.	Cultural Environment: St. Mary maintenance area historic district eventually would be lost.
	<p>Socioeconomic Environment: Rebatating facilities in St. Mary or outside the park would benefit the regional economy by increasing total industrial output and would not affect visitors and landowners in the park. Rebatating the facilities inside the park would have no effect.</p> <p>Removing facilities from St. Mary would have an overall adverse effect on businesses in St. Mary by removing customers from the area, particularly during the winter.</p>	Socioeconomic Environment: The park's beneficial contribution to local and regional economies would continue; visitor spending would remain substantially unchanged.	Socioeconomic Environment: There would be no effect on landowners, visitors, or the regional and local economies unless the area flooded and was rebatated.
WEST SIDE DISCOVERY CENTER AND MUSEUM			
	Construct a West Side Discovery Center and Museum Inside the Park	Locate Discovery Center and Museum Functions Outside the Park	Status Quo
	<p>Natural Environment: Overall, there would be minimal adverse impacts on scenic resources, vegetation, and soils, provided that mitigation was carried out during construction; there would be no effects on water quality or aquatic resources. State-listed plant species would be avoided or moved as a last resort.</p> <p>Construction associated with visitor center construction would result in temporary disturbance and displacement of many species and a small amount of habitat loss for some species. This alternative would not be likely to adversely affect federally listed species.</p>	<p>Natural Environment: Careful design and construction would mitigate any adverse effects on natural resources.</p> <p>Development of a west side discovery center outside of the park would not affect wildlife, including federally listed and state-rare species, or habitat in the park. Depending on where the facilities were located, wildlife habitat and use outside of the park could be affected. Further analysis would be completed as part of the site-selection process.</p>	<p>Natural Environment: There would be no adverse impacts on water resources, air quality, vegetation, soils, or natural sounds; there would be adverse impacts on scenic resources.</p> <p>The continued use of Appgar contact station would not have any additional effects on wildlife, including federally listed and state-rare species. Animals would continue to be displaced from this area of concentrated human activity.</p>
	Cultural Environment: There would be no adverse effects on cultural resources.	Cultural Environment: There would be no adverse effects on cultural resources.	Cultural Environment: There would be no adverse effects on cultural resources.
	Socioeconomic Environment: The construction project would benefit the economy and create additional jobs; the new visitor center would benefit visitors significantly.	Socioeconomic Environment: The park's beneficial contribution to local and regional economies would continue; visitor spending would remain substantially unchanged. Construction projects would benefit employment and income levels in northwest Montana.	Socioeconomic Environment: There would be no effect on the local and regional economies; all visitors would not benefit from an adequate, easy to find westside visitor center.