

I 29.2:G 45/11  
Transportation Plan, Glacie...

transportation plan

# GLACIER

NATIONAL PARK / MONTANA

PUBLIC DOCUMENTS  
DEPOSITORY ITEM

SEP 19 1990

CLEMSON  
LIBRARY.





# transportation plan

---

july 1990

PUBLIC DOCUMENTS  
DEPARTMENT OF THE INTERIOR

SEP 19 1990

CLEMSON  
LIBRARY

**GLACIER NATIONAL PARK • MONTANA**

---

UNITED STATES DEPARTMENT OF THE INTERIOR / NATIONAL PARK SERVICE

"The greatest achievement in the construction of Going-to-the-Sun Highway is not its character as an engineering feat. This must be considered only secondary to its greater function, that of making accessible to modern transportation the age-old wonders of the engineering of time and the elements – the movement and construction of a range of mountains, the excavation of great channels by glaciers whose probable dimensions must tax even the most vivid imagination. Our only prayer must be that our work may be truly a component part of this wonder of nature, that we may not have marked that which we, with all our science, knowledge, and experience, could never reproduce."

Jean Ewen

## CONTENTS

INTRODUCTION	3
PLANNING CONCERNS	9
TRAFFIC ANALYSIS	17
TRAFFIC CHARACTERISTICS	17
ACCIDENT CHARACTERISTICS	29
VISITOR TRANSPORTATION SYSTEM FORECAST ANALYSIS	32
THE PLAN	51
GOING-TO-THE-SUN ROAD MODIFICATIONS	52
Section 3	53
Section 4	54
Section 5	57
Section 6	58
Section 7	58
Section 8	63
OTHER ROAD AND TURNOUT IMPROVEMENTS	63
Packers Roost Road	63
Camas Road	63
Sun Point Road Intersection	64
Turnouts	64
PUBLIC TRANSPORTATION	69
TRAFFIC MANAGEMENT	71
PHASING SCHEDULE	75
MITIGATING MEASURES TO BE IMPLEMENTED DURING CONSTRUCTION	76
CONSULTATION/COORDINATION	81
APPENDIX: FINDING OF NO SIGNIFICANT IMPACT	85
REFERENCES	87
PLANNING TEAM	89

## MAPS

Regional Setting	4
Park General	11
Traffic Flow	21
Bus Stops and Routes	45
Project Sections	55
Section Detail 3-5, Road Turnout Plan	59
Section Detail 6-8, Road Turnout Plan	61

## TABLES

1: Traffic Volumes (1951 and 1984)	18
2: Traffic Volumes, 1984-1988	19
3: Going-to-the-Sun Road Capacity/Level of Service Analysis	23
4: Parking at Selected Sites – August 1984	24
5: Going-to-the-Sun Road Traffic Forecasts	27
6: Location of Two or More Reported Accidents (1983 – 1988)	30
7: Accident Rates by Park Road Segment	31
8: Visitation of High Use Months as a Percent of July	32
9: Round-trip Average Daily Load Forecasts	35
10: Round-trip Average Daily Load Forecasts	35
11: Annual Passenger Loadings and Bus Operation Costs West Glacier to St. Mary/St. Mary to West Glacier	40
12: Annual Passenger Loadings and Bus Operation Costs Many Glacier to St. Mary/St. Mary to Many Glacier	42
13: Projected Parking Space Demand/Visitor Transportation System	47
14: Turnout Recommendations	65
15: Parking Demands – Visitor Transportation System	70

## FIGURES

1: Going-to-the-Sun Road Capacity Level of Service	28
2: Percent of Visitation – High Use Period	33







## INTRODUCTION

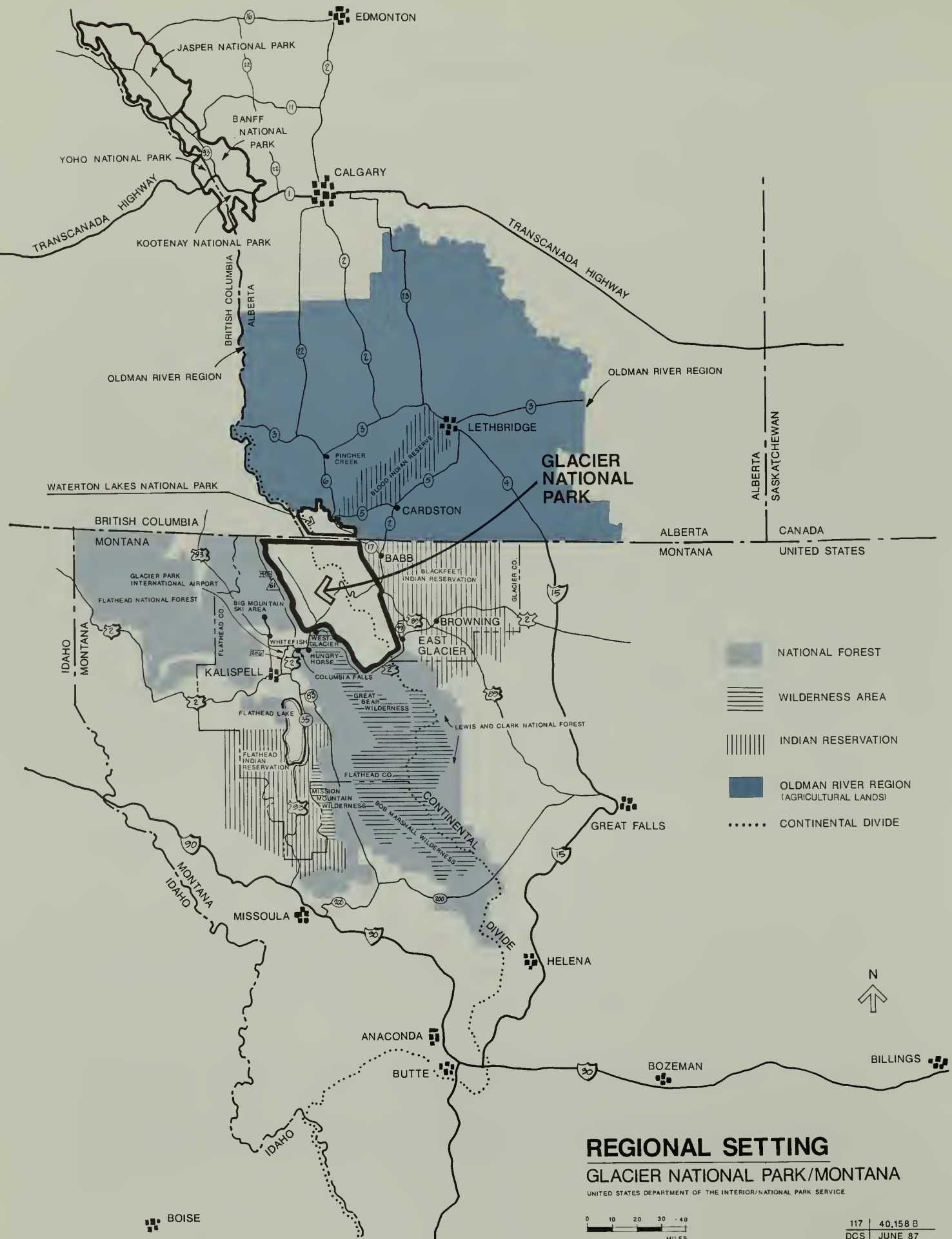
This *Transportation Plan* proposes actions to provide for safe and enjoyable travel in the area of Glacier National Park that includes Going-to-the-Sun Road and related attractions. The plan is needed to correct road deficiencies, reduce safety hazards, and solve traffic and transportation problems in this area and to identify the most feasible public transit system for future use.

Glacier National Park, on the Canadian border in the northwestern section of Montana, is part of a vast mountain recreation complex that includes superb natural and cultural resources in Canada and the United States. Going-to-the-Sun Road, which bisects the park and traverses the Continental Divide, is the only park road that provides access from one side of the park to the other and allows visitors to see examples of all of the features for which Glacier is known. Each section of the road is different in appearance, significance, and character. There is a continuous change in scenery – from the heavily wooded landscape along Lake McDonald to the open alpine zone surrounding Logan Pass and the relatively dry forests and meadows of the eastern slope. Spectacular views and a rich array of historic bridges, parapets, and retaining walls characterize the steep, rocky areas near the pass; the lower, forested sections offer distant mountain vistas. Major developments – West Glacier, Apgar, Sprague Creek campground, Lake McDonald Lodge, Avalanche Creek campground, Logan Pass visitor center, Rising Sun, and St. Mary – and other visitor attractions along the road provide interpretive facilities, amenities, and services.

The 1977 *Master Plan* and 1988 "Statement for Management" for Glacier National Park identified Going-to-the-Sun Road as the primary visitor use facility. The master plan proposed that the road be maintained to provide a cross-section of park features for enjoyment by day use visitors and a threshold for wilderness use. The plan further proposed that a public transit system be established to serve visitors on Going-to-the-Sun Road. A special study was called for to analyze system requirements and recommend feasible solutions. In addition, the study was to address the problems of noise and air pollution and the interpretive potential and overall aesthetic atmosphere. Parking facilities to support the system were to be provided at suitable locations. Particular consideration was to be given to concession facilities and campgrounds within the Going-to-the-Sun Road corridor. This *Transportation Plan* incorporates the results of the special study and identifies specific actions to implement the master plan transportation strategies.

Additional direction for this planning effort came from the park's 1980 *Interpretive Prospectus*. The *Interpretive Prospectus* identified the proposed Apgar (West Glacier) information center and the St. Mary visitor center as the locations for interpretive exhibits, leaflets, radio messages, and bulletin boards, and it recommended that these media describe the history of transportation in the park and inform people about the new public transit system, bus schedules, and vehicle size regulations for Going-to-the-Sun Road. The prospectus also recommended that interpretation of the natural and cultural resources along the road be provided by driver narration on the buses and include the geological aspects of the park (glacial, geomorphological, and historical), the diverse ecosystems, and the past and present relationships of humans to the park.

Cultural resource preservation laws and procedures were a major consideration in planning. Going-to-the-Sun Road is listed on the National Register of Historic Places as a significant cultural resource. The National Historic Preservation Act of 1966 (16 USC § 470 et seq) states that any project that will affect a national register property is subject to section 106 procedures, as defined in the act and codified in 36 CFR 800. A memorandum of agreement was signed by the Rocky Mountain regional director of the National Park



Service, the Montana state historic preservation officer, and the Advisory Council on Historic Preservation in May 1987. The memorandum addressed repairs to be accomplished on the Triple Arches and Loop walls on Going-to-the-Sun Road. It also required that the Park Service prepare and adopt a Going-to-the-Sun management plan as a basis for subsequent management decisions. The park has prepared a *Draft Cultural Resource Plan, Going-to-the-Sun Road* (NPS 1989) to establish a broad management philosophy for the road.

The information in this *Transportation Plan* reflects several phases of planning. First, the issues and objectives to be addressed in the plan were identified, and existing facilities and visitor use patterns were analyzed. Next, the most reasonable ways of resolving issues and meeting objectives were considered. Four alternatives, including a no-action and a draft preferred alternative, were developed that proposed actions for rehabilitating Going-to-the-Sun Road, implementing a public transit system, managing traffic, and improving some secondary roads and turnouts. All alternatives were analyzed to determine their beneficial and adverse effects and their cumulative impacts on known cultural resources. This analysis was presented in the *Draft Transportation Plan/Environmental Assessment*, which was released to the public in August 1989. The draft plan/assessment was available for public review and comment for 30 days. During the review process, the Park Service also sought information regarding the significance of park roads to the visitor experience. An input form was mailed with each copy of the document and document summary, and copies of the form were available at various locations in the park during 1989.

All public comments on the draft plan alternatives and the visitor experience form were considered during formulation of this final *Transportation Plan*. In addition, a "Biological Assessment" on endangered and threatened species (NPS 1990) was prepared for formal U.S. Fish and Wildlife Service section 7 consultation, as required by the Endangered Species Act. The "Biological Assessment" described in more detail the impacts that were identified in the *Draft Transportation/Environmental Assessment*. On May 2, 1990, the Fish and Wildlife Service concurred with the assessment findings that the *Transportation Plan* will not affect endangered or threatened species. After review and evaluation of all public comments and consultation, it was determined that the transportation plan did not require the preparation of an environmental impact statement, and a finding of no significant impact (FONSI) document was completed. That document is included here as an appendix.

All design work for future construction projects will be subject to the standard procedure of reviewing for the adequacy of environmental compliance. It may be necessary to include additional mitigating measures or to conduct separate reviews to ensure compliance with section 7 of the Endangered Species Act and section 106 of the National Historic Preservation Act, but these steps will not necessarily require the preparation of additional environmental assessments. Additional assessments will not be prepared unless past compliance is insufficient.

Additional copies of this document can be obtained by writing the Superintendent, Glacier National Park, West Glacier, Montana 59936.







## PLANNING CONCERNS

Going-to-the-Sun Road is a significant resource both for its historic character and engineering features and for the experiences it provides. The appearance and narrow alignment of the road combined with the beauty and spectacular scenery of the surrounding landscape leave a one-of-a-kind impression. Visitors place a high value on the "historic scene" associated with the road, the leisurely pace of travel, and the thrill of driving in a high mountain environment. The National Park Service manages the road to preserve these values and to maintain this unique visitor experience.

Because of its age and the amount of use over the years, Going-to-the-Sun Road is in need of repair. The road was built in the 1920s and early 1930s, and except for an asphalt overlay and normal maintenance, it has not been redesigned or rebuilt since the original construction. The pavement is deteriorating because of high traffic volumes, and the pavement edge is subject to cracking or failure because of a lack of support at the road shoulders. A combination of moisture problems and inadequate base materials has resulted in deformation of much of the lower sections of the road. Subsurface runoff and snowmelt in combination with a poor or nonexistent ditch section cause moisture problems. In addition, subsurface moisture from the slope below the ditch is transmitted into and under the roadway section. This subsurface moisture problem is exacerbated by fine-grained soils that have a high potential for capillary action. The end result of these problems is that water saturates the road base during most of the year. In the winter, this water freezes, expands, develops ice lenses, causes the road surface to heave, and eventually breaks up the road. Differential settlement and frost heave is severe in some areas, causing profile and cross-section distortion. Repeated patching has left the road surface uneven, which increases maintenance costs and diminishes visitor enjoyment.

The Logan Pass section of the Going-to-the-Sun Road is narrow (18 to 23 feet), with occasional rock outcroppings protruding into the driving lanes. Sections of stone parapets need repair or replacement because the stone work is low and/or tilted from avalanches. Portions of the roadway, drainage structures, and roadway prism are in poor condition and in need of repair or reconstruction. In some portions of the road, the shoulder is inadequate and erosion is continuing to reduce the shoulder width.

A number of turnouts have been created on Going-to-the-Sun Road for lake access, scenic viewing, wildlife viewing, and trailhead use. Sight distances are often inadequate for safe turning into traffic because of regrowth of vegetation on the roadcuts since original construction and the fact that the turnouts were not planned for large recreational vehicles. Another problem is that some of the turnouts are on the opposite side of the road from the scenic attractions, causing visitors to cross the road to reach their destinations. Most of the turnouts need to be redesigned to improve safety, provide acceleration and deceleration lanes, and improve parking; turnouts on blind curves or hills need to be eliminated. Formalized wayside exhibits and visitor use areas are needed to consolidate the impacts of visitor parking on sites hardened for the purpose and designed to accommodate the larger vehicles now in use.

One of the primary planning concerns for Going-to-the-Sun Road is how to accomplish necessary road rehabilitation and improvement while maintaining its historic character and values. The 1982 National Surface Transportation Assistance Act recognized a nationwide need for rehabilitating and upgrading deteriorating road systems in national parks and on national parkways, and Going-to-the-Sun Road and other major park roads can be rehabilitated under this program. The Federal Highway Administration has prepared a *Road Rehabilitation Planning Study* (FHWA 1984) that supplies project-oriented information and

a range of alternatives for correcting road deficiencies for Glacier National Park. This study has been consulted in deciding what will be done about the deteriorating portions of the park road system. However, National Park Service *Management Policies* (NPS 1988) state that "park roads are generally not intended to provide fast and convenient transportation; they are intended to enhance the quality of a visit while providing for safe and efficient travel. . . . Where roads are chronically used to capacity, the use of public transit or limitations on use will be considered as alternatives to road improvements. Although they may not meet current engineering standards, some existing roads are cultural and recreational resources, and their values will be preserved. . . . Specific road designs are subject to NPS *Road Standards*, which are adaptable to each park's unique character and resource limitations." NPS *Road Standards* (NPS 1984b) indicate that the traffic loads on Going-to-the-Sun Road would require 12-foot lanes and 3-foot shoulders, with a design speed of 45 mph maximum and 35 mph minimum. Lanes and shoulder widths along Going-to-the-Sun Road are narrower and do not meet these standards. However, the *Road Standards* caution that "basic decisions will have to be made by park management in the application of these standards based on careful examinations of the desired use levels to be allowed considering impacts on visitor use and resource protection in conformance with legislative mandates." The cultural and recreational significance of Going-to-the-Sun Road and the potential effects of major road widening and modification on visitor experiences and adjacent resources have been critical factors in decisions about road improvements.

A second major planning concern is the level of use on the road, particularly during the peak summer months. A traffic capacity and visual analysis of Going-to-the-Sun Road was carried out in August 1984. The study showed the average daily traffic (ADT) figure for August as 4,790 vehicles at the west entrance station and 3,220 ADT at the east entrance station. Although the analysis indicated that the roadway had not yet reached its traffic carrying capacity (there was no substantial stop-and-go driving), the traffic was moving 10 to 15 miles per hour below the posted speed limits. Use of the road has remained virtually constant since that time (a 4% increase in five years), but the potential for a slight increase of 1 to 1-1/2 percent per year is possible in the near future.

The road is also receiving increasing use by large buses, motor homes, and recreation vehicles as well as bicyclists. Because roadway width generally ranges from 18 to 24 feet, there is insufficient lane space for large vehicles to pass each other or to pass bicyclists. These safety problems are exacerbated by visitors' wishes to enjoy the scenery, which distracts many drivers and causes others to stop or cross traffic. Traffic management actions and additional size restrictions on vehicles may be necessary to alleviate these problems, but they would be difficult to initiate without a public transportation system. Additional conditions that support such a system include the following:

Going-to-the-Sun Road is intimidating to many visitors who are not familiar with mountain driving and/or the high levels of traffic frequently encountered on this road. Many of these individuals would prefer to leave their vehicles and ride a bus. Additionally, those familiar with mountain driving may also welcome the opportunity to take a guided bus tour.

Hikers often arrive at the park's entrances on foot and need public transportation to trailheads. Other visitors leave their vehicles in trailhead parking lots and either exit the backcountry many miles from their vehicles or must return on the same trail.

Glacier Park, Inc. (GPI), a concessioner, owns and operates the only park bus system. The concessioner provides transportation in the historic red-painted White buses for GPI overnight guests and tour groups, and as such has a limited schedule that does not meet the needs of the other park visitors. Numerous other tour buses

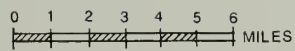


BRITISH COLUMBIA

MONTANA



FLATHEAD NATIONAL FOREST



# PARK GENERAL

GLACIER NATIONAL PARK / MONTANA

UNITED STATES DEPARTMENT OF THE INTERIOR / NATIONAL PARK SERVICE

117 | 40,134 B  
DSC | MAR 86



**PARK GENERAL**  
 GLACIER NATIONAL PARK / MONTANA  
 UNITED STATES DEPARTMENT OF THE INTERIOR / NATIONAL PARK SERVICE  
 117 | 40,134 B  
 DSCI MAR 86

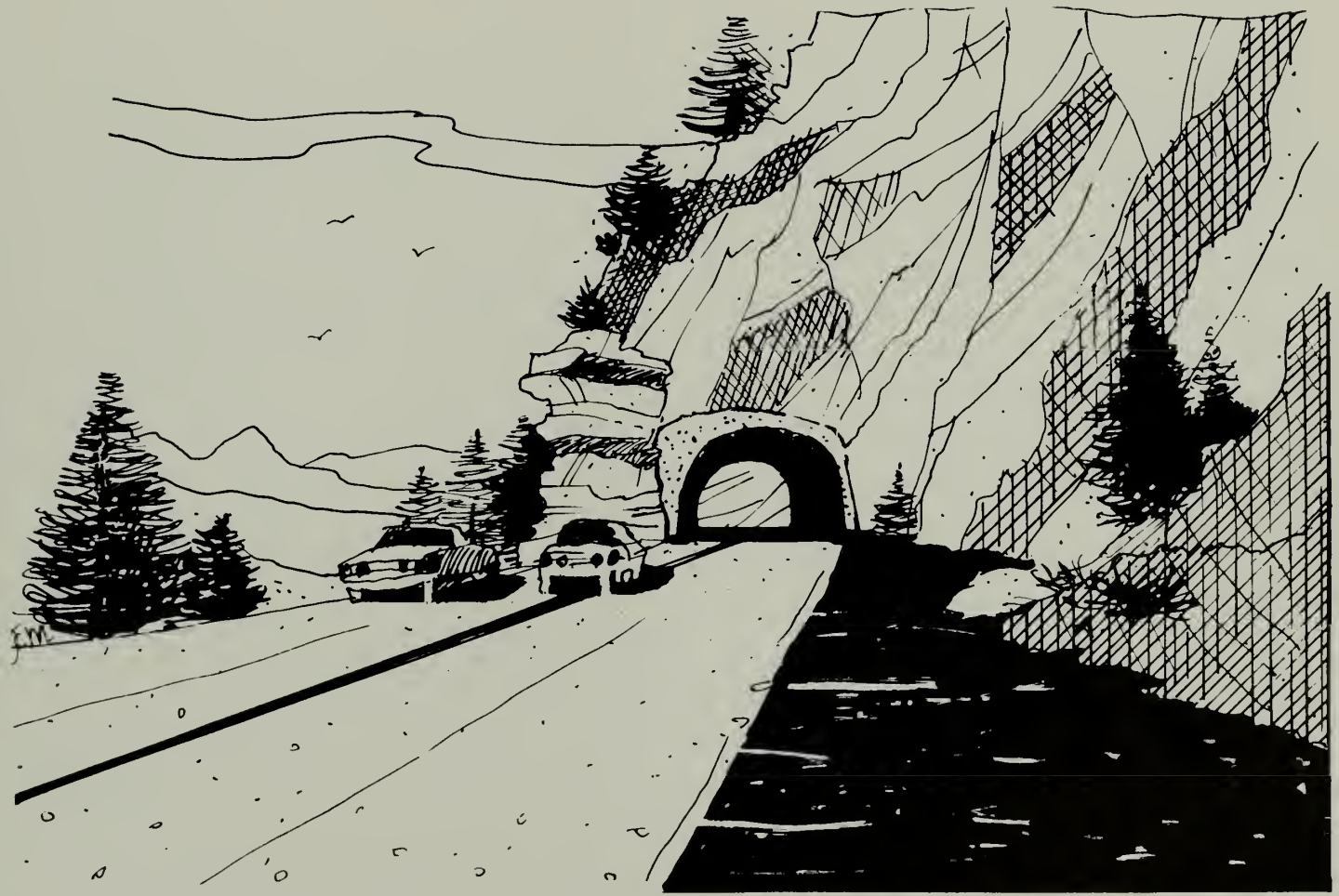
arrive at the park from several destinations, but the large size of most of these buses prohibits their use on the Logan Pass segment of Going-to-the-Sun Road.

Several public transportation modes deliver visitors to the vicinity of the park. Amtrak has stops at East Glacier and West Glacier, one major airline services Glacier Park International Airport near Kalispell, and a bus line has a Montana franchise to transport passengers to West Glacier. However, park visitors brought by these public conveyances must take taxis or limousines or rent cars at the airport or local communities to tour the park. In addition, numerous lodging accommodations, restaurants, and convention centers have been developed over the past few years. A need for public transportation between these facilities and Glacier National Park has arisen. Local public transit systems will be developed in the near future. It will then be desirable to coordinate regional and park public transportation systems to facilitate movement of visitors to and within the park.

A final concern related to use of Going-to-the-Sun Road and the potential establishment of a public transit system is the amount of available parking at major attractions and developed areas. The 1984 analysis indicated that at four sites along the road and in the Apgar area, parking demand exceeded the capacity of existing spaces. The Logan Pass parking area was the most congested area and was at capacity on weekends in July and August from about 10:00 a.m. to 4:30 p.m.

An analysis of traffic and accident characteristics along with a forecast of the requirements and costs of implementing a public transit system is included in the next section. Specific proposals for road and turnout improvements, traffic management, and establishing a public transit system are described in the plan.







## TRAFFIC ANALYSIS

### TRAFFIC CHARACTERISTICS

#### Traffic Counts

The Montana Department of Highways obtained traffic counts in various locations in the park during the period of July 11-18, 1984, and July 31, August 1-2, and 5-9, 1985. NPS staff obtained additional counts during August 2-13 at selected locations on park roads in 1984. Table 1 shows ADT for 1984, 1984 peak-day traffic (usually Sunday) for the survey periods, and the peak-hour traffic for the survey period (usually on the peak day).

The National Park Service opened five continuous count stations on park roads in July 1985 to record counts year-round (if roads were open). Table 2 shows the results of these counts for the five stations. There have been considerable fluctuations in volumes at these stations since 1984. The overall increase in ADT over the five-year period amounted to 4.0 percent. Although ADT increased slightly over the five-year period, peak hour volumes did not exceed the 1984 peak hour volumes.

It is difficult to project traffic volumes in the future based on only five years of data. Consequently, overall park visitation becomes an important factor in traffic forecasts for the future. These five-year trends perhaps indicate a leveling-off of traffic volumes during high use periods in Glacier National Park.

Table 1: Traffic Volumes (1951 and 1984)

Road Segment	1951 ADT <sup>1</sup>	1984 ADT <sup>2</sup>	1984 Peak Day <sup>3</sup>	1984 Peak Hour <sup>3</sup>
West entrance road	2,200	4,790	5,880	590
Apgar Road		2,450	2,670	280
Apgar Road east of Apgar		1,080	1,310	110
North Fork Road between Fish and Fern creeks	90 <sup>4</sup>	140	170	20
North Fork Road at Camas Creek		50 <sup>5</sup>		10
Camas Road, north of Fish Creek campground road		520	610	70
Bowman Creek Road north of Bowman Road		130	160	30
Kintla Lake Road north of Bowman Road		70 <sup>6</sup>		10
Going-to-the-Sun Road 1.5 miles south of Avalanche Creek	1,630 <sup>4</sup>	3,180	4,220	490
Going-to-the-Sun Road at work camp west of Logan Pass		3,000	3,650	460
Going-to-the-Sun Road, 2.8 miles east of Logan Pass		2,800	3,680	440
Going-to-the-Sun Road at St. Mary entrance	1,350	3,220	3,870	420
Many Glacier Road	490	1,440	1,500	160
Chief Mountain Highway	410	1,040	1,070	130
Two Medicine Road	440	620	770	80

<sup>1</sup> Rounded to the nearest 10

<sup>2</sup> Rounded to the nearest 10 for the duration of the traffic count period only

<sup>3</sup> Rounded to the nearest 10, for the duration of the traffic count period only

<sup>4</sup> Approximate location

<sup>5</sup> Average weekday volume – ADT estimated at 70

<sup>6</sup> Average weekday volume – ADT estimated at 100



Table 2: Traffic Volumes, 1984-1988

	1984 ADT <sup>1</sup>	1985 ADT <sup>2</sup>	% Inc/dec 1984-1985	1986 ADT <sup>3</sup>	% Inc/dec 1985-1986	1987 ADT <sup>4</sup>	% Inc/dec 1986-1987	1988 ADT <sup>5</sup>	% Inc/dec 1987-1988	1989 ADT <sup>6</sup>	% Inc/dec 1988-1989	% Inc/dec 1984-1989
West Glacier entrance	4,790	4,220	-11.9	4,490	6.4	4,490	0.0	5,020	11.8	5,040	0.4	5.2
Camas Creek Road west of Fish Creek campground road	520	490	-5.8	590	20.4	460	-22.2	510	10.9	460	-9.8	-11.5
Going-to-the-Sun Road from Sprague Creek to Lake McDonald Lodge	3,600 <sup>7</sup>	3,220	-10.6	3,410	5.9	3,460	1.5	3,860	11.6	3,820	-1.0	6.1
Going-to-the-Sun Road at work camp west of Logan Pass	3,000	2,520	-16.0	2,740	8.7	2,680	-2.2	3,030	13.1	3,010	-0.6	0.3
St. Mary entrance	3,220	2,970	-7.8	3,130	5.4	3,090	-1.3	3,410	10.4	3,410	0.0	-5.9

<sup>1</sup> ADT derived from survey periods noted in text

<sup>2</sup> ADT derived from counts from July 20 through August 9

<sup>3</sup> ADT derived from counts from July 19 to August 8

<sup>4</sup> ADT derived from counts from July 18 to August 7

<sup>5</sup> ADT derived from counts July 17-August 6

<sup>6</sup> ADT derived from counts July 16-August 5

<sup>7</sup> Estimated from 1984 average weekday traffic and ADT at the Sprague Creek and Work Camp locations

US 2 west of Glacier National Park records the highest traffic volumes in or near the park. In 1983, at Martin City, July ADT amounted to 7,271, peak-day traffic was 9,082, and peak-hour traffic amounted to 765. The July ADT at this location amounted to 7,321 in 1984, 7,315 in 1985, and 7,960 in 1986. The 1985 and 1986 volumes may have been affected by construction traffic during the reconstruction of US 2 west of the park during these two years. In 1987 and 1988, the July ADT amounted to 8,333 and 9,500 respectively.

## **Roadway Capacity**

The measure by which a particular roadway is fulfilling its function of carrying traffic is determined by a capacity analysis and by establishing the level of service at which the highway is operating. The capacity of a highway is defined as the maximum number of vehicles per hour that can be handled by a particular roadway under prevailing operating conditions.

To function satisfactorily, a roadway must operate at a lower volume of traffic than when the facility is at capacity. The maximum number of vehicles that can be carried on a roadway at any particular level of service is known as the service volume. Levels of service are designated from A through F (with A being the best and F the worst) to cover the full range of traffic operating conditions. These levels of service are described as follows:

Level of Service A: A free-flowing condition with low volumes and high speeds, little or no restrictions to traffic, and few delays.

Level of Service B: Stable flow with operating speeds and passing beginning to show some restriction. Reductions in speeds may occur with a low probability of traffic flow being restricted.

Level of Service C: Relatively stable flow with speeds (40 mph or higher) and maneuverability more closely controlled by the higher volumes. Most drivers are restricted in their freedom to select their own speed, change lanes, or pass.

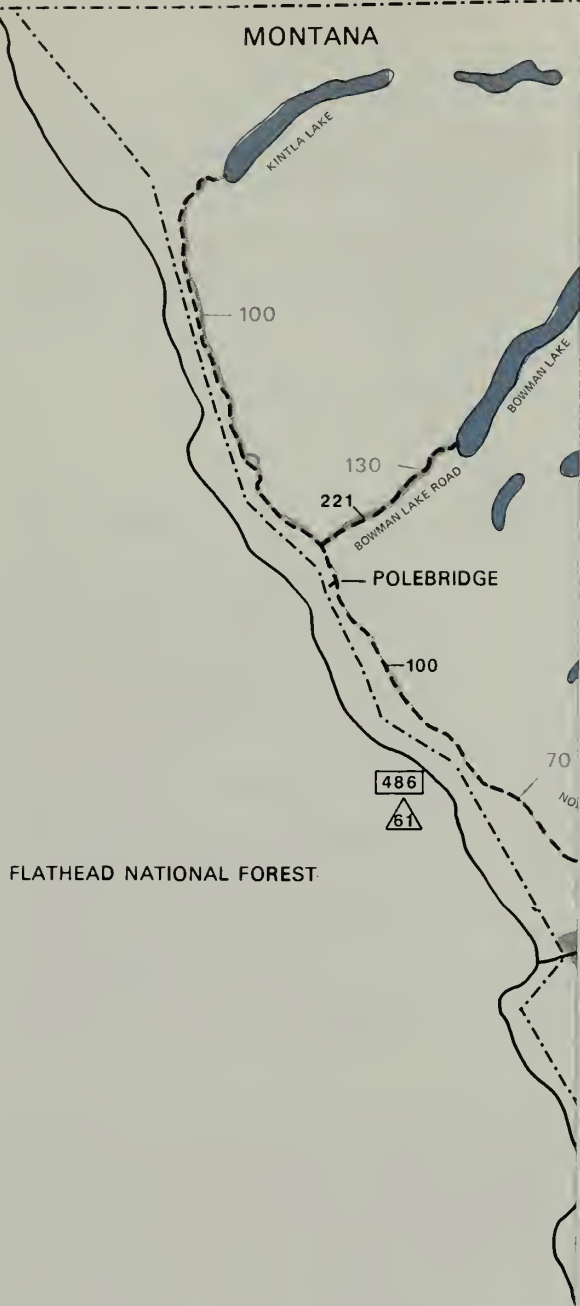
Level of Service D: Approaching unstable flow with tolerable operating speeds although considerably affected by changes in operating conditions. Drivers have little freedom to maneuver and pass other vehicles; comfort and convenience are low.

Level of Service E: Represents operations at even lower speeds than level D, with volumes at or near the capacity of the highway. The highest volume attainable under E defines the capacity of the roadway. Flows are unstable and momentary stops may occur.

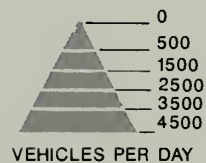
Level of Service F: Forced or breakdown flow operation at low speeds where volumes exceed capacity. Speeds are reduced substantially and stops may occur for short or long periods of time because of downroad congestion.




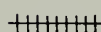
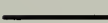

Average travel speed, percent time delay, and the traffic flow rate to the capacity of a roadway are three major factors in establishing the various levels of service. Lane width, lateral clearance (nearness of obstructions to the road traveling surface), the amount of heavy vehicles, grades, and passing sight distance are also critical elements in determining the operating conditions of the roadway.

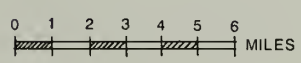
A capacity analysis was undertaken for Going-to-the-Sun Road based on the hourly volumes obtained in 1984. Peak hour volumes were slightly lower from 1985-1989 on the roadway.



GOING-TO-THE-SUN ROAD AND CAMAS ROAD  
 ARE 1984-85-86-87-88-89 ADT AVERAGE  
 US-2 NEAR WALTON IS JULY 87 ADT  
 ALL OTHER ROADS ARE 1984 ADT.



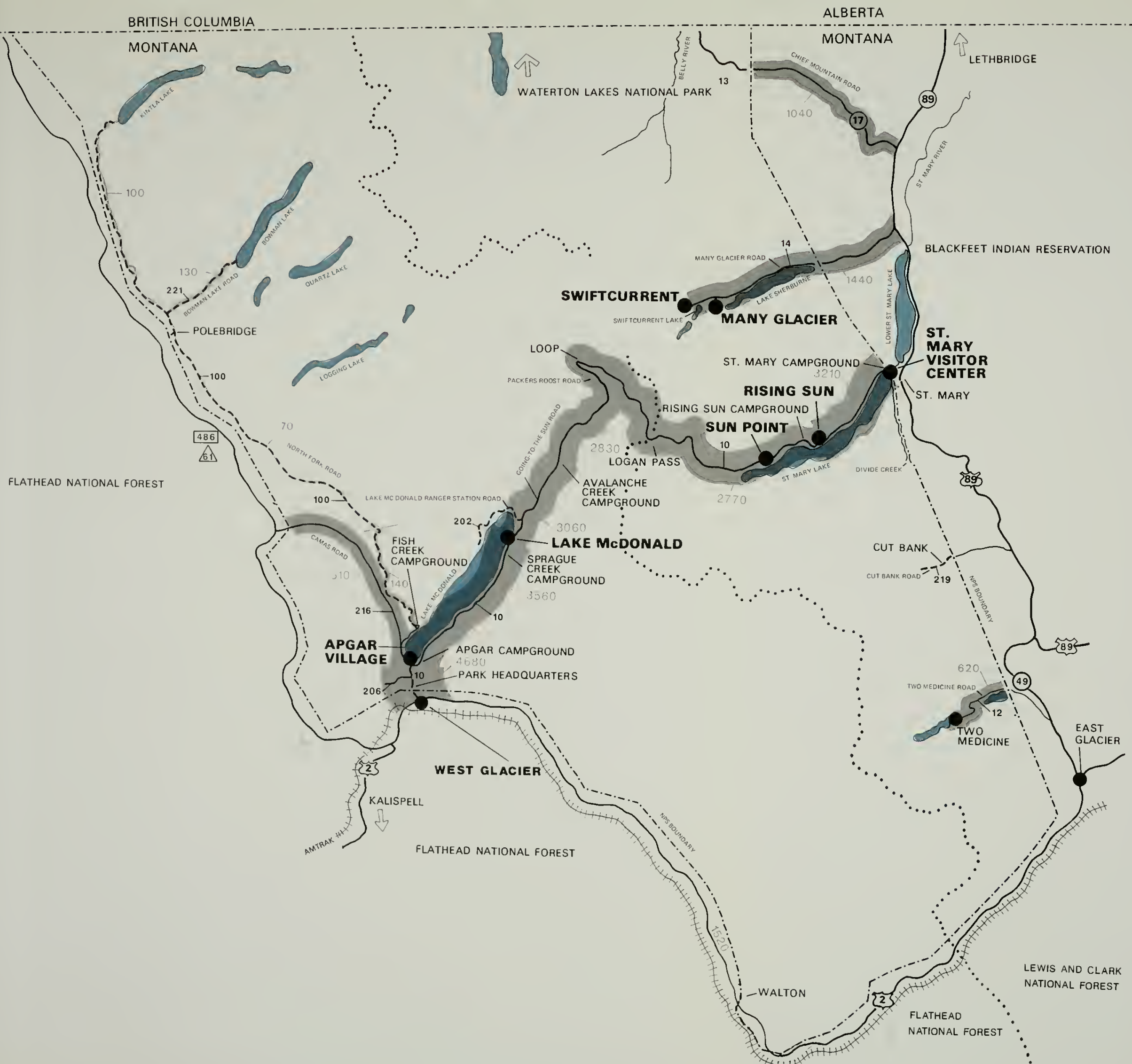
-  MAJOR DEVELOPED AREAS
-  PARK BOUNDARY
-  CONTINENTAL DIVIDE
-  AMTRAK
-  PAVED ROADS
-  UNPAVED ROADS
- 10** ROUTE OR ROAD NUMBERS



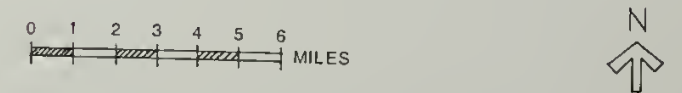
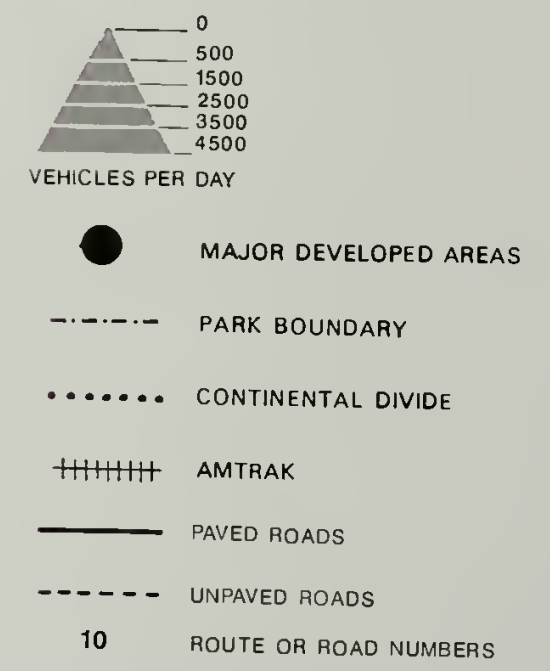
# TRAFFIC FLOW

JULY/AUGUST ATD

## PARK GENERAL



GOING-TO-THE-SUN ROAD AND CAMAS ROAD ARE 1984-85-86-87-88-89 ADT AVERAGE US-2 NEAR WALTON IS JULY 87 ADT ALL OTHER ROADS ARE 1984 ADT.



**TRAFFIC FLOW**  
 JULY/AUGUST ATD  
**PARK GENERAL**  
 GLACIER NATIONAL PARK / MONTANA  
 UNITED STATES DEPARTMENT OF THE INTERIOR / NATIONAL PARK SERVICE  
 117 | 40,135 B  
 DSC | MAR 86

This analysis along with visual observation of traffic conditions provides a measure of the operating characteristics of the roadway.

The capacity figures shown in table 3 were determined using methodology in the 1985 *Highway Capacity Manual* (Transportation Research Board 1985) and adjusted for the physical and operating conditions of Going-to-the-Sun Road.

**Table 3: Going-to-the-Sun Road Capacity/Level of Service Analysis**

<b>Road Segment</b>	<b>1984 Peak Hour Volume</b>	<b>Level of Service E Range of Volumes</b>	<b>1984 Level of Service</b>
West entrance to Camas Road	590	1,000-2,005	D
Camas Road to Lake McDonald Lodge	490	520-1,320	D
Lake McDonald Lodge to Avalanche Creek campground	490	520-1,320	D
Avalanche Creek campground to Logan Creek	460	540-1,030	D
Logan Creek to west portal, West Side Tunnel	460	285-850	E
West Portal, West Side Tunnel to Logan Pass	460	215-685	E
Logan Pass to St. Mary Falls trailhead	450*	285-855	E
St. Mary Falls trailhead to Rising Sun	450*	305-880	E
Rising Sun to St. Mary entrance	430*	555-1,320	D

\*Increased by 3 percent over counts in table 5 due to the fact that St. Mary, Many Glacier, and Two Medicine entrance stations recorded higher counts on several days other than when the traffic counters were in operation. The highest entrance station count at the West Glacier entrance occurred on the same day that the peak day and peak hour traffic were recorded.

Source: Denver Service Center

The impact of trucks, buses, and recreational vehicles in the traffic stream were also factored into the capacity analysis using the methodology presented in the 1985 manual.

The figures indicate that the section of the roadway from approximately the west portal of the West Side Tunnel to Logan Pass (section 5) was nearer capacity than any other section of the park road system during July 1984. The sections from Logan Creek to Rising Sun (sections 4, 5, 6 and 7) were operating at level of service E. Segments nearest the west and east entrances have greater capacity levels and were operating at level of service D.

As indicated earlier, the highest volume attainable under level of service defines the capacity of a roadway. As an example, if the hourly volumes on the section of roadway from the West Side Tunnel to Logan Pass exceed 685 vehicles per hour, level of service F is expected to occur with forced flow and traffic stop-and-go conditions. At the time capacity is reached, travel time will increase along with congestion. If delays are lengthy,

visitor experience will be affected by vehicle backups or queues. Along with potential degradation of visitor experience and public accommodation, peak traffic periods will be longer in duration and vehicle drivers may seek routes outside of the park (e.g., US 2 south of the park).

This information should be used as a guide and not as an absolute standard. The roadway operating conditions on Going-to-the-Sun Road are much different than typical rural two-lane highways, and operating conditions should be less congested during other than the peak hour of the traffic survey periods.

### Parking Problems

Parking problems and occupancy were observed during the period of August 2-13, 1984. Table 4 shows the use of selected parking areas along Going-to-the-Sun Road. From the observations of these areas, parking was at or above capacity at Apgar Village, the Loop, Logan Pass, Jackson Glacier/Gunsight Pass trailheads, and Sunrift Gorge.

**Table 4: Parking at Selected Sites – August 1984**

Area	Number of Spaces				Vehicles Parked High-Use Period
	Marked		Unmarked		
	Lg.	Sm.	Lg.	Sm.	
Apgar Village			8	102	—*
Lake McDonald Lodge	14	114			90
Sacred Dancing Cascade				14	8
Avalanche Creek/Trail of Cedars		38			35**
Loop (2 areas)		29			30**
Oberlin Creek				20	14
Logan Pass	28	162			235***
Lunch Creek				25	15
Siyeh Bend				27	20
Jackson Glacier/Gunsight Pass trailhead				17	25**
St. Mary Falls trailhead				?	16
Sunrift Gorge				8	11**
Sun Point				?	35
Wild Goose Island				25	7
Rising Sun				105	27
St. Mary visitor center	10	41			28
Many Glacier hotel	8	175		6	130
Many Glacier picnic area				50	31
Swiftcurrent Lodge parking lot				101	64
Two Medicine				60	23

Source: Denver Service Center

\*Capacity exceeded but no count taken

\*\*At capacity or capacity exceeded

\*\*\*Capacity reached 10 a.m. to 4:30 p.m.

Each of the areas with a capacity problem or a congestion/circulation problem is discussed below in the order shown in the table.

**Apgar Village.** The parking capacity of the area is exceeded during high-use days. The small parking lot east of Eddie's Cafe is congested. Ingress and egress become more difficult as the lot nears capacity, particularly if a camping or boat trailer is towed into the lot. Congestion occurs in the circle due to vehicle turning movements conflicting with parking maneuvers and pedestrian use.

**Lake McDonald Lodge.** At the present time, parking space appears to be adequate, but approaching capacity, in this area. Problems are caused by the configuration of the one way entrance/exit and associated parking that requires a driver unable to find parking to exit the area, make a U-turn across Going-to-the-Sun Road, and then cut back toward the lodge area. These traffic conflicts would be corrected by proposals in the Lake McDonald development concept plan, which is currently being revised.

**Avalanche Creek/Trail of Cedars.** The parking in these areas is at capacity during high-use periods. There is parking on both sides of the roadway and east and west of the bridge over the creek. There is poor sight distance to the east from the parking area on the north side of the roadway adjacent to the picnic area. The entrance to the Avalanche Creek campground is located on the opposite side of the road. The Avalanche Creek and the Trail of Cedars trailhead is immediately east of this area. Pedestrian movement is across Going-to-the-Sun Road and across the bridge. Parking maneuvers, vehicles entering and leaving the picnic and camping areas, and pedestrian movement on the roadway create a congested situation. Many of these problems will be corrected when the approved Trail of Cedars plan (NPS 1984b) is implemented. Existing roadside parking areas would be replaced with off-road parking.

**Loop.** The upper and lower parking lots are at capacity during high-use periods. Poor sight distance exists at the sharp curve, particularly when drivers exit the upper loop and try to view the roadway downhill. Pedestrians entering or leaving the Granite Park Chalet Trail cross the roadway at the sharp curve. When the parking areas are near capacity, drivers are looking for empty parking spaces or viewing the roadway and are often surprised by a pedestrian crossing the roadway or attempting to cross the roadway. Long-term trailhead parking also limits short-term parking use of the overlook area.

**Logan Pass.** On high-use days, the parking area fills by 10:00 a.m. and continues to be full until 4:30 to 5:00 p.m. Vehicles are parked in unmarked spaces within the parking lot and also park on the south shoulder of Going-to-the-Sun Road between the two entrances to the parking lot and on the north shoulder west of the west entrance. When the parking lot is full and the road shoulders are being used for parking, drivers circulating to find parking spaces and attempting to enter the parking lot create additional congestion. There were approximately 45 vehicles parked on the shoulders or in unmarked spaces during the periods of observation. This requires at least one park staff person to direct traffic and parking in the area in late morning or early afternoon. Longer-term trailhead parking occurs simultaneously with day-use visitor parking, lowering the parking turnover rate required to accommodate the day-use visitor. This area generates the greatest vehicular congestion in Glacier National Park.

**Jackson Glacier/Gunsight Pass Trailheads.** The capacity of the parking area is exceeded during high-use periods.

**Sunrft Gorge.** The parking contiguous to the roadway does not meet the demand for spaces. Parking is provided on the shoulders in the eastbound lane in two pullout areas. When these two areas are at capacity, drivers park on the shoulder not designed for parking and encroach on the westbound lane. A potentially dangerous pedestrian crossing is at the west edge of the first parking area immediately east of the gorge bridge.

**Many Glacier Hotel and Swiftcurrent Lodge.** Parking space is ample in the hotel parking lot. Circulation and parking problems in these areas were addressed in the approved development concept plans (NPS 1986).

## Traffic Forecasts

A number of factors were considered in preparing traffic forecasts, including park visitation and state and national travel forecasts. Population and travel in the United States are increasing and are expected to continue to increase. The only significant decreases in traffic volumes on the nation's roads and streets since 1935 occurred during World War II and in 1974 and 1979. From March 1980 to March 1987, volumes increased by 25.1 percent.

An environmental impact statement prepared by the state of Montana for a section of US 2 between Hungry Horse and Martin City forecasted a 50 to 70 percent travel increase over this section of roadway for a 20-year period ending in 2003. The state highway department generally uses a 2 to 3 percent traffic volume increase per year for highway design and construction. The Federal Highway Administration used a 50 percent growth factor on most of the Glacier National Park roads for the year 2000 in the *Road Rehabilitation Planning Study* for the park.

From 1983 through 1985, traffic volumes on US 2 west of the park leveled off. The high use summer volume of traffic decreased on park roads in 1985 from 1984 levels, increased in 1986, and was near 1986 levels in 1987. Although park use increased 15.1 percent from 1986 to 1988, the previous four years had seen relatively stable visitation. These trends suggest a leveling off of increases in park traffic and visitor use. These short-range trends may not continue; however, the large increases recorded in the 1950, 1960, and early 1970 decades may not be experienced over the next 20 years.

Based on data, trends, and forecasts reviewed to date, traffic forecasts for various segments of Going-to-the-Sun Road have been developed (see table 5 and for more detail). The table also indicates the estimated roadway capacity for the years 1992 and 2007 based on present operating conditions.

Based on these forecasts, high use period ADT is projected to reach 6,080 by year 2007 from the west entrance to Camas Road. Peak day volumes may be between 7,200 to 7,800 vehicles per day.

Based on these forecasts, by the year 2007 all sections of Going-to-the-Sun Road, except sections 1 and 8 near the west and St. Mary entrances, will be operating at level of service E. The section of the roadway from the West Side Tunnel to Logan Pass may be approaching capacity on peak hours. The figure following table 5 shows the maximum peak hour forecasts for 2007 versus the capacity of the section from the West Side Tunnel to Logan Pass (section 5) as well as incremental increases of the maximum forecast. It is possible that the traffic volumes could be higher or lower than the forecast over the planning period. When peak hour traffic volumes increase to approximately 200-245 vehicles



Table 5: Going-to-the-Sun Road Traffic Forecasts

Road Segment	ADT <sup>1</sup>	1992 ADT <sup>2</sup>	2007 ADT <sup>3</sup>	1984 Peak Hour <sup>4</sup>	Level of Service E Range of Volume	1992 Peak Hour <sup>5</sup>	1992 Level of Service	2007 Peak Hour <sup>6</sup>	2007 Level of Service
West Entrance to Camas Road	4,680	5,030	6,080	590	1,000-2,005	620	D	710	D
Camas Road to Lake McDonald Lodge	3,500	3,830	4,630	490	520-1,320	510	D	590	E
Lake McDonald Lodge to Avalanche Creek campground	3,060	3,290	3,980	490	520-1,320	510	D	590	E
Avalanche Creek campground to Logan Creek	2,830	3,040	3,680	460	540-1,030	480	D	560	E
Logan Creek to west portal West Side Tunnel	2,830	3,040	3,680	460	285-850	480	E	560	E
West portal, West Side Tunnel to Logan Pass	2,830	3,040	3,680	460	215-685	480	E	560	E
Logan Pass to St. Mary Falls trailhead	2,740	2,950	3,560	450	285-855	470	E	540	E
St. Mary Falls trailhead to Rising Sun	2,740	2,950	3,560	450	305-880	470	E	540	E
Rising Sun to St. Mary entrance	3,210	3,450	4,170	430	555-1,320	450	D	520	D

Source: Denver Service Center

<sup>1</sup> Derived from 1984, 1985, 1986, and 1987 counts

<sup>2</sup> 7.5% increase to 1992

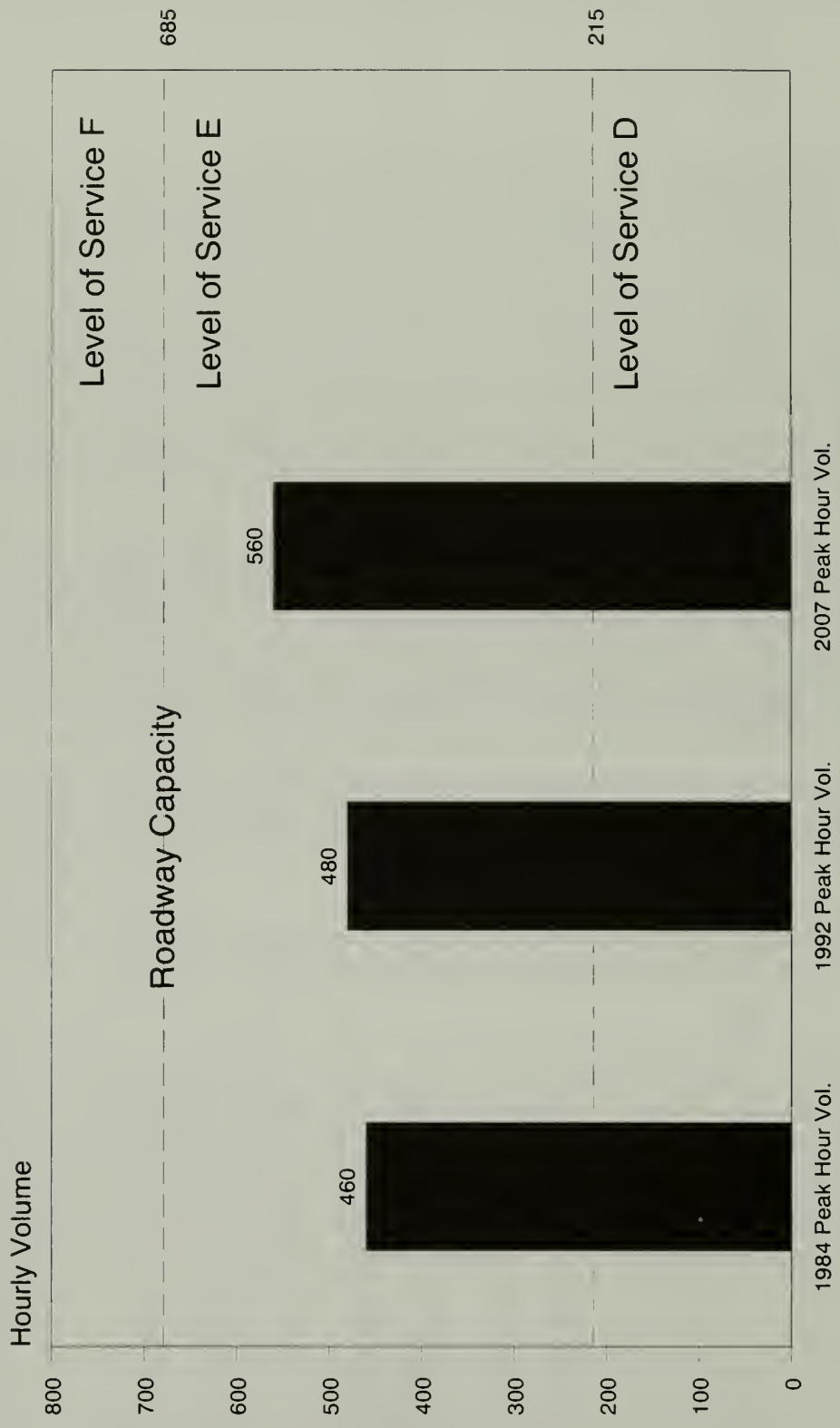
<sup>3</sup> 30% increase to 2007

<sup>4</sup> Peak hour forecasts used 1984 as the base year because 1984 peak hour counts have not been exceeded through 1989.

<sup>5</sup> 5% increase to 1992

<sup>6</sup> 21% increase to 2007

Figure 1: Going-to-the-Sun Road  
Capacity/Level of Service - 1984-1987  
West Side Tunnel to Logan Pass



per hour higher than recorded in 1984 on the west side of Logan Pass, total traffic breakdown or forced flow may occur.

If these forecasts are reached and vehicular congestion becomes unbearable from traffic delays or degradation of roadside resources, traffic management actions and/or public transit will be needed.

A 30 percent ADT increase and a 21 percent peak-hour traffic increase on roads other than Going-to-the-Sun Road are not expected to cause traffic congestion problems merely from traffic volume increases.

### **Current Traffic and Bicycle Use Restrictions on Going-to-the-Sun Road**

Currently, vehicles or a combination of vehicles and towed vehicles cannot exceed 35 feet in length for the months of September to June between Avalanche and Sun Point. During the summer tourist season the length is reduced to 30 feet.

The use of bicycles on the roadway is prohibited for safety reasons from 11 a.m. to 4 p.m. from June 15 through Labor Day between Apgar and Sprague Creek and between Logan Creek and Logan Pass. These restrictions for bicycle riders are removed for the shoulder seasons.

The peak day volume of bicycle traffic arriving at the west entrance amounted to 15 in June and 31 in July 1984, indicating a very low level of bicycle traffic recorded through this entrance. The average figure for July amounted to 8.5 bicycles/day. There may be higher levels of use on sections of Going-to-the-Sun Road if visitors are transporting their bicycles on vehicles and then using the roadway system for recreational biking. There is a bicycle path between park headquarters and Apgar.

## **ACCIDENT CHARACTERISTICS**

### **Accident Trends**

A total of 442 vehicular accidents were reported on park roads in 1983 (90), 1984 (69), 1985 (53), 1986 (72), 1987 (83), and 1988 (75). Table 6 shows park road sections and areas recording three or more accidents per calendar year over the five-year period.

The highest number (44) of reported accidents for the five years occurred on Going-to-the-Sun Road from the Loop to Weeping Wall. This section of roadway is within the most congested portion of Going-to-the-Sun Road when reviewing the capacity of the road. The total number of reported accidents in the park decreased from 1983 through 1985 and increased in 1986 and 1987 to near the 1983 level.

A total of 43.2 percent (191) of all reported park vehicular accidents (442) over the six-year period occurred at locations and road segments on Going-to-the-Sun Road from Logan Creek to Rising Sun. This included the reported accidents at the Loop and Logan Pass parking areas.

**Table 6: Location of Two or More Reported Accidents (1983 – 1988)**

Location	1983	1984	1985	1986	1987	1988	Total 1983/88
Loop to Weeping Wall (SR)*	9	7	6	7	5	10	44
Weeping Wall to Logan Pass (SR)	7	5	5	4	7	14	42
Logan Pass parking area (SR)	7	2	3	7	8	2	29
Many Glacier Area and access road	5	7	2	4	5	4	27
Logan Creek to Loop (SR)	5	4	2	4	6	6	27
Rising Sun to St. Mary (SR)	8	4	3	6	2	3	26
Foot of Lake McDonald to Avalanche (SR)	3	5	4	5	6	2	25
North Fork Road and campground	3	1	1	3	10	6	24
Jackson Glacier pullout to Rising Sun (SR)	9	1	2	1	3	4	20
West entrance station (SR)	5	4	3	3	3	0	18
Apgar	6	1	4	3	1	3	17
Logan Pass to Jackson Glacier pullout (SR)	4	4	1	2	2	3	16
West Glacier Bridge to foot of Lake McDonald (SR)	2	3	1	1	6	3	16
Loop parking areas and hairpin turns (SR)	7	2	1	0	3	0	13
Avalanche to Logan Creek (SR)	2	3	1	0	3	2	11
Camas Road	0	3	1	2	1	0	7
St. Mary visitor center parking area	3	0	1	0	0	0	4

\*(SR) a section or location on Going-to-the-Sun Road

Source: Park data

### Accident Rates by Park Road Segment

Conversion of accident numbers into accident rates based on the numbers of vehicles that enter an intersection or pass through a particular road section is a useful method of analyzing accident data. These rates provide a means of comparing the relative safety of different locations on a road network. The 1984, 1985, and 1986 accidents for July and August for the major park road network were compared to the existing traffic volumes passing over specific road sections in July and August.

Accident rates shown in table 7 were calculated for each road section and expressed in terms of accidents per million vehicle miles traveled (ACC/MVM).

The following information on Montana roads is taken from the *Traffic Engineering Safety Improvements Study, Grand Teton National Park* (Peccia 1985).

Type of Road	Average Accident Rate	Critical Rate
Interstate	1.29	2.83
Primary	2.27	3.78
Secondary	2.76	7.06

**Table 7: Accident Rates by Park Road Segment**

Road or Section of Road	Miles of Segment	ADT <sup>1</sup>	Number of Accidents	Accident Rate ACC/MVM <sup>2</sup>
Going-to-the-Sun Road				
West Glacier to Camas Road	1.72	4,500	2	1.39
Camas Road to Avalanche Creek	14.46	3,410	4	0.44
Avalanche Creek to Logan Creek	4.45	2,750	3	1.32
Logan Creek to Loop	3.33	2,750	6	3.52
Loop to Weeping Wall	4.70	2,750	15	6.24
Weeping Wall to Logan Pass	3.10	2,750	12	7.57
Logan Pass to Jackson Glacier pullout	4.66	2,680	5	2.15
Jackson Glacier pullout to Rising Sun	7.23	2,680	2	0.55
Rising Sun to St. Mary	6.14	3,110	6	1.69
Chief Mountain Highway	14.22	1,010	1	0.36
Camas Road	11.66	530	3	2.61
Two Medicine Road	6.20	620	2	2.80

<sup>1</sup> 1984, 1985, and 1986 ADT average

<sup>2</sup> ACC/MVM is accidents per million vehicles miles traveled.

<sup>3</sup> 1984 ADT

The highest accident rate for a single segment amounted to 7.57 on Going-to-the-Sun Road from Weeping Wall to Logan Pass, which is above the average accident rate of 2.27 and 2.76 for state primary and secondary roads in Montana. This rate is also above the critical rates of 3.78 and 7.06 for primary and secondary roads in the state. Accident rates that exceed the critical rate in Montana are considered to be high and indicate the need for investigation and correction. The Montana rates are based on annual data, whereas the park road rates were determined from July and August data. Additionally, the Montana critical rates are based on statewide road standards. Most state primary and secondary roads are less mountainous, wider, and straighter than many of the park roads. Consequently, the rates are not directly comparable between park roads and state highways.

As indicated in the traffic analysis section, the segments from the Loop to Logan Pass are also the most congested when comparing traffic volumes to roadway capacity.

Although the accident rates for the portions of Going-to-the-Sun Road west of Logan Pass are high, the accident severity is low due to slow traveling speeds.

Table 7 also shows that the accident rates for park roads at the lower elevations are about the same as the average accident rate for Montana primary and secondary roads. Where traffic counts and accident data were both available for analysis, Chief Mountain Highway and the Going-to-the-Sun Road segment from Camas Road to Avalanche Creek had the two lowest accident rates of the road segments studied.

## VISITOR TRANSPORTATION SYSTEM FORECAST ANALYSIS

### Passenger Load Forecast Factors

To calculate the potential passenger loadings for a visitor transportation system, one of the most important factors is the average daily load by month during service.

The high use visitation months are June, July, August, and September. Figure 2 illustrates the amount of visits in these four months as a percent of total annual visitation for 1981 through 1987. The range was from 75.9 percent in 1983 to 88.7 percent in 1982; the seven-year average amounted to 87.3 percent.

There is also considerable variance among the four high use months expressed in average daily use. Table 8 shows average daily use and the percent of use for each day as a percent of July daily use (highest use month).

Average daily use for the months of July 1981 through 1988 amounted to 16,737. Average daily use in June, August, and September amounted to 52, 92, and 36 percent of July daily use, respectively.

Table 8: Visitation of High Use Months as a Percent of July

Month	1981 ADU	% of July	1982 ADU	% of July	1983 ADU	% of July	1984 ADU	% of July	1985 ADU
June	8,681	47	7,920	46	7,360	46	8,790	51	9,055
July	18,430	100	17,094	100	15,953	100	16,651	100	15,737
August	16,463	89	16,567	97	15,592	99	14,598	88	13,652
September	6,735	37	6,565	38	6,400	36	5,927	36	4,745

Month	1986 ADU	% of July	1987 ADU	% of July	1988 ADU	% of July	1981-88 ADU	% of July
June	9,020	60	9,412	58	9,674	51	8,739	52
July	15,026	100	16,149	100	18,836	100	16,737	100
August	14,836	99	14,068	87	16,405	87	15,272	91
September	4,961	33	6,679	41	6,806	36	6,102	36

\*ADU = Average Daily Use

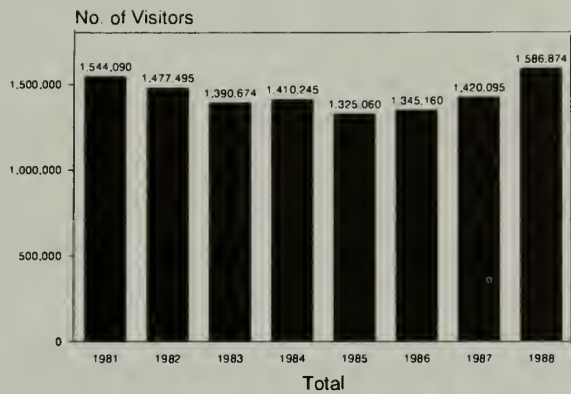
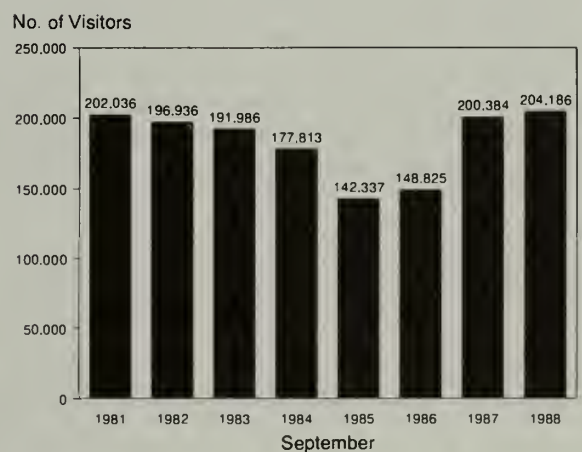
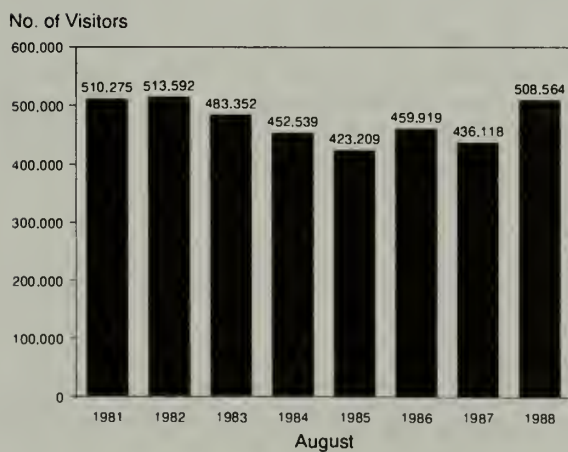
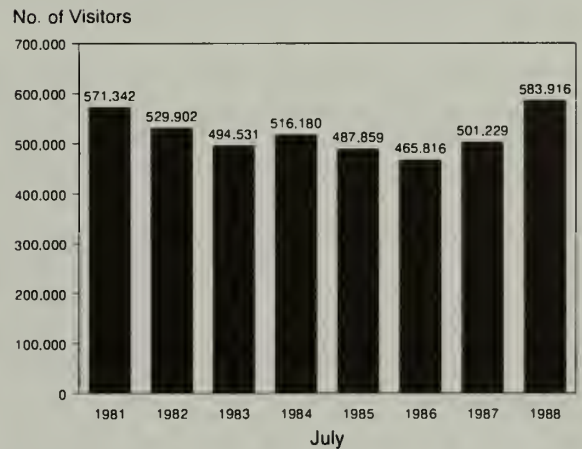
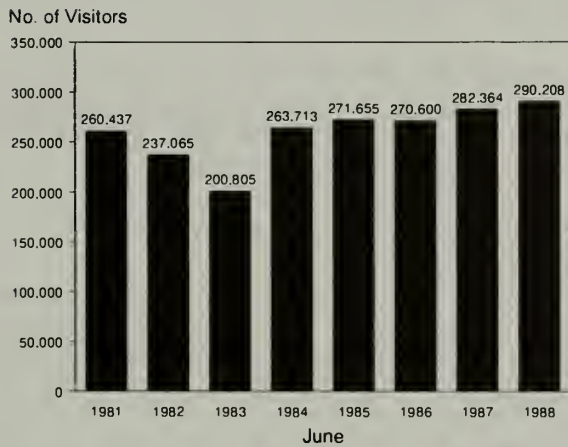


Figure 2: Percent of Visitation  
High-Use Period

% of Total Year

1981	86.4
1982	88.7
1983	75.9
1984	88.2
1985	86.9
1986	85.2
1987	85.5
1988	87.3

8-Year Average 87.3%



Park visitation, traffic data, and other factors were used to prepare a maximum passenger design load forecast for the various park road corridors implementing a voluntary ridership system with existing vehicle length restrictions on Going-to-the-Sun Road.

As an introduction to the forecasts in tables 13 and 14, the current maximum daily design load forecasts for July are as follows:

<b>Road Corridor</b>	<b>Number of Round-trip Visitors</b>
Going-to-the-Sun Road	
From West Glacier to St. Mary and return	400
St. Mary to Many Glacier and return	300
East Glacier to Many Glacier and return	100
Many Glacier to Waterton and return	20
<b>TOTAL</b>	<b>820</b>

These maximum projected daily loads for July amount to 5.0 percent of the total visitation in the park based on July visitation from 1981 through 1987 (820 ÷ 16,737). If 10 percent of these persons would ride a bus, the ridership would amount to 1,640 persons per day.

A total of 820 round-trip riders (or 1,640 one-way) was used as a base figure for maximum design passenger loadings per day in July. For July and August 1984, concessioner buses transported an average of 275 persons per day on one-way trips (equivalent to 137.5 per round-trip) amounting to 16.8 percent of the maximum design load forecasts.

Table 9 shows average daily load forecasts for the Going-to-the-Sun Road corridor.

It is presumed that the maximum visitation levels would not be attained in the early years of a voluntary ridership visitor transportation system. Perhaps 50 percent of the maximum loads could be attained in the early startup years of operation under present vehicular use restrictions in the summer.

The column identified as 50 percent of maximum design loads with vehicle size restrictions is an attempt to project passenger loads if more stringent oversize-vehicle restrictions were implemented for travel on Going-to-the-Sun Road. Information from the trailhead survey indicated that 10 percent of the trailhead users surveyed during August used vehicles or vehicles and trailers over 20 feet in length. If this is a valid overall park visitor statistic, then one-half, or 50 percent, might be a reasonable estimate of visitors who would choose to ride a park public transit system. At 50 percent of the maximum design load with large vehicle travel restrictions on Going-to-the-Sun Road, July average day loadings would amount to 620 passengers, with corresponding figures for other months.



**Table 9: Round-trip Average Daily Load Forecasts  
Going-to-the-Sun Road**

Month	Use as % of July*	Max. Load	70% of Max. Load	50% of Max. Load	30% of Max. Load	50% of Max. Load with Vehicle Size Restrictions
June	52	210	145	105	60	320
July	100	400	280	200	120	620**
August	91	370	260	185	110	575
September	36	145	100	70	45	220

\* Based on 1981-1988 data

\*\*2900 ADT average on Going-to-the-Sun Road between Lake McDonald and Rising Sun  
(2900 x 5 percent = 145 vehicles) 145 x 2.9 persons per vehicle = 420 persons  
(420 + 200 = 620 for July)

Table 10 shows the round-trip average daily load forecasts from Many Glacier to St. Mary.

**Table 10: Round-trip Average Daily Load Forecasts  
Many Glacier to St. Mary**

Month	Use as % of July*	Max. Load	70% of Max. Load	50% of Max. Load	30% of Max. Load
June	52	155	110	80	45
July	100	300	210	150	80
August	91	280	195	140	85
September	36	110	75	55	30

\* Based on 1981-1988 data

The maximum average daily design load for July was estimated at 300 per day as compared to 400 per day on Going-to-the-Sun Road based on the forecast.

The projected passenger loadings do not reflect high-day usage. The average daily loadings were multiplied by a factor of 1.3 to arrive at the number of additional buses, trips, and time required on high-use days of the operating season.

## Operating Season

Other than the four months of June, July, August, and September, it appears that passenger loadings would be very minimal based on park visitation patterns. Loadings would be low until concessioner lodging was open for the season and until campground activity increased in June. These activities would then reduce greatly in September. For analysis purposes, it was estimated that visitor transportation services would be available from June 21 through September 4 or around Labor Day. This would amount to 10 days in June, 31 each in July and August, and four in September for a total of 76 days. Under actual operating conditions, this figure would vary somewhat. It was also estimated that there would be three high-use days in June, 10 in July, 9 in August, and 1 in September. High-use days were estimated to occur on holidays and weekends.

## Vehicle Types

The park concessioner, Glacier Park, Inc., owns and operates three types of vehicles at the present time. The most numerous and prominently used vehicle is the White coach (red bus) manufactured in the 1930s. Thirty-three of these vehicles are available for service, with a load capacity of 14 passengers. GPI also has three Flexible buses manufactured in the 1950s, with a capacity of 29 passengers, and six Crown coaches built in 1962, with a capacity of 37 to 41 passengers. The red buses are part of the historical character and scene of the park and are the only buses small enough to be permitted over Logan Pass.

In arriving at vehicle types, the following operating characteristics of buses seem desirable:

- ease of maintenance and operation
- flexible capacity
- economical to purchase and operate
- ease of boarding/unloading
- dependability
- pleasing appearance
- low air and noise pollution

Electric, battery-powered buses would be environmentally ideal. They consume no fossil fuels directly, are essentially pollution free, and operate very quietly. However, several disadvantages currently outweigh these positive characteristics. These vehicles have not yet been proven in a rigorous bus operation, and capital and maintenance costs are high compared to more standard vehicles.

Vans, converted vans, light transit vehicles, small modified school buses, and light buses are considered appropriate for traversing Logan Pass because of their short wheel base and overall length.

Smaller vehicles would be less costly and quieter in operation than large conventional transit coaches. The larger conventional coach is not appropriate for use over Logan Pass because of roadway constraints. Large buses could be used on the west side to Lake McDonald Lodge and the east side to Rising Sun and Many Glacier.

For forecasting purposes, a 10-passenger modified van, a 15-passenger modified maxi van, and a 25-passenger vehicle were used for potential service on Going-to-the-Sun Road.

## **Existing Service and Potential Routes**

GPI currently provides service to lodging, train depots, Two Medicine Lake, and other park locations by request. On occasion GPI will pick up lodging visitors at the airport. In addition, sightseeing circle tours have been provided since 1983. The Bus Routes and Stops map shows the location of existing and potential bus stops.

In 1971 an effort was undertaken to provide shuttle service over Going-to-the-Sun Road. In the interim, several subsequent routes and systems have been proposed but not implemented. These past efforts were mainly based on the idea to provide service to day trail users along Going-to-the-Sun Road.

This analysis expands on these attempts and has determined that potential users of a new public transit system include the following:

- Persons who do not want to drive over Logan Pass

- Persons with oversize vehicles

- Hikers who enter one trailhead and exit another (reduces the demand for parking spaces at trailheads)

- Persons who arrive at the park in other than private vehicles

- Employees of the park and concessioners

- Persons desiring an interpretive tour of Going-to-the-Sun Road

Persons staying at campgrounds or in lodging may desire to use a bus for a day-use trip in the park. Lodging guests without private vehicles would use a bus to travel between lodging facilities. GPI currently provides these services between facilities.

An ancillary positive benefit in the provision of bus service would be some decrease in vehicular congestion on the critical section of Going-to-the-Sun Road. The amount of relief would depend on the frequency of bus service and the amount of passenger loadings. As potential routes were reviewed, it appeared that the greatest benefits of a transportation system would occur along Going-to-the-Sun Road because of the high levels of traffic congestion on high use days and the presence of numerous developed areas and trailheads.

Probably the greatest need for shuttle service is between Lake McDonald Lodge and Rising Sun. This is the section of Going-to-the-Sun Road that is the narrowest, has the greatest gradients and curves, has several trailhead parking areas, and provides service to the Logan Pass visitor center, which has high visitor use and congested parking conditions.

## **Capital and Operating Costs**

Total annualized costs include capital and operating costs of equipment, capital costs for maintenance and dormitory space, personnel costs, and 20 percent added to operation and maintenance costs. This latter item includes costs for overhead, and/or profit, administration, and contingencies. All projects costs are based on 1988 figures.

## Annualized Cost Implications

These data, presumptions, and forecasts were analyzed by option to arrive at comparative potential bus loadings and costs. Tables 11 and 12 show the results of these analyses. The tables show the number of round-trip passengers, miles traveled, operation time, number of buses required for both average and high-use days, total annualized costs, cost per user, and cost per mile for each option. The number of additional buses and trips per day for high-use days were added to the costs, if applicable. In each option, standby buses were included in the costs incurred for emergency repairs. It should be noted that in the higher bus passenger loading options with smaller vehicles, the number of trips would be greater than those scheduled. It is important to note that the forecasts and following text pertain to round-trip passengers.

As noted earlier in the report, the higher passenger loadings may not be attainable under present vehicular use restrictions and a voluntary ridership system. If 50 percent of estimated maximum loadings is attained (13,265 passengers per season), a 15-passenger van would appear to cost less to operate than a 25-passenger vehicle. In addition, one-hour headways for the whole season would result in lower costs than 1/2-hour headways in July and August, but convenience and flexibility would be decreased with the longer headways and might result in a lower level of ridership.

If 50 percent loading was attained and vehicle size restrictions were implemented prohibiting any vehicle or vehicle and towed vehicle over 20 feet in length to travel over Logan Pass (perhaps resulting in an increase in ridership of 5 percent of all visitors per day on Going-to-the-Sun Road), the 25-passenger bus would result in lower costs per rider than the smaller vehicles. In a situation with larger ridership (41,125 passengers per season), larger buses would be more cost-effective. However, the cost per mile of the vans would be lower than that of the 25-passenger vehicles.

For comparison purposes, the existing red bus was substituted for a new 15-passenger van using the 50 percent of maximum passenger load with one-hour headways in June and September and 1/2-hour headways in July and August. This presumed that the red bus would cost approximately \$1.05 per mile to operate, that capital costs were amortized, and that operator costs were the same as used for the study forecasts. The costs per user and mile were estimated to be nearly the same for a new 15-passenger van. The number of red buses with high maintenance requirements would not be sufficient to meet the public transit schedule and concessioner lodging transportation requirements in the park.

In addition to the mid-range ridership levels, a level of 123,670 was also analyzed. This level of ridership resulted in the lowest cost per user (\$14.13) while using a 25-passenger vehicle. However, it should be noted that the cost per user (\$14.71) to haul 41,125 passengers per season was not much greater. With the larger loads, total system costs would be higher due to the demand for the number of vehicles and hours of labor for operation. The ridership level of 123,670 passengers would reduce the number of private vehicles on Going-to-the-Sun Road by approximately 20 percent, thus reducing congestion.

It is important to note that the costs per user reflect round-trips; one-way trips would amount to 50 percent of the costs in tables 15 and 16. It is also recognized that only a portion of the passengers might make a complete round-trip between St. Mary and West Glacier. There would be a larger number of one-way trips between the east and west sides and round-trips between West Glacier and Logan Pass or from St. Mary to Logan Pass. There would also be demand to use visitor transportation services between Lake McDonald Lodge and Logan Pass and Rising Sun to Logan Pass. Consequently, if users were charged a fee, a graduated fee schedule would have to be developed such as used by GPI

at the present time.

Generally at the higher loading levels, the capacity of the system met or closely met the projected demands. No system will operate at a 100 percent occupancy level. Administration and overhead were held at 20 percent of operation and maintenance costs for all system sizes. The administrative costs probably would not be much higher for operating a system hauling 26,000 passengers than for accommodating 13,000 passengers.

An actual operating schedule would have to be flexible. If 30-minute headways attracted only minimal passenger loadings in July and August, one-hour headways could be used for longer periods on days when ridership might be lower due to weather. However, reducing frequency would reduce convenience for potential riders, who might decide to use private vehicles if buses were not frequent enough to provide convenient service.

Some conclusions pertaining to visitor transportation services on Going-to-the-Sun Road include the following:

Lower ridership levels (13,000 to 19,000 per season) would probably occur if there were no additional private vehicle use restrictions on Going-to-the-Sun Road and if the system was operated on a voluntary use basis only. Perhaps even lower levels might occur if 1-hour rather than 1/2-hour headways were used.

When ridership approached 40,000 per season, costs per user would not appreciably decrease with higher load levels. A system accommodating 26,000 passengers per season would probably cost 25 percent more than one hauling 13,000 passengers.

When ridership approached 30,000 to 35,000, a 25-passenger vehicle would be more cost-effective to operate than a 15-passenger vehicle.

A system hauling 20 percent or approximately 120,000 to 140,000 of the visitors on Going-to-the-Sun Road would appreciably reduce congestion levels on the roadway. This would reduce vehicular traffic by about 100-110 vehicles during high-use hours. A system hauling 40,000 passengers per season would reduce vehicular congestion by about 35 vehicles per high-use hour. Ridership levels at 18,000 to 20,000 passengers per season would do little to reduce congestion on Going-to-the-Sun Road.

It appears that any park public transit system would require subsidization even with user fees and high ridership levels. Trip miles are extensive and traveling speeds are low, requiring high equipment operation and labor costs.

**Table 11: Annual Passenger Loadings and Bus Operation Costs  
West Glacier to St. Mary/St. Mary to West Glacier**

<b>Size of Vehicle and Level of Passenger Loading</b>	<b>Total Round- Trip Passenger Capacity</b>	<b>Forecast Round-Trip Passengers</b>	<b>Miles</b>	<b>Operation Time (hrs)</b>	<b>No. of Buses/Day Average</b>	<b>High Use</b>	<b>Total Annualized Costs</b>	<b>Cost/User Round-Trip</b>	<b>Cost/Mile</b>
Maximum load 25-passenger bus	42,100	26,550	202,080	23,712	18	18	\$557,123	\$20.98	\$2.76
Maximum load 15-passenger van	29,565	26,550	236,520	26,755	18	23	\$532,232	\$20.05	\$2.25
70% of maximum load* 25-passenger bus	26,850	18,590	128,880	13,488	10	11	\$342,099	\$18.40	\$2.65
70% of maximum load 25-passenger bus	42,100	18,590	202,080	23,712	18	18	\$557,204	\$29.97	\$2.76
70% of maximum load 15-passenger van	25,410	18,590	203,280	23,824	18	18	\$456,860	\$24.58	\$2.25
50% of maximum load* 25-passenger bus	26,600	13,265	127,680	13,376	10	10	\$331,406	\$24.98	\$2.60
50% of maximum load* 15-passenger van	16,830	13,265	134,640	14,026	10	12	\$292,484	\$22.05	\$2.17
Expanded system** 50% of maximum load 15-passenger van	25,260	13,265	202,080	23,712	18	18	\$465,250	\$35.07	\$2.30
50% of maximum load*** 14-passenger red bus	23,576	13,265	202,080	23,712	18	18	\$466,162	\$35.14	\$2.31
30% of maximum load 10-passenger van	16,840	7,910	202,080	23,712	18	18	\$448,872	\$56.75	\$2.22

Size of Vehicle and Level of Passenger Loading	Total Round-Trip Passenger Capacity	Forecast Round-Trip Passengers	Miles	Operation Time (hrs)	No. of Buses/Day Average	High Use	Total Annualized Costs	Cost/User Round-Trip	Cost/Mile
50% of maximum load Veh. size restrictions 25-passenger bus	46,525	41,125	223,320	25,956	18	19	\$605,021	\$14.71	\$2.71
50% of maximum load Veh. size restrictions 15-passenger van	45,585	41,125	364,680	38,660	28	34	\$787,013	\$19.14	\$2.16
Highest load 25-passenger bus	136,450	123,670	654,960	68,440	49	62	\$1,746,904	\$14.13	\$2.67
Highest load 15-passenger van	136,675	123,670	1,025,400	110,824	80	103	\$2,247,605	\$18.17	\$2.19
Alternative A**** 15-passenger van Two-hour headways	9,120	5,470	72,960	7,296	6	6	\$158,400	\$28.96	\$2.17
Alternative B**** 15-passenger van Four-hour headways	4,560	3,420	36,480	3,648	3	3	\$84,491	\$24.70	\$2.32

\*One-hour headways for total season

\*\*\*Expanded system also includes a route from St. Mary to Many Glacier. To maintain comparability between options, data on a route from St. Mary to Many Glacier has not been incorporated into this table. For information on that route, readers should refer to table 12.

\*\*\*\*These figures are only for cost comparison. The red buses would not be part of the shuttle system. They would continue to be used for scenic tours.

\*\*\*\*\*Presumes no extra trips or buses for high use periods; all other scenarios included time for two dispatchers only, one included for the initial system. The forecast loading assumed 60 percent occupancy for the season for the initial system.

**Table 12: Annual Passenger Loadings and Bus Operation Costs  
Many Glacier to St. Mary/St. Mary to Many Glacier**

Size of Vehicle and Level of Passenger Loading	Total Round- Trip Passenger Capacity	Passengers	Miles	Operation Time (hrs)	No. of Buses/Day Average High Use	Total Annualized Costs	Cost/User Round-Trip	Cost/Mile
70% of maximum load 25-passenger bus*	24,700	13,955	47,424	5,472	4	\$130,409	\$ 9.38	\$2.76
70% of maximum load 15-passenger bus*	16,575	13,955	53,040	7,131	4	\$130,459	\$ 9.35	\$2.46
Expanded system 50% of maximum load 15-passenger bus*and**	14,820	10,010	47,424	5,472	4	\$107,666	\$10.76	\$2.27
30% of maximum load 10-passenger bus*	9,880	5,995	47,424	5,472	4	\$106,360	\$17.74	\$2.24

\*One-hour headways

\*\*This option has been incorporated into the expanded system. The data presented in this table is only for the St. Mary-Many Glacier component of that system. For additional information on the expanded system, refer to table 11.



The various passenger loading options and costs are shown in table 12 for Many Glacier to St. Mary routes. The cost per mile to operate the system is estimated to be slightly higher than West Glacier to St. Mary because of the need for higher ratios of relief drivers to regular drivers for full seven-day service and the higher ratio of standby vehicles to scheduled service buses. The 50 percent of maximum design load with an increased restriction on oversize vehicles option was not analyzed for this route because private vehicle size is not a problem on this route and vehicular volumes are lower than on Going-to-the-Sun Road.

This analysis also indicates that as ridership became higher, larger vehicles would be more cost-effective as related to cost per user. This system, using a 15-passenger modified van with 13 trips per day for the whole season at the 50 percent of maximum load level, is estimated to cost \$105,000 to \$115,000 per year to operate.

### **Support Facilities**

As mentioned earlier, there are needs for dormitory facilities and a maintenance facility to support a shuttle system. These needs are based on a system and schedule described for the expanded system using 15-passenger buses (or 25-passenger buses). Dormitory facilities would be required at West Glacier and St. Mary because shuttle trips would originate from both locations during the operating season. It is estimated that 24 beds (12 rooms) would be required at West Glacier for drivers, and 30 beds (12 rooms) at St. Mary for drivers, dispatchers, and mechanics.

The expanded system was selected as the basis for computing size of support facilities because the level of service under the expanded system provides frequent service and flexibility to the rider. The annual ridership levels may be attained with some additional restrictions on the length of the vehicles driving over Logan Pass. Smaller support facilities are described for the initial system.

The support facility needs and costs are general in nature. Additional need and cost refinements will be required before implementation. If these needs and costs are added to the annualized costs of the visitor transportation system for the St. Mary to West Glacier route, using the 50 percent of maximum load levels for 15-passenger vans with 1/2-hour headways in July and August and a St. Mary to Many Glacier route, total annual costs for the expanded system would be from \$700,000 to \$735,000 per season.

### **Parking Demand Generated by a Visitor Transportation System**

Various levels of parking demand would be generated based on passenger load levels. Passenger loading areas would be at designated trailheads, campgrounds, and developed areas. At campgrounds and trailheads, passengers would most generally walk to and from a shuttle bus stop, but at specific developed areas, staging/parking areas would be required for drivers to park their vehicles for the duration of a shuttle trip.

It is expected that a major staging/parking area would be required in the West Glacier area. The most desirable location would be at the proposed visitor center. In a draft environmental assessment for revisions to the *Apgar Headquarters Development Concept Plan* (NPS 1981), a new visitor contact station/center is shown in two possible locations between the existing headquarters areas and the intersection of Camas and Going-to-the-Sun roads. A visitor center/staging area could also be constructed outside the park near West Glacier. This facility could be constructed cooperatively with the U.S. Forest Service, as discussed in the late

1970s and at present. A parking/staging area for the visitor transportation system could be sited with the parking area required for the visitor center.

The following forecasts were made using a maximum daily passenger round-trip loading of about 40,000 per season (620 per day in August) on Going-to-the-Sun Road. Based on traffic volumes and locations of campgrounds on Going-to-the-Sun Road, it was presumed that 60 percent of the 620 passengers would be originating on the west side and 40 percent on the east side.

From traffic volumes, peak-hour traffic volumes amounted to nearly 17 percent of average daily volumes from Rising Sun to Lake McDonald Lodge. Applying this ratio to peak-hour bus loadings and consequent parking demand, about 105 passengers per hour would approximate peak-hour demand in August. Since it does not appear feasible to size staging areas for single peak-hour demand, the peak-hour parking demands were multiplied by 0.93 to identify high-use day demands. The average of the fourth and fifth high-use hours on weekends amounted to approximately 93 percent of the peak hour during the summer.

Table 13 shows the presumptions and forecasts used to project parking space demand for staging areas along Going-to-the-Sun Road. The table indicates that the largest demand would be at the West Glacier visitor center (74 spaces) and the St. Mary visitor center (42 spaces). This is presuming that drivers could also park their cars at Apgar Village, Lake McDonald Lodge, and Rising Sun. A new visitor center in the West Glacier area would also generate parking needs for private drivers not using the visitor transportation system. The existing developed areas currently contain parking areas. Approximately 1.5 acres should be added to the 1.3 acres projected for visitor transportation system passengers at the new visitor center.

If a route were added between St. Mary to Many Glacier, 35 additional spaces would be needed at Many Glacier assuming that 70 percent of the shuttle passengers would also ride the Going-to-the-Sun Road shuttle to Logan Pass. The estimated demand at St. Mary for shuttle riders to Many Glacier amounted to 24 additional spaces. This is based on the assumption that 70 percent of the passenger loadings would be attained from table 16, and that 90 percent of the visitor transportation system riders would drive vehicles to the staging area at both St. Mary and Many Glacier. If both systems were in service, the total parking demand for the visitor transportation system at St. Mary is estimated to be 66 spaces (24 + 42).

BRITISH COLUMBIA

MONTANA

KINTLA LAKE

BOWMAN LAKE

221

BOWMAN LAKE ROAD

POLEBRIDGE






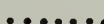



100

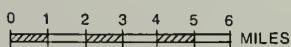
486

61

FLATHEAD NATIONAL FOREST

POTENTIAL VISITOR TRANSPORTATION SYSTEM BUS ROUTES AND STOPS

-  WEST GLACIER TO ST.MARY – PHASE 1
-  MANY GLACIER TO ST. MARY – PHASE 2
-  STOPS
-  MAJOR DEVELOPED AREAS
-  PARK BOUNDARY
-  CONTINENTAL DIVIDE
-  AMTRAK
-  PAVED ROADS
-  UNPAVED ROADS
- 10** ROUTE OR ROAD NUMBERS



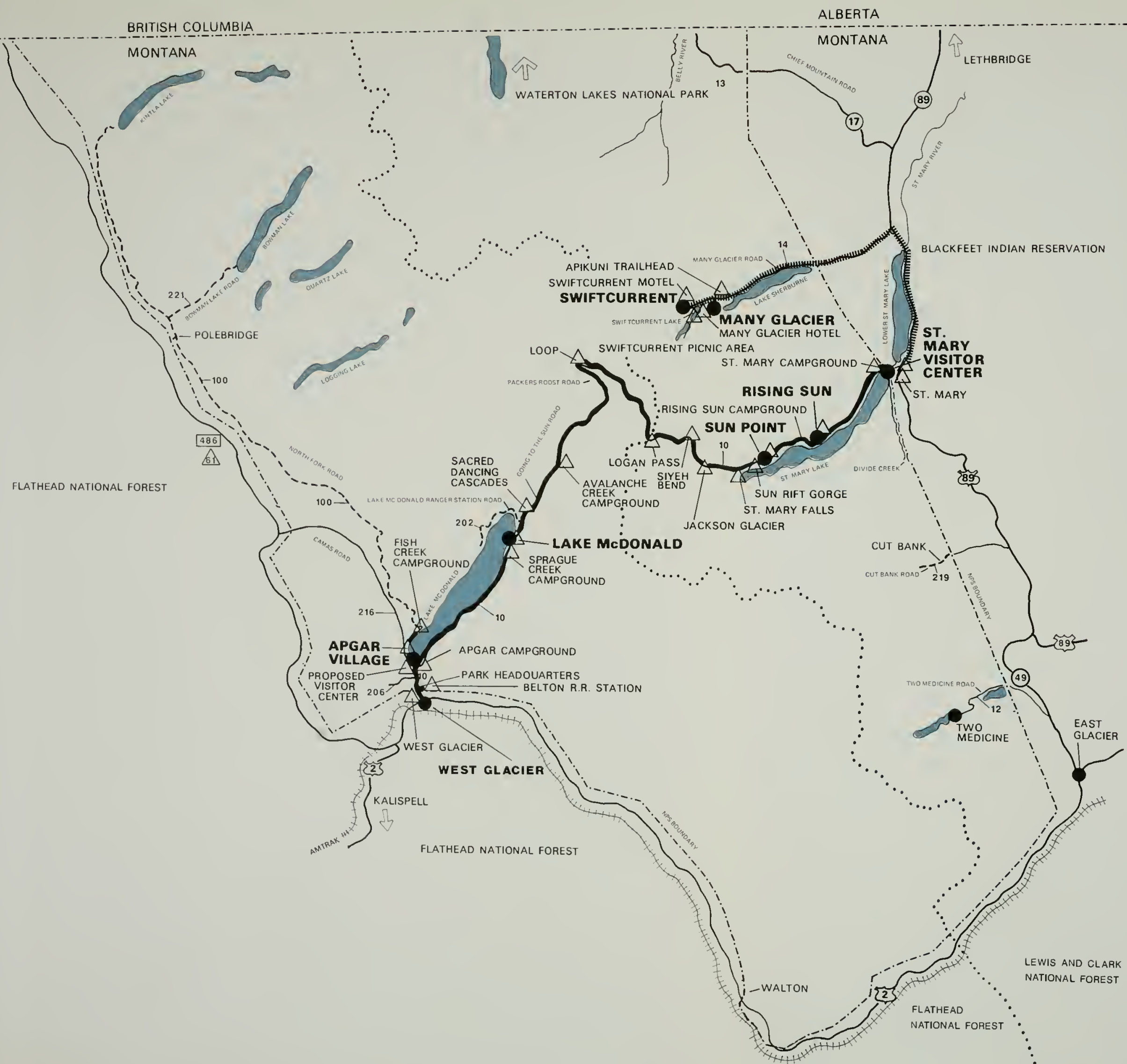
# BUS ROUTES AND STOPS

## PARK GENERAL

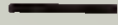
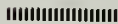








GLACIER NATIONAL PARK / MONTANA

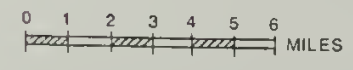
UNITED STATES DEPARTMENT OF THE INTERIOR / NATIONAL PARK SERVICE

117 | 40,137 C  
DSC | MAR 86



POTENTIAL VISITOR TRANSPORTATION SYSTEM BUS ROUTES AND STOPS

-  WEST GLACIER TO ST. MARY - PHASE 1
-  MANY GLACIER TO ST. MARY - PHASE 2
-  STOPS
-  MAJOR DEVELOPED AREAS
-  PARK BOUNDARY
-  CONTINENTAL DIVIDE
-  AMTRAK
-  PAVED ROADS
-  UNPAVED ROADS
-  ROUTE OR ROAD NUMBERS



# BUS ROUTES AND STOPS

## PARK GENERAL

**Table 13: Projected Parking Space Demand/Visitor Transportation System  
West Glacier to St. Mary**

	<u>West Side</u>		<u>East Side</u>
Passengers	59		39
Passengers arriving by vehicle <sup>1</sup>	47		31
Vehicles to be parked <sup>2</sup>			
West Glacier	10	St. Mary visitor center	7
Apgar Village	2	Rising Sun	4
Lake McDonald Lodge	5		
	<b>17</b>		<b>11</b>
Parking spaces needed <sup>3</sup>			
West Glacier	74	St. Mary visitor center	42
Apgar Village	15	Rising Sun	23
Lake McDonald Lodge	23		
Additional acres needed for parking <sup>4</sup>			
West Glacier visitor center	1.3	St. Mary visitor center	.7
Apgar Village	.3	Rising Sun	.4
Lake McDonald Lodge	.5		

<sup>1</sup> 80 percent of passengers arrive by vehicle, 20 percent walk to shuttle stops from campgrounds, lodging, and trailheads.

<sup>2</sup> 9 persons/vehicle - 60% at West Glacier VC, 10% at Apgar Village and 30% at Lake McDonald Lodge on the west side, 66% at St. Mary and 34% at Rising Sun on the east side

<sup>3</sup> Computed from total trip time to destinations from West Glacier and St. Mary resulting in total parking turnover time

<sup>4</sup> 60 spaces per acre

## Funding for Visitor Transportation Systems

If possible, a new visitor transportation system should be self-supporting and operated at no cost to the federal government; instead, the private sector should own and operate the system. Some existing systems are funded by user fees, increases in visitor rates for a variety of goods and services supplied by a concessioner, and by annual appropriations. In some instances, a combination of user fees and annual appropriations are used simultaneously.

Enhancement or entrance fees can be used for protection of natural and cultural resources and maintenance activities related to protection of these resources as well as research and interpretation. An interpretation of the use of these funds indicates that if a strong case can be made to protect resources, perhaps these fees can be used to assist in funding a visitor transportation system.









## THE PLAN

This plan for the Going-to-the-Sun Road area provides strategies for dealing with identified traffic and transportation problems through phased road rehabilitation, implementation of a public transit system, and a number of traffic management actions. It also proposes treatments for Packers Roost and Camas roads, the Sun Point Road intersection, and the 130 turnouts on Going-to-the Sun Road. Proposals for rehabilitation of other major park roads (Many Glacier Road, Two Medicine Road, Chief Mountain Highway) are not included in this plan because further geotechnical and planning studies will be required before road options can be formulated. Road options for the North Fork area are being analyzed as part of the development concept planning effort for that area, which is currently underway. Because the Cut Bank Road is in generally good condition, no actions other than normal maintenance are proposed. Although the plan does not contain rehabilitation proposals for all park roads, its public transit system and traffic management proposals are parkwide.

In planning for Going-to-the-Sun Road, the historic character and significance of the road, the quality of the visitor experience, and visitor safety have all been important considerations. The road is on the National Register of Historic Places because it exemplifies a major engineering feat of early road building and is identified with the automobile tourist. The alignment, road width, stone walls, parapets, culverts, bridges, and C-shaped tunnels are all significant features of the road. Driving the historic road has always been central to the visitor experience at Glacier. The road is known for its spectacular scenery and for its narrow width, steep vertical walls on one side, and steep vertical drop-offs on the other. These characteristics produce the white-knuckle driving experiences for which the road is famous and also necessitate low travel speeds to negotiate the road and enjoy the drive and the scenery. Altering the road to meet modern highway standards would require replacing the historic stonework, constructing higher steel-reinforced concrete walls, widening the road, and straightening the alignment to enable safe travel at higher speeds. Because these changes would destroy the historic character of the road and the associated driving experience, major modernizing improvements have not been considered. Similarly, road reconstruction to accommodate bicycles, either by expanding the road shoulder or providing separate bicycle lanes, has not been considered because such changes would involve widening the existing road up to 8 feet. Alternative locations for bicycle lanes, including existing footpaths and powerline rights-of-way, have been eliminated from consideration because they are too steep in grade or there is insufficient space.

Rehabilitation work for the Going-to-the-Sun Road will include critical stabilization, repair, repaving, and improvement projects. No road widening or realignment will be involved. Stone walls will be treated as prescribed in the 1989 *Draft Cultural Resource Plan, Going-to-the-Sun Road*, as revised. Walls in some sections of the road will be repaired and their historic appearance maintained. In other areas new walls will be built to meet safety standards; these walls will be designed to blend with the historic features. Culverts will also be repaired, replaced, or installed to reduce safety hazards. Rock protrusions will be removed in sections where they contribute to hazards in the travel corridor. Along with road improvement work, an expanded public transit system will be established to encourage alternate means of travel on the road. Traffic management actions will be implemented as necessary to reduce congestion during peak periods. To promote the safety of bicyclists, bicycle use will be prohibited on Going-to-the-Sun Road from 10 a.m. to 5 p.m. during the peak season. Bicycle use will be encouraged during the shoulder seasons. Because there is a lack of accurate data on the existing volume and distribution of bicycle use in the park, a systematic and comprehensive analysis of bicycle use will be conducted at the earliest possible opportunity (in consideration of available funding and staff). After completion of the analysis, a bicycle management plan will be developed for the park.

The plan for Going-to-the-Sun Road will preserve the road's historic character and the traditional driving experience while improving safety and providing options for travel by shuttle bus. The actions to improve safety will not bring the road to modern standards. Visitors will be warned that the road does not meet modern standards and therefore requires cautious driving. Visitors who chose to make this trip will continue to exchange the relative ease of driving on a modern highway for the unique experience that this one-of-a-kind road provides.

When the design phase is initiated to implement specific plan proposals, all natural and cultural resource concerns identified in this plan, in the *Draft Transportation Plan/Environmental Assessment*, in the *Draft Cultural Resource Plan, Going-to-the-Sun Road*, as revised, and in the "Biological Assessment" on endangered and threatened species will be reviewed to ensure that environmental concerns have been addressed in sufficient detail for those designs. If environmental concerns have been adequately addressed, no further documentation will be prepared. However, if they have not been addressed at a level appropriate for design, additional documentation will be completed. The design process and products will continue to be reviewed to ensure that environmental concerns are addressed and that the mitigating measures described in the various planning documents are included in the design decisions and documents for the implementing projects. If future design decisions require additional environmental documentation, such documentation will be prepared.

## **GOING-TO-THE-SUN ROAD MODIFICATIONS**

For planning purposes, Going-to-the-Sun Road has been divided into the same sections as it was in the *Road Rehabilitation Planning Study* prepared for Glacier National Park by the Federal Highway Administration in 1984. The Project Sections map shows the location of each of these road sections. The entire Going-to-the-Sun Road is classified as NPS standard class I, principal public use road.

The portion of Going-to-the-Sun Road covered by this plan includes sections 3 through 8, beginning at the head of Lake McDonald (milepost 12.10) and ending at the eastern park boundary (milepost 49.79). Although no recommendations for sections 1 and 2 are included, a review of past and present actions in these sections is important.

Section 1 starts at the West Glacier park boundary (milepost 0.00) and goes to milepost 2.27, which is 0.55 miles east of the T intersection of Going-to-the-Sun and Camas roads. The road traverses the flat valley floor between the Apgar Mountains and Belton Hills and passes through an even-aged stand of lodgepole pine resulting from the 1929 fire in the area. With the exception of the historic west entrance station, little of the original historic fabric remains. The roadway in section 1 was improved in a separate project, completed in 1983, with 14-foot lanes and 2-foot paved shoulders for a roadway top width of 32 feet. The surface of the roadway and roadside conditions are good. Section 1 serves as the major west entrance to the park and handles more traffic than any of the other road sections.

Section 2 starts at milepost 2.27 and ends at the Lake McDonald ranger station road (milepost 12.10). This area is forested and provides occasional views of the lake and distant mountain scenery. Visitors using this section of the road are generally beginning or ending a trip across the pass on Going-to-the-Sun Road. The 40 turnouts in this section are used for interpretation, scenic viewing, and to allow slow traffic space to pull off the road. One of the park's major developed areas, Lake McDonald Lodge, and the Sprague Creek campground are served by this section. The present traveling width of the roadway in this

section is 22 feet, with gravel shoulders of 1 to 1.5 feet in width, for a top width of 25 feet. The existing roadway and shoulders are in poor condition. Based on a separate assessment (NPS 1985b), section 2 is programmed to be reconstructed in 1990-1991 to establish a paved traveling surface of 22 feet with 1-foot shoulders. Drainage and roadbed improvements will be made in this rehabilitation project while retaining much of the historic character of the road.

Following are the actions proposed for sections 3-8 of Going-to-the-Sun Road.

### **Section 3**

Section 3 runs from the Lake McDonald ranger station road (milepost 12.10) to a point 0.44 mile north of the Logan Creek Bridge (milepost 21.07). It parallels McDonald Creek and exhibits an abundance of stone parapets and retaining walls on the creek side. These historic structures serve as a safety barriers but also act to support the roadbed and define the many interpretive turnouts overlooking the creek. Several historic stone bridges and a stone-faced horse-trail underpass are in this section. Views are primarily of the creek and vegetated roadside, with occasional vistas of the mountains including the Garden Wall section of the Continental Divide. The Avalanche campground, picnic area, and interpretive trail are adjacent to the road at the Avalanche Creek Bridge, and the historic Logan Creek patrol cabin is visible from the Logan Creek Bridge. The Avalanche and Logan Creek bridges are also historic.

Two portions of road in this section were destroyed by a flood in 1964 and were reconstructed to an improved roadway standard in 1965. The older portions of the road have 11-foot lanes, with untreated shoulders that vary from 0 to 2 feet in width. The roadway top width varies from 22 to 26 feet. The pavement, shoulder, and drainage conditions are fair, as are foundation/stability conditions. The reconstructed sections are in good condition, with 11-foot lanes, 3-foot paved shoulders, and a 28-foot roadway top width. There is a concrete box culvert at North Cannon Creek. The deck width of this culvert is 22 feet between the stone parapets, and the length is 12 feet. Its general condition is good, but the deck is narrow.

The roadway in section 3 will be rehabilitated with a bituminous plant-mix overlay. The project will involve excavation and replacement of surfacing and paving in areas of severe roadway distress or subgrade failure. This work, together with a preleveling course and bituminous plant-mix overlay, will restore riding qualities and extend the service life of the roadway. No road shoulders will be widened in this section. Selective thinning and clearing of vegetation on roadside areas will improve sight distances.

Road work will involve limited changes in the drainage characteristics of the roadside ditches and may result in minor disturbance of roadway cut-and-fill slopes if subdrainage pipes are needed. The surface width may be narrowed by up to 2 feet in some areas because of the grade rise resulting from the preleveling course and overlay. The final paved top width will average 22 to 24 feet, although 3.36 miles, or 37 percent of the total section, will be as narrow as 20 feet. Preparation of an adequate road base will raise the road, and because the road is narrower in that section, the effective top width will be decreased. The 2.1 miles of road in this section that were rebuilt in 1965 to a width of 28 feet (1.2 miles near Sacred Dancing Cascade and 0.9 mile from the north end of this section) will be maintained.

There will be little or no change in roadside or drainage characteristics at North Cannon Creek and Logan Creek, and the historically significant structures at Avalanche and Logan

creeks will be retained. Because the hydraulic capacity of the Logan Creek Bridge is inadequate, the channel under the bridge will be cleaned periodically to avoid loss of the structure. Logs and rocks are currently removed about once every 10 years. The narrow, hazardous North Cannon Creek box culvert will be widened.

#### **Section 4**

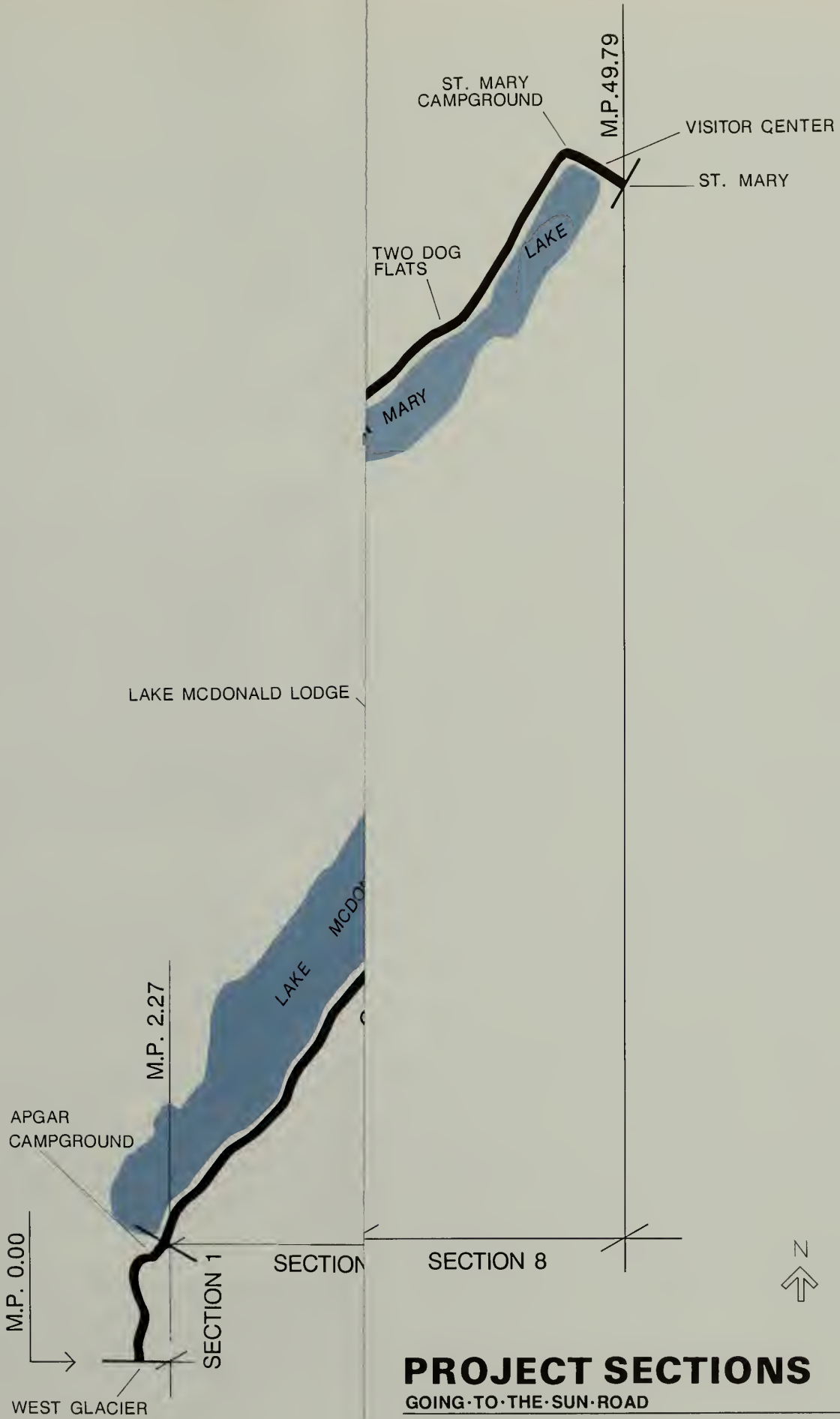
Section 4 begins at a point 0.44 mile north of the Logan Creek Bridge (milepost 21.07) and continues to the west portal of the West Side Tunnel (milepost 23.35). This section is constructed on a steep side slope that burned in 1967, and it begins the 6 percent grade that continues to Logan Pass. Because of the fire, the former forest along the roadside has been replaced by shrub and low tree growth that allows open views of the upper McDonald Creek valley and adjacent Livingston Range. This section contains several sections of historic stone guardrail and the west portal of the West Side Tunnel.

The existing roadway top width in this section is 22 feet, and there are no shoulders. The pavement and drainage conditions are poor, and foundation/stability conditions are fair. The failing roadway embankments on the south approach to the West Side Tunnel need to be stabilized. Existing roadside ditches are extremely narrow and restricted in drainage capacity. There is a double box culvert at Alder Creek with 10- by 8-foot and 6- by 4-foot barrels. The deck width between the stone-faced parapets is 22 feet. The structure is in good condition.

Road work in section 4 will include excavating subbase failures and resurfacing. Roadway embankments will be stabilized and rebuilt, and drainage will be corrected in three areas where roadway embankments are failing. The first two embankment failures (milepost 21.74 to 21.80 and milepost 23.13 to 23.17) are relatively minor and will be generally reconstructed to the original slopes. If cost effective, retaining walls may be used to reduce fill requirements. The third location (milepost 23.73 to 23.84) near the west portal of the West Side Tunnel is a massive localized slump caused by over-steepening the original roadway embankment. Approximately 50,000 cubic yards of common-borrow material will be required to reconstruct and stabilize this embankment and restore the integrity of the roadway. Retaining walls or crane-placed rock fills may also be used in this area to reduce the borrow requirements. The amounts of cut and fill are estimates; actual amounts will be determined during the design process.

After stabilization, the roadway will be preleveled, and the pavement will be overlaid with bituminous plant-mix. Because of the depth of overlay and because no roadway or ditch widening will be involved, the effective paved top width of the roadway and pavement will be reduced from 22 feet to 20 feet along the entire section. Roadside vegetation will be selectively thinned and cleared to improve sight distances. Guardrails may be required for the steep, slope-failure areas that are proposed for reconstruction.

Road work in this section will also involve delicate "rock surgery" to remove rock protrusions that extend into the travel way above the driving lanes. The average width of excavation will be about 1 foot; the height will range from 0 to 15 feet above the road surface. The maximum amount of rock removed will be 100 cubic yards, and each excavation site will be reviewed with the goal of keeping required removal below that limit. Some of the removed material is expected to be good quality quarry stone that is badly needed for wall and parapet construction and repair. Protective mats will be placed over stone parapets and other structures to prevent damage during blasting operations. Work will be performed at night or after Labor Day weekend to avoid conflicts with visitor use. Removal of the rock protrusions will provide a clear, 20-foot width through most of the section.

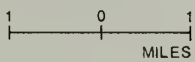


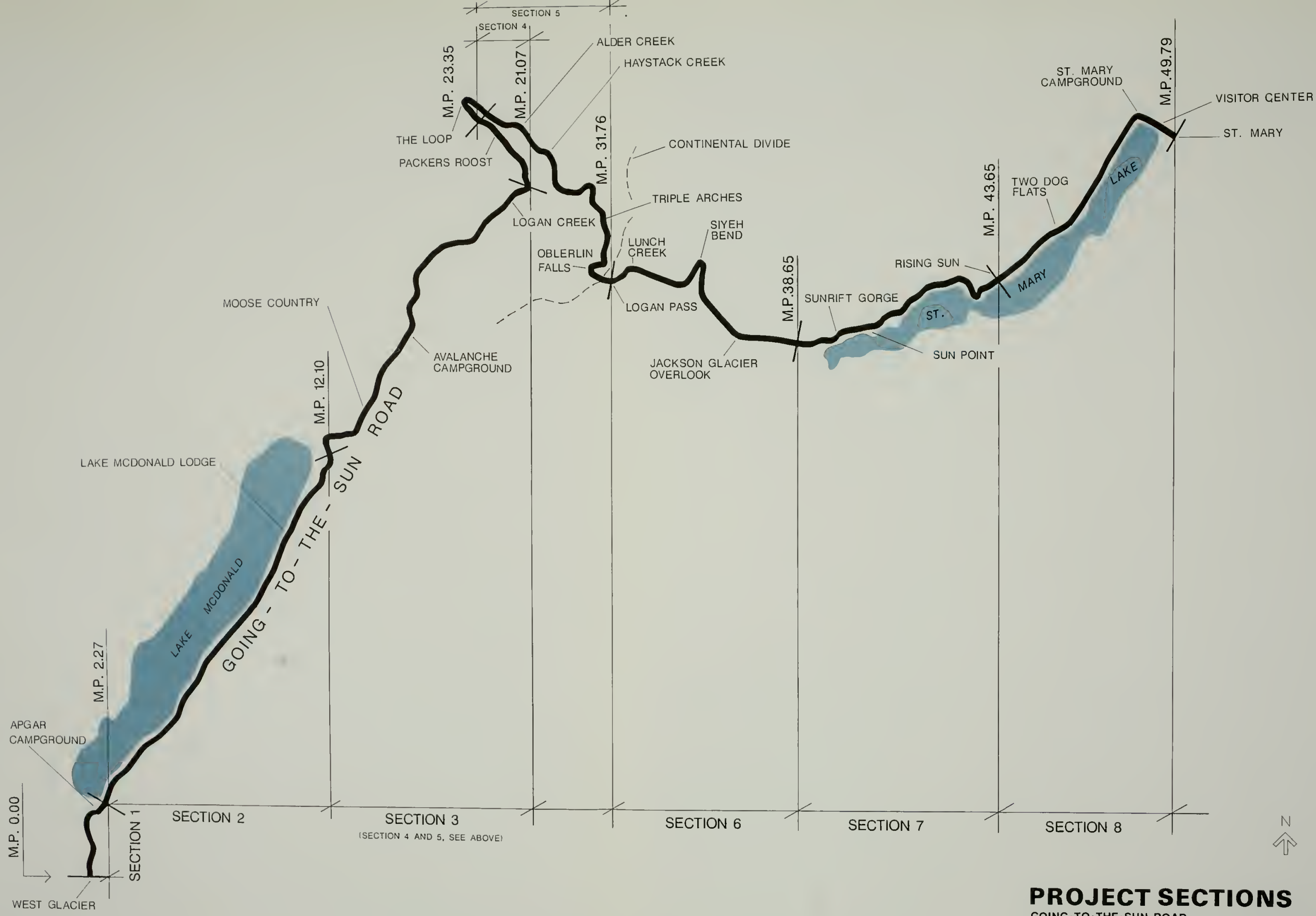
# PROJECT SECTIONS

GOING TO THE SUN ROAD

GLACIER NATIONAL PARK/MONTANA

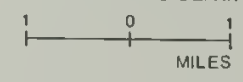
UNITED STATES DEPARTMENT OF THE INTERIOR/NATIONAL PARK SERVICE





# PROJECT SECTIONS

GOING TO THE SUN ROAD  
 GLACIER NATIONAL PARK/MONTANA  
 UNITED STATES DEPARTMENT OF THE INTERIOR/NATIONAL PARK SERVICE



## Section 5

Section 5 begins at the west portal of the West Side Tunnel (milepost 23.35) and extends to the Logan Pass summit (milepost 31.76). This section, which traverses the most spectacular portion of the park, is the area responsible for the famous "white-knuckle" driving experiences attributed to the road because of its narrow driving lanes, protruding rocks, and close proximity to vertical rock faces several hundred feet high. Interpretive and scenic turnouts include the Loop, Birdwoman Falls overlook, Weeping Wall, and Oberlin Falls areas. Historic rock retaining walls, stone parapets, and drainage structures are prevalent in this section as are historic features such as the road camp (now used as a maintenance area) and Triple Arches. Three historic structures are in this section of road – West Side Tunnel, Triple Arch Bridge, and the Haystack Creek box culvert (also known as the Haystack Creek Amphitheater Bridge). These features coupled with the spectacular roadside setting and views of the surrounding mountains are a central part of the character of Going-to-the-Sun Road.

Section 5 was originally constructed in 1932 as a 16-foot-wide, one-lane road with a roadside ditch on the inside. The road was later modified for two-lane use by converting the ditch for traffic use. The pavement width varies from 18 to 21 feet and is in fair to good condition; the roadway top width varies from 19 to 24 feet. There are no shoulders, and drainage is poor. Foundation/stability conditions are fair. Because the roadway has been expanded into the original ditch, traffic gets close to the irregular, protruding rock faces in many of the roadway cut areas. The box culvert crosses Haystack Creek at milepost 27.06. The roadway is 23 feet wide between the parapets. The length of the culvert is 10 feet, and the general condition is good.

The stone parapets in this section, many of which date back to the original highway construction, are deteriorating. Parapets on the outside of the road in particular are subject to damage and displacement by heavy snow loads. Some original parapets have been destroyed by avalanche activity, and these structures have been replaced by removable wooden guardrails. In addition, some parapets are significantly lower than the standard height.

The existing paved surface in section 5 will be rehabilitated, and drainage will be improved. Additional cross-highway culverts and catch basins will be constructed as necessary to ensure proper drainage, and partially crushed culvert pipes will be replaced. Protective barriers and traversable, flush-mounted metal gratings will be installed on culvert inlets and drains that present a safety hazard for bicyclists, pedestrians, or motorists. Designs to meet safety and aesthetic standards will be developed during the design stage.

The hand-placed, rubble-masonry retaining wall at the Loop will be stabilized. This work is needed to prevent the collapse of the wall and overlying stone parapet and the failure of about 100 feet of roadway in the switchback turn. Recent test drillings indicate that voids in the coarse-rock embankment and the migration of fine material into these voids is the probable cause of both roadway and wall settlement. Remedial measures will include enlarging and extending the subsurface and surface drainage system, repairing and stabilizing the rubble-masonry retaining wall and parapet, and resurfacing and paving the roadway.

Most of the low stone parapets will be repaired. Parapets that are in poor condition will be removed and replaced in kind. New stone parapets will be constructed to fill in short gaps between existing parapets along the roadway and around turnouts. Additional removable guardrails designed to meet current safety and crash standards will be installed in some sections.

"Rock surgery" will also be performed along this portion of the roadway to remove protrusions above the driving lanes. The maximum amount of rock removed will be 885 cubic yards, and each excavation site will be reviewed with the goal of keeping required removal below that limit. The procedures and mitigating measures recommended for section 4 will also be carried out in this section.

None of the historic structures (West Side Tunnel, Haystack Creek Amphitheater Bridge, and Triple Arch Bridge) will be modified by proposed road work in section 5.

## **Section 6**

Logan Pass Summit (milepost 31.76) is the beginning of section 6, which ends at the St. Mary Falls trailhead (milepost 38.65). This section traverses a steep, rocky side slope overlooking the upper St. Mary River valley. It contains several historic features, including stone parapets and the stone-faced East Side Tunnel.

The pavement and roadway top widths in this section vary between 22 and 23 feet, and there are no shoulders. The pavement and foundation/stability conditions are good; drainage is fair to good. Four areas of shoulder and embankment failure need correction (milepost 33.03 to 33.07; milepost 33.10 to 33.17; milepost 33.34 to 33.37; and milepost 33.41 to 33.46). Several of the rubble-masonry paved waterways need to be repaired or replaced.

Road work will include building retaining walls to stabilize the four areas of shoulder and embankment failure, installing removable guardrails to improve safety, repairing and extending stone parapets and other stone-masonry structures, and applying periodic seal coats to prevent pavement deterioration. The roadway will not be widened beyond the existing 22 to 23 feet. About 1,000 linear feet of retaining walls ranging from 6 to 8 feet in height will be required to stabilize shoulders and embankments. Construction may be done with stone masonry, stone-masonry-faced concrete, or stone-filled gabion baskets. Several damaged rubble-masonry waterways will be repaired or replaced, and drainage gutters along the road edge will be reconstructed. No changes will be made to the historic East Side Tunnel.

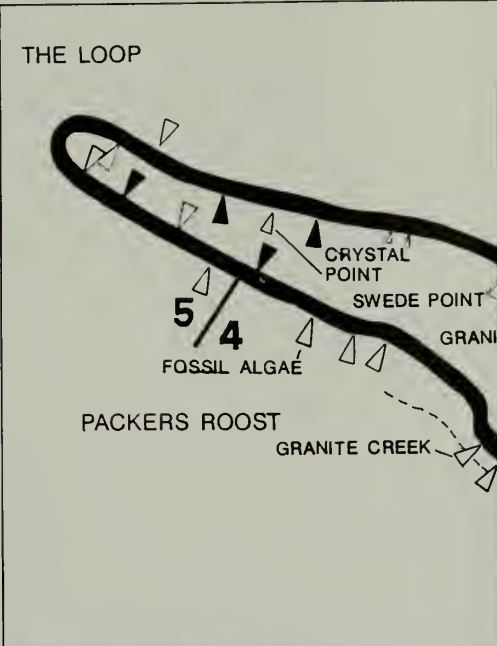
## **Section 7**

This section of road begins at the St. Mary Falls trailhead (milepost 38.65) and ends at Rising Sun (milepost 43.65). It is in a largely forested setting but offers occasional views of the distant mountains, glaciers, waterfalls, and lakes. Historic rock retaining walls, stone parapets, and the Sunrift Gorge Bridge are prominent features at the Sun Point and Sunrift Gorge areas. Trailhead parking is provided at Sun Point, Sunrift Gorge, and the Gunsight Pass overlook.

In this section the pavement width varies from 21 to 22 feet and the gravel shoulder varies from 1 to 4 feet, for a roadway top width of 23 to 28 feet. The pavement and shoulder conditions are poor, foundation/stability is fair, and drainage is good. New guardrails need to be installed, and some stone parapets need to be repaired.

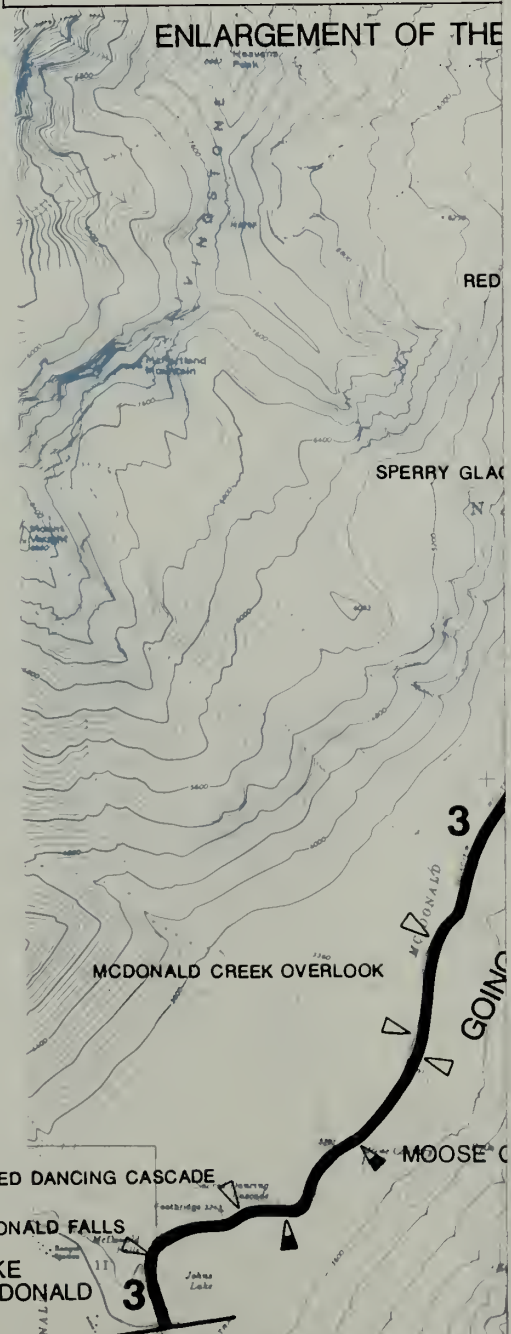
Work in section 7 will include the repair of base-failure areas and the improvement of parapets and guardrails. An overlay to maintain the existing paved surface will also be provided. Surface failure areas will be dug out and repaired, and the road will be preleveled and overlaid with bituminous plant-mix. Some stone parapets will be repaired, and some





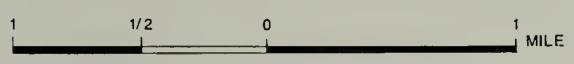
LEGEND

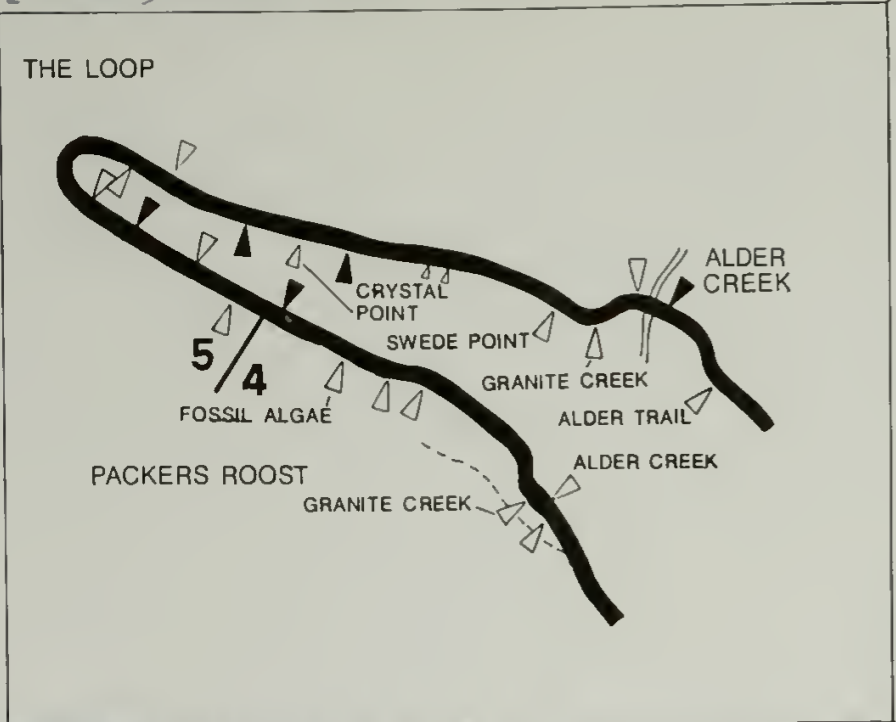
- △ EXISTING TURNOUT, RETAINED
- ▲ TURNOUT TO BE DELETED
- ◄ TURNOUT TO BE ENLARGED
- NEW TURNOUT



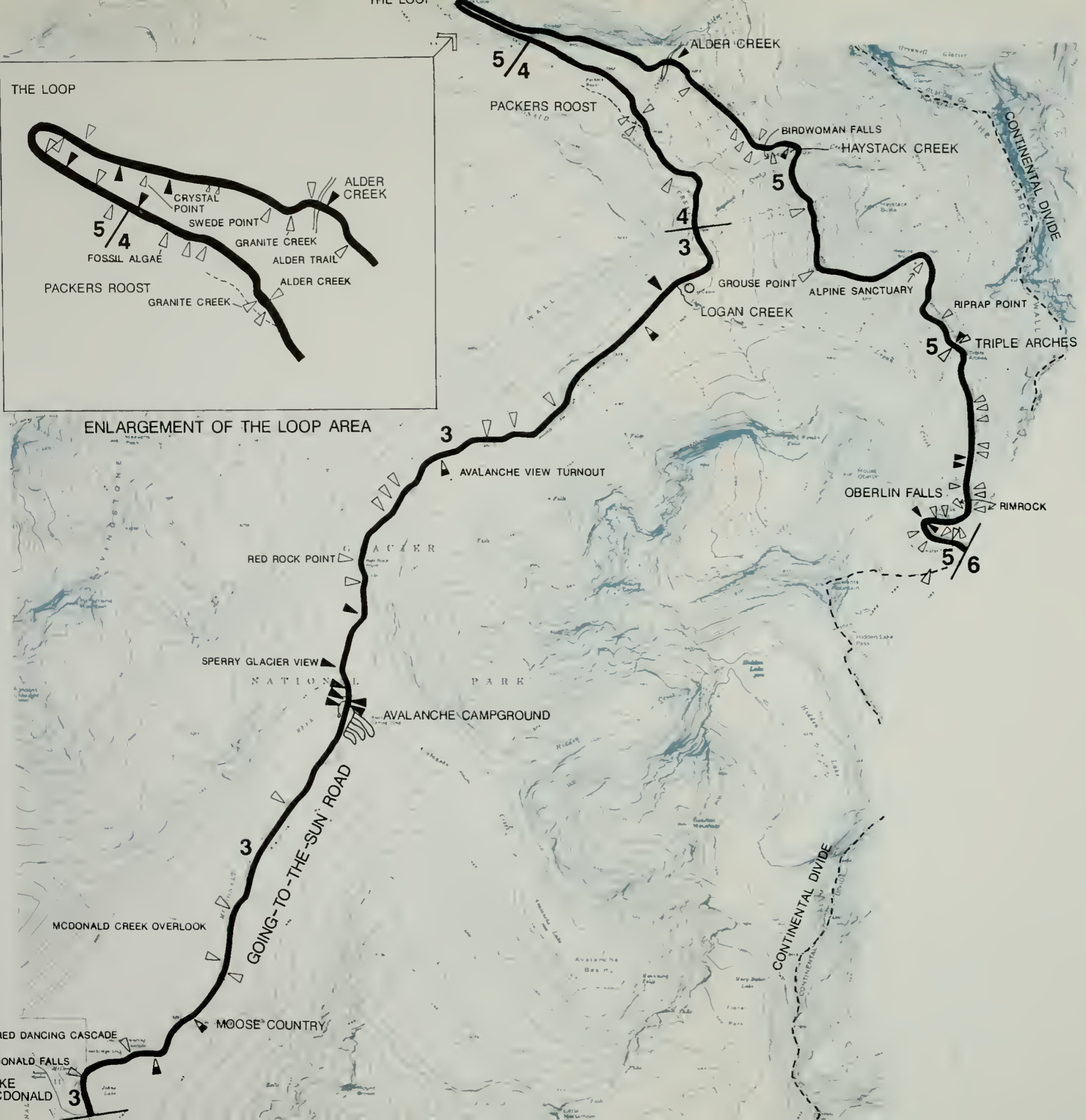
**SECTION DETAIL 3-5**  
**ROAD TURNOUT PLAN - GOING TO THE SUN ROAD**

GLACIER NATIONAL PARK MONTANA  
UNITED STATES DEPARTMENT OF THE INTERIOR/NATIONAL PARK SERVICE





ENLARGEMENT OF THE LOOP AREA



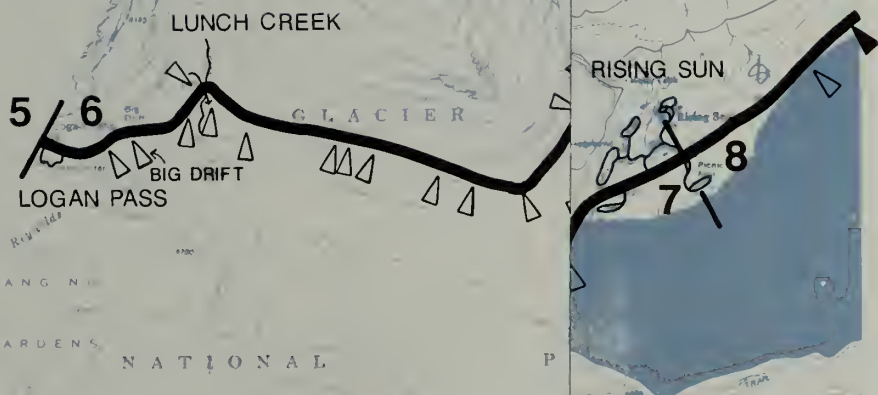
- LEGEND**
- △ EXISTING TURNOUT, RETAINED
  - ▲ TURNOUT TO BE DELETED
  - ▲ (with horizontal line) TURNOUT TO BE ENLARGED
  - NEW TURNOUT

**SECTION DETAIL 3-5**  
 ROAD TURNOUT PLAN - GOING-TO-THE-SUN ROAD  
 GLACIER NATIONAL PARK\MONTANA  
 UNITED STATES DEPARTMENT OF THE INTERIOR/NATIONAL PARK SERVICE

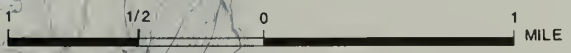
1 1/2 0 1 MILE

**LEGEND**

- △ EXISTING TURNOUT, RETAINED
- ▲ TURNOUT TO BE DELETED
- ◀ TURNOUT TO BE ENLARGED



**SECTION DETAIL 6-8**  
**ROAD TURNOUT PLAN - GOING TO THE SUN ROAD**  
**GLACIER NATIONAL PARK/MONTANA**  
UNITED STATES DEPARTMENT OF THE INTERIOR/NATIONAL PARK SERVICE





new stone parapets will be added. Selective sight-distance clearing will be done as necessary. No changes will be made to the historic Sunrift Gorge Bridge.

## **Section 8**

Section 8 begins at Rising Sun (milepost 43.65) and ends at the junction with US 89 at St. Mary (milepost 49.79). The road in this section traverses an open, relatively dry landscape along the shore of St. Mary Lake, with scenic views of the surrounding mountains. Historic structures include the St. Mary and Divide Creek bridges. The Rose Creek Bridge is also in this section.

The pavement width in section 8 averages 21 to 22 feet with 1- to 3-foot gravel shoulders and a roadway top width of 23 to 26 feet. The pavement and shoulders are in poor condition. Drainage and foundation/stability are fair to poor.

The road in this section will be preleveled, and base failures repaired. A plant-mix overlay will be applied to maintain the existing 22-foot-wide paved surface. A hydrologic study of Divide Creek is currently underway, and future bridge design will accommodate the flood flows defined in this study. The historic St. Mary River Bridge will not be altered.

## **OTHER ROAD AND TURNOUT IMPROVEMENTS**

### **Packers Roost Road**

Packers Roost Road is a 10-foot-wide graded dirt road that is in poor condition. The road is 0.6 mile long; there are no shoulders and the average operating speed is 15 miles per hour. Drainage is poor and foundation/stability is fair. The road crosses a bridge over Alder Creek.

Two alternatives are being considered for Packers Roost Road; one of these alternatives will be selected during the design phase for this project. The first alternative is to widen the 10-foot-wide, one-way road to 14 feet. This would involve resurfacing the road with crushed gravel, adding passing turnouts. The second alternative is to develop a new trailhead to the Granite Park Chalet at Packers Roost instead of the Loop. This would entail realigning a 600-foot section of Going-to-the-Sun Road; constructing a new grade intersection about 250 feet north of the present Packers Roost Road approach; clearing, grading, draining, and surfacing a new two-lane, 20-foot-wide paved road from the new approach to the present road; and providing a one-way turnaround loop at the road end. The road grade would be reduced from the existing 10 percent to 8 percent. Parallel parking would be provided along the Loop road for 25 cars or small buses.

### **Camas Road**

Camas Road is 11.66 miles long and runs from the T intersection with Going-to-the-Sun Road to the junction with County Road 486 (North Fork Flathead River Road). The roadway top width is 27 feet, with 2-foot paved shoulders. Work for Camas Road will involve the application of a bituminous plant-mix overlay, with application of bituminous seal coats about every five years.

## Sun Point Road Intersection

The two-lane Sun Point Road is 0.26 mile long and 20 feet wide, with 3-foot untreated shoulders. Drainage and foundation/stability are fair. The average operating speed on the roadway is 35 miles per hour. The intersection with Going-to-the-Sun Road is a double Y, which is causing congestion and creating traffic operation and safety problems.

The Sun Point Road intersection will be improved by converting the present Y connection to a standard T intersection, with painted left-turn channelization on Going-to-the-Sun Road. Three minor, unstable areas on the access road will be removed, and the contaminated surfacing replaced. The access road and paved parking areas will be improved by applying a bituminous plant-mix overlay, and the parking area will be modified as described in the approved *Sun Point Development Concept Plan* (NPS 1985a).

## Turnouts

There are more than 130 turnouts in the section of Going-to-the-Sun Road covered by this plan. Some have formalized parking; others are merely extensions of the existing road shoulder that have been paved to serve as slow vehicle pullovers. Most are in need of improvement. The plan recommends that 100 of these turnouts be retained with some improvements, 10 enlarged, and 19 removed. The Section Detail 3-5 and Section Detail 6-8 maps show the location and disposition of turnouts to be retained, expanded, or removed. Table 14 indicates the planned treatments for these turnouts.

**Table 14: Turnout Recommendations  
Going-to-the-Sun Road**

<b>Milepost</b>	<b>Description</b>	<b>Dimensions</b>	<b>Disposition</b>
12.10	Lake McDonald Ranger Station Road		retain
12.32L*	McDonald Falls turnout	15x675	retain
12.77L	Sacred Dancing Cascade turnout	14 sm spaces	retain
13.00R	Turnout, gravel (Mt. Brown)	14x156	enlarge
13.43R	Moose Country turnout	25x480	enlarge
13.90R	Small turnout w/view of falls	24x210	retain
14.19	McDonald Creek overlook	55x375	retain
14.35L	Small turnout w/rock wall	22x225	retain
15.28L	Camp 8 pit turnout	25x531	retain
16.08L	Avalanche Creek turnout, restrooms	19 spaces	remove
16.15R	Small turnout before bridge		remove
16.19L,R	Turnouts after bridge	small	remove two
16.22R	Small turnout, gravel	27,210	remove
16.34L	Sperry Glacier View turnout	23x165	remove
16.84L	Small turnout on curve	26x147	remove
17.07L	Turnout	15x348	retain
17.27L	Red Rocks Point turnout	54x294	retain
17.63L	Turnout	20x213	retain
17.76L	Turnout	28x228	retain
17.90L	Turnout	19x351	retain
18.33R	Avalanche View turnout w/sign	15x357	enlarge
18.69L	Turnout	17x270	retain
18.88L	Turnout on curve	24x258	retain
19.24L	Turnout	17x285	retain
19.70R	Turnout	two-car	already removed
20.22R	Turnouts for comfort stations	24x246	enlarge
20.43L	Gravel turnout	12x201	remove
20.62R	Logan Creek Bridge		add
21.73L	Turnout on curve	23x228	retain
22.11L	Tiny turnout		already removed
22.16	Packers Roost Road		retain
22.20L	Turnout	25x147	retain
22.27L	Turnout	17.96	retain
22.29R	Alder Creek turnout, gravel/paved	2-car	retain
22.33L	Granite Creek turnout	22x225	retain
22.75L	Turnout	15x87	retain
22.88L	Turnout w/rock wall	15x108	retain
23.02L	Turnout, gravel/paved	12x84	retain
23.05L	Fossil Algae Deposit turnout w/stones	very small	retain
23.13L	Turnout, gravel/paved w/stones	8x180	remove
23.26L	Widened shoulders		remove
23.34-.39	West Side Tunnel		retain
23.42L	Turnout w/wall	12x75	retain
23.60R	Rockfall area	15x153	retain
23.82R	Turnout	14x174	remove
23.92	Lower loop	2 lots	retain

\*L = left, R = right

\*\*Turnouts are paved unless otherwise indicated.

\*\*\*Feet, except where indicated

Milepost	Description	Dimensions	Disposition
23.99	Upper loop	29 small spaces	retain
24.04L	Turnout before gate	17.162	retain
24.11R	Turnout	17x231	retain
24.44R	Small turnout w/ wall	8x60	remove
24.58R	Crystal Point turnout	26x102	retain
24.78R	Series of three turnouts	1-car	remove all but lower turnout
25.08R	Turnout	10x165	retain
25.16R	Turnout, gravel/paved	8x90	retain
25.50R	Swade Point turnout w/wall	18x102	retain
25.70R	Granite Creek turnout w/wall	20x90	retain
25.85L	Little Granite Creek turnout w/wall		retain
25.99R	Alder Trail turnout, gravel/paved	18x126	retain
26.30R	Turnout, exhibit ahead sign	14x108	retain
26.37R	Turnout w/interpretive fire exhibit	25x324	retain
26.57R	Turnout w/work area sign	15x306	retain
26.67L	Road Camp turnout	30x105	retain
26.67R	Turnout, radiator water	30x165	retain
26.79R	Birdwoman Falls turnout	30x18	retain
26.93R	Turnout w/stones	15x135	enlarge
27.02R	Haystack Creek culvert		retain
27.51R	Glaciation interp turnout w/wall	24x444	retain
27.69R	Grouse Point turnout	10x345	retain
28.63-.79	Weeping Wall		
28.94R	Alpine Sanctuary turnout	30x450	retain
29.60L	Riprap Point turnout		retain
29.80	Shoulder widening w/wall	8x60	remove
29.82L	Shoulder widening		retain
29.84R	Shoulder widening		retain
30.2L	Shoulder widening		retain
30.4L	Shoulder widening		retain
30.6L	Shoulder widening	15x105	retain
30.84	Shoulder widening w/stones	15x114	retain
30.89	Shoulder widening w/stones, gravel/paved		retain
31.04R	Turnout w/wall	8x18	retain one
31.09L	Turnout, rockfall area	8x50	retain
31.12L	Turnout, gravel		retain
31.17R	Rimrock turnout, gravel/paved	small	retain
31.17L	Rimrock turnout	small	retain
31.25L,R	Oberlin Falls/Garden Wall/Lewis Range turnouts	15x270	retain
31.30	Turnout		remove
31.32L,R	Widening on curve, grave	120x300	remove
31.38R	Shoulder widening		retain
31.42R	Widening on curve, gravel		retain
31.47L	Turnout, gravel		retain
31.66R	Shoulder widening	20x680	retain
31.68L	Shoulder widening	20x420	retain
31.71	West entrance Logan Pass	162 small, 281	
31.77R	Shoulder widened between entrances	12x250	remove
31.82	East entrance Logan Pass		
32.00R	Widened shoulder w/wall		retain



Milepost	Description	Dimensions	Disposition
32.10R	Big Drift turnout	12x60	retain
32.30R	Widened shoulder w/wall	20x265	retain
32.40R	Turnout w/wall	16x156	retain
32.44R	Lunch Creek turnout	14x160	retain
32.71R	Upper tunnel turnout w/wall	17x186	retain
32.86-.94	East Side Tunnel		
33.03R	Turnout w/wall	14x126	retain
33.10R	Turnout w/wall	14x165	retain
33.21R	Turnout w/wall	24x240	retain
33.35R	Turnout w/stones	24x144	retain
33.56R	Turnout w/stones	25x156	retain
33.82R	Turnout w/stones	25x240	retain
34.25R	Turnout	18x210	retain
34.36R	Turnout	35x300	retain
34.47R	Turnout		retain
34.56	Turnout		retain
34.57	Turnout		retain
34.59R	Siyeh Bend turnout	35x200	retain
34.78R	Turnout, gravel	12x135	retain
34.97R	Turnout	29x390	retain
35.06R	Turnout	29x390	retain
35.49R	Widened shoulder	6x120	remove
35.73R	Turnout	21x234	retain
36.07R	Turnout	12x50	retain
36.39R	Jackson Glacier Overlook	28x363	retain
36.48R	Gunsight Pass trailhead	27x486	retain
37.06R	Shoulder widening, gravel		retain
37.19R	Turnout w/avalanche sign	65x477	retain
37.75R	Slow vehicle pullover	21x219	retain
37.91R	Turnout	35x213	enlarge
38.27R	Turnout	12x100	retain
38.54R	St. Mary Falls trailhead	21x372	retain
38.73R	Turnout, horse loading area	17x165	retain
38.98R	Turnout	18x306	retain
39.17L	Turnout	12x50	retain
39.19R	Turnout	15x200	enlarge
39.23	Sunrift Gorge Bridge		
39.26L,R	Turnout	35x300	enlarge both
39.33R	Turnout, gravel		enlarge
39.65	Shoulder widening	15x108	retain
39.82	Sun Point		
40.24R	Lost Lake turnout	20x300	retain
40.55R	Slow vehicle pullover	13x198	retain
40.87R	Widened curve	13x138	remove
41.24R	Turnout on curve w/wall	30x573	enlarge
41.28L	Turnout	16x261	remove
41.85R	Turnout	27x186	retain
42.03R	Turnout	21x375	delete
42.60L	Wild Goose Island turnout	27x228	retain
42.74L	Wild Goose Island turnout	20x276	retain
42.78	Wild Goose Island turnout	24x393	retain
43.04R	Turnout on curve	39x330	retain

Milepost	Description	Dimensions	Disposition
43.56	Rising Sun campground road		
43.59	Rose Creek Bridge		
44.38R	Turnout	12x123	retain
44.59R	Turnout, gravel	12x54	remove
45.25R	Turnout	14x129	remove
45.42R	Triple Divide Creek turnout	18x162	enlarge
46.32R	Turnout	21x213	retain
47.26L	Two Dogs Flats turnout	16x129	retain
47.89R	Turnout	24x231	retain
48.23R	Turnout, gravel	12x165	retain
48.45-.46	Widened shoulder, gravel	20x60	remove
48.70R	Turnout	24x288	retain
48.96R	Turnout	50x138	retain
49.00	St. Mary River Bridge		
49.26	Entrance station		
49.67	Divide Creek Bridge		

## **PUBLIC TRANSPORTATION**

To provide alternate means of access along Going-to-the-Sun Road, public transportation will be expanded. Glacier Park, Inc., the park concessioner, has the preferential right to expand its bus operations to include a park shuttle bus system for this purpose, and the Park Service will explore this possibility with GPI. If a GPI-operated system is not feasible, the Park Service will contract, through a statement of requirements, with a private company outside the park to implement a shuttle bus system in the park. The selected company will operate under a concession permit or contract on a trial basis to see that it meets NPS standards and objectives (fees, routes, number of people transported, size and type of vehicles, designated stops). A long-term contract or concession permit will be initiated within a few years if the bus system is acceptable. It is important to note although the public transit system will provide an attractive and convenient alternative for traveling and viewing sights on Going-to-the-Sun Road, private vehicles will continue to be allowed on the road now and in the future.

In its initial phase, the Going-to-the-Sun Road shuttle bus system will require six (four plus two standby) new 15-passenger buses (the buses will likely be maxi-vans modified to enhance views and include luggage racks). Two buses be fully accessible to disabled visitors, and schedules will be published announcing the departure times of the accessible buses. New buses will be compatible with historic buses. The buses will operate every two hours from 6:00 a.m. to 11:00 p.m. during the operating season. Buses will depart from West Glacier and St. Mary starting at 6:00 a.m. and 8:00 a.m. respectively and ending at 9:00 p.m. and 11:00 p.m. This service will require 12 (eight plus four standby) drivers and will provide a maximum passenger capacity of 9,120 round-trip or 18,240 one-way trip passengers for a 76-day season. Demand will probably exceed capacity during the middle of the day; however, it will be nearly impossible to achieve 100 percent occupancy for a total operating day. The early buses may not be filled and poor weather may reduce ridership. Bus fares low enough to encourage sufficient ridership will be negotiated with GPI or the private operator. Interpretation of the park's natural and cultural resources may be provided on the bus by the drivers or park interpretive staff.

The buses will stop at major trailheads and scenic areas, including Sacred Dancing Cascades, Sperry Chalet trailhead, Avalanche Creek, the Loop, Logan Pass, Siyeh Bend, Jackson Glacier overlook, St. Mary Falls, Sunrift Gorge, and Sun Point. Major developed areas visited will be West Glacier, the proposed west side visitor center, Fish Creek campground, Apgar village, the Apgar and Sprague Creek campgrounds, Lake McDonald Lodge, Logan Pass, Rising Sun, St. Mary visitor center, and St. Mary village. The largest estimated parking/staging demand will occur at West Glacier (16 spaces) and St. Mary (9 spaces), with some additional parking required at Apgar (4 spaces), the Lake McDonald Lodge area (6 spaces), and Rising Sun (5 spaces).

Annual operating costs for the initial system for a 76-day season will range from \$157,000 to \$162,500, including amortization of the buses. These costs do not include support facilities or extra service for peak hours or high use days. Anticipated support facility requirements will include four-room dormitories at St. Mary and West Glacier. The initial capital costs for these facilities will be \$326,000, and the annual operating costs will be approximately \$36,200. Minor or routine services for the buses will be obtained from existing automotive service facilities at West Glacier and St. Mary in the summer. The total annual cost of the initial bus system with the dormitory facilities will range from \$190,000 to \$200,000.

If demand warrants and the initial system proves economically feasible, the shuttle bus system will be incrementally expanded to eighteen (16 plus two standby) 15-passenger

buses. The number of accessible buses will also be increased. These buses will operate every hour from West Glacier and St. Mary between 6:00 a.m. and 11:00 p.m. during June and September; during July and August, the schedule will be increased to every 1/2 hour from 9:00 a.m. to 10:00 p.m. The buses will stop at the major trailheads listed above and at the developed areas at West Glacier, Apgar visitor center, Apgar, Apgar campground, Lake McDonald Lodge, Logan Pass, Rising Sun, St. Mary visitor center, and St. Mary. This service will require 39 (28 plus 11 standby) drivers and will be able to accommodate a maximum of 25,260 round-trip passengers or 50,520 one-way trip passengers during the 76-day operating season. Again, although demand will probably exceed capacity during peak midday hours, ridership will likely be well below 100 percent occupancy for the total operating day. Bus fares low enough to encourage sufficient ridership will be negotiated with GPI or the private operator.

If ridership demand increases to more than 25,000 round-trip passengers per season, additional buses or more frequent service may be provided. If demand increases to more than 30,000 to 35,000 passengers per season, 25-passenger vehicles will probably be more cost-effective than 15-passenger vehicles.

Based on demand and visitor circulation patterns, a route from St. Mary to Many Glacier may also be included in the shuttle bus operation. If established, this route will include four (three plus one standby) 15-passenger buses operating every hour from 8:00 a.m. to 8:30 p.m. for the 76-day season and stopping at St. Mary visitor center, St. Mary village, Appekuny trailhead, Swiftcurrent picnic area, Swiftcurrent Motel, and Many Glacier Motel. This service will require nine drivers (six plus three standby) and will accommodate a maximum of 14,280 round-trip passengers or 28,560 one-way trip passengers during the season.

Increased parking demands will result with the establishment of an 18-bus operation on Going-to-the-Sun Road and a shuttle route between St. Mary and Many Glacier. The largest demands will occur at West Glacier and St. Mary, and some additional parking will be required at Apgar, the Lake McDonald Lodge area, and Rising Sun. The estimated demands are shown in table 15.

**Table 15: Parking Demands – Visitor Transportation System**

<b>Location</b>	<b>Initial System</b>	<b>Expanded System</b>
West Glacier	16 spaces	74 spaces
Apgar Village	4 spaces	15 spaces
Lake McDonald Lodge	6 spaces	23 spaces
Rising Sun	5 spaces	23 spaces
St. Mary	9 spaces	66 spaces
Many Glacier	0 spaces	35 spaces

If GPI operates the bus system, additional employee housing will be required at Lake McDonald Lodge and Rising Sun. In addition, a new bus maintenance area will need to be constructed at St. Mary or West Glacier.

Annual operating costs for the expanded system will range from \$565,000 to \$590,000, including the amortization of vehicles. Support facilities will include dormitories at St. Mary

and West Glacier and a maintenance facility at St. Mary or West Glacier. The initial capital costs for these facilities are estimated to range from \$2,000,000 to \$2,200,000, and the annual costs from \$230,000 to \$250,000 per year.

Even if the bus system grows beyond the levels described in the expanded public transit system, the size and number of support facilities within the park will not exceed those described above. If additional parking or other facilities are needed, they will be built outside the park.

In addition to expanding public transit within the park, the Park Service will seek commercial use licenses or operating authority from the state and Interstate Commerce Commission for one or two private firms outside the park to operate a regional public transit system that services the park. This external system will be closely coordinated with the park shuttle bus system and GPI's existing bus operations to ensure maximum service to park visitors. It is expected that the existing concessioner red buses will continue to be used for transporting guests between lodges and for scenic tours.

## **TRAFFIC MANAGEMENT**

The following three actions will be implemented as soon as possible to help reduce the number of private vehicles on Going-to-the-Sun Road during peak periods:

Advise park visitors of the congestion problems on Going-to-the-Sun Road and the optimal times to traverse Logan Pass. Information pamphlets, road signs, education and interpretive programs, and private sector advertisements can all be used to inform people about the traffic situation. The peak congestion period for Logan Pass (10:00 a.m. to 4:00 p.m.) can be publicized in the local news media and in brochures by the bureaus of state tourism and local chambers of commerce. This will allow visitors to plan their trips to avoid congested periods.

Encourage visitors to make loop trips through and around the eastern and southern portions of the park on Going-to-the-Sun Road, US 89, State Route 49, and US 2. Such trips can be promoted at the entrance stations, visitor centers, and amphitheaters and in brochures. Loop trips will be even more attractive if pullouts are added that include wayside exhibits interpreting the Blackfeet Indian Reservation and the ecology and geology of the area. This effort will require close coordination with the Blackfeet Tribe, the Federal Highway Administration, and the Montana Department of Transportation regarding road maintenance and law enforcement.

Actively promote travel to the park by a regional public transportation system. Park staff will have to coordinate closely with the management staffs of local businesses transporting people to the park (regional bus systems such as Intermountain Transportation Company, Brown Lines, Inc.), airlines such as Delta that fly into Kalispell and Great Falls, and Amtrak to advertise and promote relatively inexpensive package tours to the park. The bureaus of state tourism, local chambers of commerce, and local media can be encouraged to assist in this promotion.

To better manage traffic on Going-to-the-Sun Road, a 20-foot vehicle length restriction will be imposed for Logan Pass during peak use periods on summer days. Automobiles, most pickup trucks with campers, small recreational vehicles, and vans will be able to cross the pass without restriction, but midsized and larger recreational vehicles, motor homes, and the largest pickup/campers will not be allowed. Visitors will be notified of this restriction through the news media and bureaus of state tourism before they arrive at the park as well

as at park entrance stations. Larger vehicles will be measured at the entrance stations. Visitors in longer than 20-foot vehicles will be offered the option of detouring south to reach facilities and roads on the east side of the park or of using public transit to visit features on the Going-to-the-Sun Road. Random vehicle-length checks will be conducted by park rangers in the lower sections of the restricted zone between 10:00 a.m. and 4:00 p.m. on weekends and holidays. If congested conditions continue to occur on Logan Pass, an all-day vehicle-length restriction will be implemented for the peak months of the summer.

In addition to vehicle length restrictions, as traffic increases the number of vehicles driving over Logan Pass will be limited between 10 a.m. and 4:00 p.m. on high use summer days; if congested conditions continue, use will be limited throughout the summer. The park staff will monitor traffic for breakdowns (stop-and-go traffic with unacceptable delays, increased adverse effects on natural resources from overuse, and serious increases in accident rates on the pass. When traffic breakdowns occur on a regular basis, the volume of traffic in both directions will be noted. When the hourly volume approaches the breakdown value (level of service F), the staff at Logan Pass will notify park personnel at two checkpoints to initiate a traffic-volume control process. The checkpoints will be at Lake McDonald Lodge on the west and Rising Sun on the east. As one vehicle leaves the Lake McDonald checkpoint traveling west, an eastbound vehicle will be permitted to enter from Lake McDonald toward the pass; similarly, as one vehicle leaves the Rising Sun checkpoint traveling east, a westbound vehicle will be permitted to enter toward the pass. This traffic metering method will allow one vehicle per designated period to enter the pass (for example, one vehicle per 10 seconds from each checkpoint). Metering can be done by a staff person at each site. Traffic metering will be initiated when breakdown volumes are approached, based on the capacity of the roadway west of Logan Pass where the worst congestion occurs. The highest peak hour volume recorded to date along this road section has been 460 vehicles per hour, with the roadway operating at level of service E. It is estimated that the capacity of this section (level of service F) is 685 vehicles per hour. When hourly volumes reach 550 to 600 vehicles per hour, the vehicle length restrictions should be operational. If hourly volumes continue to increase, the number of vehicles driving over Logan Pass should be limited through traffic metering.

A traffic management plan will be prepared to detail these traffic management methods and times for implementation.

**Road Improvements**

Rehabilitate road

Decrease road width in sections 3 and 4; retain existing road width in other sections

Correct drainage problems

Repair parapets

If feasible, construct new single-span bridge of similar appearance to historic bridge over Divide Creek

Remove rock protrusions in sections 4 and 5

Implement turnout plan

**Public Transportation**

**Initial System**

Provide transit service every 2 hours from 6 a.m. to 11 p.m. System capacity would be 9,120 round-trip passengers.

**Expanded System**

Provide transit service every hour from 6 a.m. to 11 p.m. in June/ September. Increase in July/August to every half hour between 9 a.m. and 10 p.m. System capacity would be 25,260 round-trip passengers.

Provide transportation service from St. Mary to Many Glacier every hour from 8:00 a.m. to 8:30 p.m. System capacity would be 14,820 passengers.

\$157,000-162,500

\$460,000-480,000

Annual operating costs (initial bus cost included)

\$105,000-110,000

Initial cost of support facilities

\$2,000,000-2,200,000

Annual cost for support facilities

\$36,200

\$230,000-250,000 (includes St. Mary to Many Glacier)

**Summary of Actions**

**Traffic Management**

- Inform visitors of congestion problems
- Encourage south and east loop trip
- Promote travel to park by public transportation system
- Continue existing management restrictions on vehicle size and length
- Limit vehicles over Logan Pass
- Impose 20-foot length restriction during peak times on high-use days



## PHASING SCHEDULE

Actions to rehabilitate roads and implement public transit and traffic management measures will be implemented in three or possibly more phases depending on funding. Specific time frames have not been set because implementation is contingent on congressional appropriations and park visitation levels. Turnout improvements will be completed in conjunction with the phased work on Going-to-the-Sun Road. Packers Roost and Sun Point roads will be included in the work for their respective sections.

### Phase 1

**Going-to-the-Sun Road Modifications.** Some road construction projects have already been programmed and are underway or completed: reconstruction of section 2 (previously described), stabilization of the masonry wall at the Loop, repair of Rose Creek Bridge abutments, and emergency repair of road failure near Triple Arches.

A phasing schedule has been developed for road construction to correct the most immediate needs. The following actions will be taken in phase 1:

- Repair section 8, Rising Sun to St. Mary, Going-to-the-Sun Road.

- Resurface and/or reconstruct sections of Camas Road.

- Repair or replace rock wall and any associated failing embankments, entire Going-to-the-Sun Road.

- Improve shoulders and resurface section 4, Going-to-the-Sun Road.

- Complete rock scaling, sections 4 and 5, Going-to-the-Sun Road.

Contractors will be required to operate only in late summer when roads were dry to avoid damaging the road.

**Public Transportation.** The initial public transit system schedule will be every two hours on Going-to-the-Sun Road.

**Traffic Management.** Visitors will be advised of congestion problems on Going-to-the-Sun Road and optional times for traversing Logan Pass. They will also be encouraged to make loop trips through and around the eastern and southern portions of the park on Going-to-the-Sun Road, US 89, State Route 49, and US 2. Travel to the park by regional public transportation will be promoted.

### Phase 2

#### Going-to-the-Sun Road Modifications

- Repair other failing roadway embankments in sections 4 and 6.

- Correct drainage and resurface section 5.

- Reconstruct and resurface section 7.

The same restrictions will be placed on contract operations to avoid damaging the road.

**Public Transportation.** Same as phase 1.

**Traffic Management.** The traffic management actions implemented in phase 1 will continue, and the 20-foot vehicle length restriction will be imposed on vehicles traveling over Logan Pass during peak use periods.

### **Phase 3**

**Going-to-the-Sun Road Modifications.** Section 3 will be reconstructed and resurfaced.

**Public Transportation.** If the transit system is successful, the GPI and/or contracted commercial operation will be further expanded to every half-hour between 9:00 a.m. and 10:00 p.m. and every hour between 6:00 a.m. and 9:00 a.m. and 10:00 p.m. and 11:00 p.m. Service from St. Mary village to Many Glacier will be provided every hour between 8:00 a.m. and 8:30 p.m. If the transit system does not prove successful, one-hour operation will be continue.

**Traffic Management.** Steps will be taken as necessary to limit the number of vehicles traveling over Logan Pass during peak periods.

### **MITIGATING MEASURES TO BE IMPLEMENTED DURING CONSTRUCTION**

Actions to minimize potential construction-related disturbance of bald eagles will include hiring a minimum of two seasonal biologists to monitor bald eagle activity in segments of the Going-to-the-Sun Road where there is documented bald eagle activity and determining when construction should not occur there. Monitoring will be conducted for a period of one year before road rehabilitation and will continue until one year after project completion. Disruptive construction activities will not be allowed during those time when eagles are sensitive to disturbance, primarily the critical nesting period. These stipulations will be included in construction contracts.

If any peregrine falcon nests are discovered in the project area during the ongoing nesting survey, the "no effect" determination will be reevaluated and the U.S. Fish and Wildlife Service will be consulted. The discovery of a nest or nests will require construction restrictions in the nest area(s) during the critical nesting period, generally from mid-March to as late as mid-July. Restrictions could result in project delays.

To avoid direct impacts on gray wolves, sustained heavy equipment use and demolition will not be permitted within a 5-mile radius of wolf dens. Additionally, human activity will be restricted for a 1-mile radius around wolf dens from April 1 to July 1. These restrictions will be implemented only if there is a wolf den in the vicinity of the proposed construction. Avoiding impacts and disturbance to ungulates during key times will also eliminate indirect effect on wolves. Construction will be restricted in or near ungulate winter ranges from December 1 to May 15 to avoid indirect impacts on wolves.

Grizzly bears are commonly seen along park road corridors including Going-to-the-Sun, Camas, Packers Roost, and Sun Point roads. Road rehabilitation crews will be instructed in "bear country sanitation" to reduce the potential for attracting bears to construction areas. Additionally, a stipulation will be added to construction contracts that roadwork will be limited during the denning period and near denning sites.

If new information becomes available, new species are listed as endangered or threatened, or a change occurs in the rehabilitation operations described in the "Biological Assessment" or the *Draft Transportation Plan/Environmental Assessment*, formal section 7 consultation will be repeated.

Borrow, aggregate base, and asphalt paving materials for road construction and rehabilitation will come from sources outside the park. Some existing borrow pits and maintenance areas within the park will be used as staging areas for construction activities. Construction staging areas will probably be at Logan Creek and Sun Point; material may also be stockpiled at the Moose Country pit, and there may be limited use of the Logan Pass area. These sites will be rehabilitated after road work is complete. Lake McDonald, St. Mary Lake, and streams where there will be no adverse effect on park resources will be the only allowable sources of water for construction. Screens will be placed over the openings of hoses used to withdraw water from the lakes for soil compaction and hydroseeding to prevent large and small aquatic organisms from being sucked into the hoses. The screens will also help reduce hose clogging.

The contractor will be required to remove all timber 6 inches or greater in diameter at breast height. Small trees and slash will only be burned at the Moose Country pit (or another designated area), and all applicable state controls will be followed. Most waste materials will be deposited outside the park; appropriate waste materials such as rock and soil can be used as fill in rehabilitating old quarry sites like the one at Moose Country. Restrictions will be set on the length of time allowed for construction delays based on the time of day. There will be no work after dark near developed areas and campgrounds.

A park staff member will be on-site during construction to monitor all ground-disturbing activities, such as stockpiling of plants and topsoil, slope stabilization, and culvert installation, to ensure that activities meet park standards and prevent unnecessary impacts. Construction activities will be confined to the smallest area possible to eliminate unnecessary impacts. Within the clearing limits, trees will be removed selectively near the perimeter to save larger trees and create a more natural-appearing edge. Construction areas will be clearly delineated, and the contractor will work within those limits.

In cases where construction occurs in stream and river corridors (for example, replacing culverts), procedures will be taken to limit the amount of slumping and erosion of material into the waterway. Flowing side streams will be temporarily routed past the construction area through bypass culverts and returned to their channels downstream. Park staff will designate when such activity will be carried out, depending on stream flows, fish spawning activities, and weather predictions. Any turbid water resulting from construction activities will be collected and pumped to a location where sediment can settle. Culverts that may be used by fish will be designed to allow fish passage.

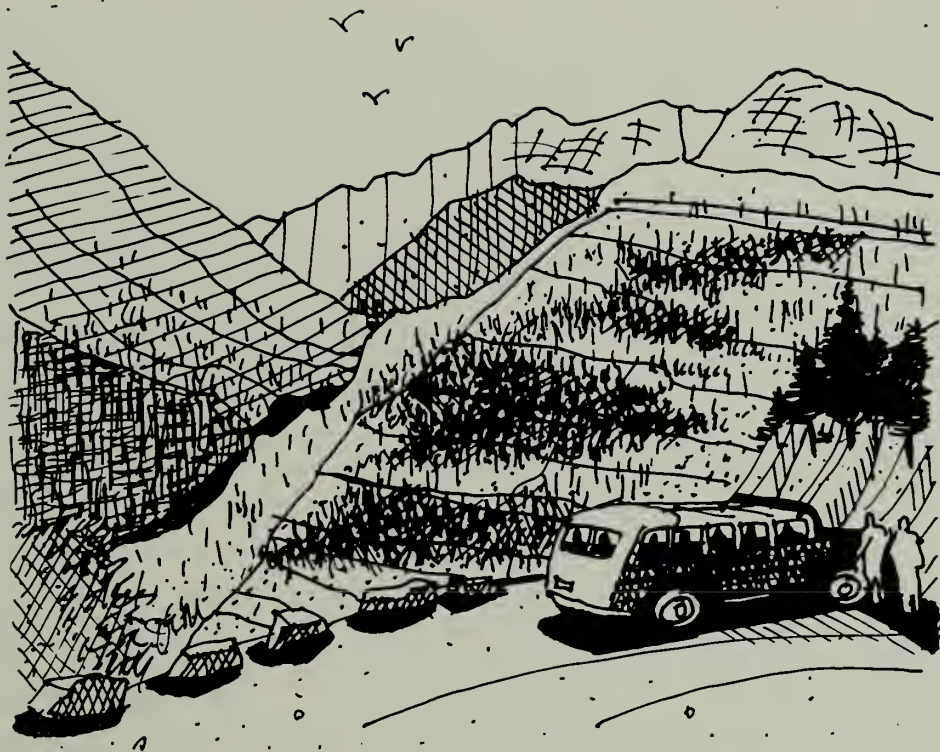
Soil erosion will be minimized by revegetating with native species, using jute matting or a similar material to hold the slope until vegetation becomes established, and making ditches that follow the contour of the slope to redistribute the downward flow to water horizontally. Silt fences will be used along gentle fill slopes to hold soils while allowing water to percolate through.

A vegetation plan similar to the one being developed for the Lake McDonald road section (section 3) will be prepared by the park design team for the remainder of the roadway. The plan will identify and prescribe revegetation treatments for each identified vegetation cover type. Extensive revegetation will be undertaken in disturbed areas. Areas of high erosion potential, including slope cuts, downslope fills, turnouts, and other sites with major soil disturbance, will be given the highest priority. Additional topsoil will be brought in from

outside the park as needed and spread over soil surfaces in preparation for revegetation. High erosion areas will be hydroseeded using annual grasses to stabilize soils, minimize erosion, and reduce the establishment of exotic species. Native vegetation communities will be restored wherever possible. Where the community cannot be fully restored, the goal will be to restore enough of the community to give the area a natural appearance. Only plants indigenous to the park that are produced under agreement with the Soil Conservation Service Plant Materials Center or other applicable contractors will be used, except in cases where sterile nonnatives are planted to produce vegetation cover quickly and to create stubble mulch to aid native plants in becoming established. Construction vehicles will be hosed down before entering the park to limit the potential for spread of exotic plant species.

Numerous historic culvert headwalls along the Going-to-the-Sun Road will need to be replaced. Stone headwalls that are visible from the road or visitor use areas or that are determined to be architecturally significant will be documented, dismantled, and later reassembled over the new culvert pipes. Other headwalls will be documented, dismantled, and the stone salvaged for reuse in other stone structures in the park. Log guardrails or stone parapets will be constructed where retaining walls are placed on fill slopes. These measures will help maintain the historic character of the road.

An NPS archeologist will be available during construction to evaluate any archeological material that may be discovered during the construction process. Work will be done in conformance with the CRP, as amended.





## CONSULTATION/COORDINATION

### SUMMARY OF PUBLIC INVOLVEMENT ON THE *DRAFT TRANSPORTATION PLAN/ENVIRONMENTAL ASSESSMENT*

The following public involvement was carried out during August and September of 1989.

**Document Mailing and Announcement** – The complete *Draft Transportation Plan/Environment Assessment* was mailed to approximately 100 agencies and groups, and a summary document was mailed to about 800 individuals who had requested to be included in the planning effort. The availability of the plan/assessment was advertised in the media, and comments were accepted during a 30-day review period that extended from August 15 to September 15. Ninety-six cards and letters were received from the public in response to the document.

**Questionnaire Mailing** – A questionnaire was developed to get more information on the Going-to-the-Sun Road visitor experience. This questionnaire was included in the plan/assessments and summary documents that were mailed out. A total of 1,900 questionnaires were made available to visitors in park lodges and visitors centers during August.

**Public Meetings** – Three public meetings were held during the first week of September in the towns of East Glacier, Kalispell, and West Glacier, Montana. Sixty-one people attended these meetings.

### AGENCIES AND ORGANIZATIONS CONTACTED

The following agencies and organizations were contacted over the course of this study:

#### Federal Agencies

Advisory Council on Historic Preservation  
Department of Agriculture  
    Forest Service  
Department of Interior  
    Bureau of Indian Affairs  
    Bureau of Land Management  
    Fish and Wildlife Service  
Department of Transportation  
    Federal Highway Administration  
Environmental Protection Agency

#### International Agencies

Province of British Columbia  
Province of Alberta  
Canadian Parks Service

## **State, Local, and Other Agencies**

Blackfeet Tribal Council  
County Road Departments  
Flathead County Commissioners  
Flathead River Basin Environmental Impact Study  
Flathead Tribal Council  
Kalispell Chamber of Commerce  
Montana Department of Fish, Wildlife, and Parks  
Montana Department of Health and Environmental Sciences  
Montana Department of Highways  
Montana Department of Natural Resources and Conservation  
Montana Planning Commission  
Montana Public Service Commission  
Montana State Historic Preservation Officer  
Montana Tourism Bureau  
Whitefish Chamber of Commerce

## **Other**

Belton Chalets, Inc.  
Coalition for Canyon Coalition  
Environmental Information Center  
Environmental Law Society  
Flathead Coalition  
Flathead Wildlife  
Glacier National Park Foundation  
Glacier National History Association  
Glacier Park, Inc.  
Glacier Park Boat Co.  
Montana Wilderness Association (Flathead Chapter)  
Montana Wildlife Federation  
National Parks and Conservation Association  
Rocky Mountain Outfitters  
The Sierra Club (Montana Chapter)  
The Wilderness Society  
Wildlife Society Montana Chapter  
Waterton Shoreline Cruises







## APPENDIX: FINDING OF NO SIGNIFICANT IMPACT

The transportation plan for the Going-to-the-Sun Road area provides strategies for dealing with identified traffic and transportation problems through phased road rehabilitation, implementation of a public transit system, and a number of traffic management actions. The plan also proposes treatments for Packers Roost and Camas roads, the Sun Point Road intersection, and the 130 turnouts on Going-to-the-Sun Road. The *Draft Transportation Plan/Environmental Assessment* that analyzes alternatives for these areas was released to the public in August 1989. The preferred alternative identified in that document is summarized below.

### PROPOSAL

Rehabilitation work for the Going-to-the-Sun Road will include critical stabilization, repair, repaving, and improvement projects. No road widening or realignment will be involved. Stone walls will be treated as prescribed in the draft 1989 "Cultural Resource Plan, Going-to-the-Sun Road." Walls in some sections of the road will be repaired and their historic appearance maintained. In other areas, new walls will be built to meet safety standards; these walls will be designed to blend with the historic features. Culverts will also be repaired, replaced, or installed to reduce safety hazards. Rock protrusions will be removed in sections where they contribute to hazards in the travel corridor. Along with road improvement work, an expanded public transit system will be established to encourage alternate means of travel on the road. Shuttle bus service would depart every two hours from West Glacier and St. Mary and would provide service to all major facilities, trailheads, and scenic areas along Going-to-the-Sun Road. Traffic management actions will be implemented as necessary to reduce congestion during peak periods (informational pamphlets, signs, radio broadcasts, interpretive programs, promoting loop drives through the park, promoting use of the regional public transportation system, limiting the number of vehicles on Logan Pass, and imposing vehicle-length restrictions on the pass). To promote the safety of bicyclists, bicycle use will be prohibited on Going-to-the-Sun Road from 10 a.m. to 5 p.m. during the peak season. Bicycle use will be encouraged during the shoulder seasons. Because there is a lack of accurate data on the existing volume and distribution of bicycle use in the park, a systematic and comprehensive analysis of bicycle use will be conducted and a bicycle management plan will be developed.

### ALTERNATIVES CONSIDERED

Four alternatives, including no-action and preferred alternatives, were developed. Under the no-action alternative present management and travel and use patterns would continue, and no road rehabilitation except for routine maintenance, vista clearing, and repairs necessary to reduce safety hazards would be undertaken. Bus service would not be expanded beyond present levels, and no additional traffic management actions would be implemented. Alternative A is the National Park Service preferred alternative, described above. Under alternative B, Going-to-the-Sun Road would be widened to 24 feet with 1-foot turf shoulders where possible. Rock protrusions above the driving lanes would be removed in sections 4 and 5. Shuttle bus service would be instituted every four hours during the peak season, and parking would be provided. Traffic management options would be implemented as necessary, except that vehicle-length restrictions would not be

imposed. Alternative C would involve the same actions for Going-to-the-Sun Road as alternative B, except that section 8 would also be widened to 24 feet with 1-foot turf shoulders. Under this alternative the proposed shuttle bus service would operate every hour during June and September and every half-hour during July and August, and hourly service from St. Mary to Many Glacier would also be established. Parking and support facilities would be developed. All of the traffic management options described in alternative A would be implemented as necessary to reduce traffic congestion during peak hours.

## **PUBLIC INVOLVEMENT**

The environmental assessment was made available for public review and comment during a 30-day period ending September 15, 1989. Public involvement consisted of distributing the planning documents to an extensive mailing list, conducting three public review sessions in local communities, distributing a visitor questionnaire, and advertising the plan's availability in the local news media. There were 96 cards and letters and 850 questionnaire forms received, and 61 persons attended public meetings. Most respondents favored the preferred alternative, although some took exception to some elements of the proposal. Those who disagreed with the preferred alternative usually cited adverse impact to cultural resources.

## **CONCLUSION**

The proposal does not constitute an action that normally requires preparation of an environmental impact statement (EIS). The proposal will not have a significant effect on the human environment. Negative environmental impacts that could occur are minor and temporary in effect. There are no unmitigated adverse impacts on public health, public safety, threatened or endangered species, sites or districts listed in or eligible for listing in the National Register of Historic Places, or other unique characteristics of the region. No highly uncertain or controversial impacts, unique or unknown risks, cumulative effects, or elements of precedence were identified. Implementation of the action will not violate any federal, state, or local law.

Based on the foregoing, it has been determined that an EIS is not required for this project and thus will not be prepared.

Approved:

Lorraine Misty Meyer  
Regional Director, Rocky Mountain Region

6-20-90  
Date

## REFERENCES

### FEDERAL HIGHWAY ADMINISTRATION, DEPARTMENT OF TRANSPORTATION

- 1983 *Road Inventory and Needs Study for Glacier National Park*. Denver, CO.
- 1984 *Road Rehabilitation Planning Study, Glacier National Park*. Western Direct Federal Division. Vancouver, WA.

### FISH AND WILDLIFE SERVICE, DEPARTMENT OF INTERIOR

- 1981 *Fishery Investigations, Glacier National Park, 1980 Progress Document*. Northwest Montana Fishery Center. Kalispell, MT.

### HOUK, ROSE, PAT O'HARA, AND DANNY ON

- 1984 *The Story of the Highway Across Glacier, Going-to-the-Sun*. Woodlands Press, Del Mar, CA.

### MONTANA DEPARTMENT OF HIGHWAYS AND FEDERAL HIGHWAY ADMINISTRATION

- 1982 *Final Environmental Impact Statement/Forest Plan, Highway 2, Hungry Horse to West Glacier*. In cooperation with U.S. Forest Service, National Park Service, and U.S. Fish and Wildlife Service. Vancouver, WA.

### NATIONAL PARK SERVICE, U.S. DEPARTMENT OF THE INTERIOR

- 1965 "Archeological Reconnaissance, Vicinity of West Glacier and Glacier National Park, Montana, 1963" by Carling Malouf. Unpublished manuscript on file. Midwest Archeological Center. Lincoln, NB.
- 1974 Letter from F.A. Calabrese to J L. Budwig, Office of Federal Highway Projects, Federal Highway Administration, November 14. On file at Midwest Archeological Center, Lincoln, NB.
- 1976 "Archeological Survey, Glacier National Park, 1976," by Anthony Zalucha and Alan Thompson. On file at Midwest Archeological Center, Lincoln, NB.
- 1977a *Final Environmental Statement, Master Plan, Glacier National Park*. Denver Service Center. Denver, CO.
- 1977b *Final Master Plan, Glacier National Park*. Denver Service Center, Denver, CO.
- 1977c "Pre-Construction Archeological Investigations in Glacier National Park," by Mark Stiger. On file at Midwest Archeological Center, Lincoln, NB.
- 1978 "Cultural Resource Inventory of Specified Areas within Glacier National Park, Montana," by Mark Guthrie. On file at Midwest Archeological Center, Lincoln, NB.
- 1980 *Interpretive Prospectus, Glacier National Park*. Glacier National Park. West Glacier, MT.
- 1982a *Development Concept Plan, Apgar/Headquarters Area, Glacier National Park*. Denver Service Center. Denver, CO.
- 1982b "Nomination Form, National Register of Historic Places. Multiple Resource Submission for Historically and Architecturally Significant Resources in Glacier National Park." Unpublished.

- 1983 "Floodplain Analysis of Lake McDonald and St. Mary Development Concept Plan Areas at Glacier National Park." Denver Service Center. Denver, CO.
- 1984a *Bear Management Plan, Glacier National Park.* Glacier National Park. West Glacier, MT.
- 1984b *NPS Park Road Standards.* Washington Office. Washington, D.C.
- 1984c *Resource Management Plan, Glacier National Park.* Glacier National Park. West Glacier, MT.
- 1984d "The Going-to-the-Sun Road" by Dennis Holden. Glacier National Park. West Glacier, MT.
- 1985a *Environmental Assessment, Development Concept Plans, Lake McDonald, Sun Point/Rising Sun/St. Mary, Many Glacier/Swiftcurrent, Glacier National Park.* Denver Service Center. Denver, CO.
- 1985b *Environmental Assessment, Glacier National Park, Road Improvements, Going-to-the-Sun Road.* Denver Service Center. Denver, CO.
- 1985c *Statement for Management, Glacier National Park.* Glacier National Park. West Glacier, MT.
- 1986 *Development Concept Plan, Lake McDonald, Sun Point/Rising Sun/St. Mary, Many Glacier/Swiftcurrent, Glacier National Park.* Denver Service Center. Denver, CO.
- 1989 *Draft Cultural Resource Plan, Going-to-the-Sun Road.* Glacier National Park. West Glacier, MT.
- 1990 "Biological Assessment for the Transportation Plan/Environmental Assessment, Glacier National Park." Denver Service Center. Denver, CO.

ROBERT PECCIA AND ASSOCIATES

- 1985 *Traffic Engineering Safety Improvements Study, Grand Teton National Park.* Prepared for the National Park Service. Helena, MT.

THE TRANSPRO GROUP, INC.

- 1984 *Visitor Use Survey Results for Glacier National Park Montana.* Bellevue, Washington.

TRANSPORTATION RESEARCH BOARD, NATIONAL RESEARCH COUNCIL

- 1985 *Highway Capacity Manual.* Special Report 209.

## PLANNING TEAM

### Denver Service Center

\*Mary M. Magee, Team Captain/Natural Resource Specialist  
John T. Austin, Economist  
Berle Clemensen, Cultural Resource Specialist  
David Fritz, Cultural Resource Specialist  
David Kenney, Natural Resource Specialist  
Roberta V. Mc Dougall, Interpretive Planner  
R. Michael Madell, Sociologist  
\*Maurice Miller, Transportation Planner  
John Murphy, Landscape Architect  
\*Howie Thompson, Former Team Captain/Natural Resource Specialist  
\*Christine L. Turk, Former Team Captain/Natural Resource Specialist  
Sandy Vana-Miller, Natural Resource Specialist  
Rosellen I. Westerhoff, Planning Technician

### Rocky Mountain Region

W. Wayne Gardner, Former Regional Coordinator, Landscape Architect  
Christine L. Turk, Regional Coordinator, Supv. Environmental Protection Specialist

### Glacier National Park

Gil Lusk, Superintendent  
\*Robert Dunkley, Park Landscape Architect

### Federal Highway Administration

Dan O'Brien, Project Planning Engineer

## CONSULTANTS

### Denver Service Center

John Dolan, Highway Engineer

### Rocky Mountain Region

Staff, Division of Cultural Resources

### Glacier National Park

Robert Burns, Visitor Protection Specialist  
Joe Decker, Interpreter  
Keith Fellbaum, Former Chief of Maintenance  
Bruce Fladmark, Cultural Resource Specialist  
Gary Gregory, Resource Management Specialist  
Clyde Lockwood, Former Chief Naturalist  
Gerry Nelson, Communications Supervisor  
Jack Potter, Chief of Trail Maintenance  
Ellen Seeley, Former Hudson Bay District Ranger  
Charles Sigler, Management Assistant

\*Primary Contributor



As the nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural and cultural resources. This includes fostering wise use of our land and water resources, protecting our fish and wildlife, 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. The department also promotes the goals of the Take Pride in America campaign by encouraging stewardship and citizen responsibility for the public lands and promoting 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.

Publication services were provided by the graphics and editorial staffs of the Denver Service Center.  
NPS D-149A July 1990





