US Highway 89 Browning to Hudson Bay Divide

Final Environmental Impact Statement and Section 4(f) Evaluation

Montana Department of Transportation

and

U.S. Department of Transportation
Federal Highway Administration

January 2007

Note:
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US Highway 89: Browning to Hudson Bay Divide

STPP 58-1(19)0~Control Number 4045 (Browning to Kiowa)
Reference Post 0 to Reference Post 12
and
STPP 58-1(19)0~Control Number 4047 (Kiowa to Hudson Bay Divide)
Reference Post 12 to Reference Post 25.5
in
Glacier County, Montana

FINAL ENVIRONMENTAL IMPACT STATEMENT AND SECTION 4(F) EVALUATION

Submitted pursuant to 42 United States Code 4332 (2)(c);
49 United States Code 303; Section 2-3-104 and 75-1-201 Montana Code Annotated;
and Executive Orders 11990, 11988, and 12898

MONTANA DEPARTMENT OF TRANSPORTATION
AND
U.S. DEPARTMENT OF TRANSPORTATION, FEDERAL HIGHWAY ADMINISTRATION

Cooperating Agencies
U.S. Army Corps of Engineers
Bureau of Indian Affairs
U.S. Fish and Wildlife Service

Resource Agencies
Montana Fish, Wildlife, and Parks
U.S. Environmental Protection Agency
Blackfeet Nation

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Montana Department of Transportation

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ABSTRACT: The proposed action is the improvement of a 41-kilometer (25.5-mile) segment of US Highway 89 (US 89) from its junction with US Highway 2 to the Hudson Bay Divide south of Saint Mary in Glacier County. The improvements are proposed to provide a facility that meets current design standards in order to enhance the safety and operation of the facility. A no-build alternative (Alternative A), and two widening alternatives are analyzed for the project: Alternative B with a 9.8-meter (32-foot) cross-section and Alternative C with a cross-section of 11 meters (36 feet). This document also analyzes the Duck Lake Road Option, which consists of improvements in three areas along Duck Lake Road as an alternate truck route for US 89 and could be implemented with any of the alternatives. The preferred alternative consists of Alternative C and the Duck Lake Road Option. The final environmental impact statement (EIS) also addresses comments received on the draft EIS and identifies mitigation for unavoidable impacts.

THIS DOCUMENT IS POSTED ON THE FOLLOWING WEBSITE: <www.mdt.mt.gov/pubinvolve/eis_ea.shtml>.

Table of Contents

Chapter 3. Affected Environment

Chapter 4. Environmental Consequences

Tables

Figures

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Abbreviations

AADT	average annual daily traffic
AASHTO	American Association of State Highway and Transportation Officials
AIRS	Aerometric Information Retrieval System
BMP	best management practice
ºC	degrees Celsius
CFR	Code of Federal Regulations
cfs	cubic feet per second
cms	cubic meters per second
CO	carbon monoxide
DLR	Duck Lake Road (reference post label)
EIS	environmental impact statement
ºF	degrees Fahrenheit
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
GED	general education development
ha	hectare
km	kilometer
L_{eq}	equivalent sound level
LOS	level of service
$\mu g/m^3$	micrograms per cubic meter
MCA	Montana Code Annotated
MDT	Montana Department of Transportation
MEPA	Montana Environmental Policy Act
MFWP	Montana Fish, Wildlife, and Parks
MT DEQ	Montana Department of Environmental Quality
NAAQS	national ambient air quality standards
NAC	noise abatement criteria
NEPA	National Environmental Policy Act
NO_2	nitrogen dioxide
NPDES	National Pollutant Discharge Elimination System
O_3	ozone
PAB	palustrine aquatic bed
Pb	lead
PCB	polychlorinated biphenyl
PEM	palustrine emergent
PFO	palustrine forested
PL	Public Law
PM	particulate matter
PM_{10}	particulate matter less than 10 microns in diameter
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
POW	palustrine open water
ppm	parts per million

PR	provincial route
PSS	palustrine scrub/shrub
PVC	polyvinyl chloride
R2UBH	riverine lower perennial, perennially flooded
R3UBH	riverine upper perennial, perennially flooded
R3USC	riverine upper perennial unconsolidated shore seasonally flooded
R4SB	riverine intermittent streambed
RP	reference post
RV	recreational vehicle
SO_2	sulfur dioxide
SPA	Stream Preservation Act
TERO	Tribal Employment Rights Ordinance
TSP	total suspended particulates
US 2	US Highway 2
US 89	US Highway 89
USC	United States Code
U.S. EPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VOC	volatile organic compound
W	wetland

SUMMARY

Summary

The Federal Highway Administration and the Montana Department of Transportation propose to improve a 41-kilometer (25.5-mile) segment of US Highway 89 (US 89) east of Glacier National Park in Glacier County, Montana (Figure S-1). The US 89 Browning to Hudson Bay Divide project initially considered improvement of a network of roadways that perform some of the transportation functions that might otherwise be performed by US 89 if it met current roadway standards. As a result of this initial consideration, MDT and FHWA concluded that the most pressing need for roadway improvements within this roadway network exists in the transportation corridor between the Saint Mary-Babb area (including points north of Babb and west of Saint Mary) and the Browning area (including points south and east of Browning). US 89 and Duck Lake Road function as the primary transportation links between these two areas. Therefore, the proposed project has focused on potential improvements to US 89 between Hudson Bay Divide and Browning as well as improvements to Duck Lake Road between US 89 south of Babb and Browning. The proposed project has not included consideration of the portion of US 89 north of Hudson Bay Divide because this segment of US 89 has recently been widened—two 3.6-meter (12-foot) lanes with two 1.2-meter (4-foot) shoulders and a 3.6-meter (12-foot) climbing lane—and is not in need of improvement. Further detail on the alternative development and selection process, including a description of those alternatives that were initially considered but then eliminated from further study, is contained in Chapter 2.

The proposed US 89 improvement project analyzed in this final environmental impact statement (EIS) would improve the segment of US 89 from the city of Browning to the Hudson Bay Divide by increasing the roadway width to either 9.8 meters (32 feet) or 11 meters (36 feet) and would consider optional improvements at three areas along Duck Lake Road (Montana Secondary Highway 464). The project proponents have selected the 11 meters (36 feet) roadway width and the optional improvements at three areas along Duck Lake Road as the preferred alternative. All proposed improvements are located within the Blackfeet Indian Reservation.

US 89 is open year-round and is the primary north-south route for summer-season tourist traffic destined for the east entrance of Glacier National Park at the town of Saint Mary (Figure S-2). Duck Lake Road is also open year-round and provides an alternate route for traffic traveling between the Canadian border and the city of Browning. This route is preferred over US 89 by some drivers because of its flatter and straighter alignment.

Project Purpose and Need

The Federal Highway Administration and the Montana Department of Transportation have defined the purpose of and need for action in the transportation corridor between Browning and Saint Mary-Babb based on three specific categories of issues with the existing US 89 roadway:

Figure S-1. Vicinity map of the US 89 improvement project, Montana.

10-09-03/rtb/HEC-O/rb/00-01457-001-216-001/DEIS

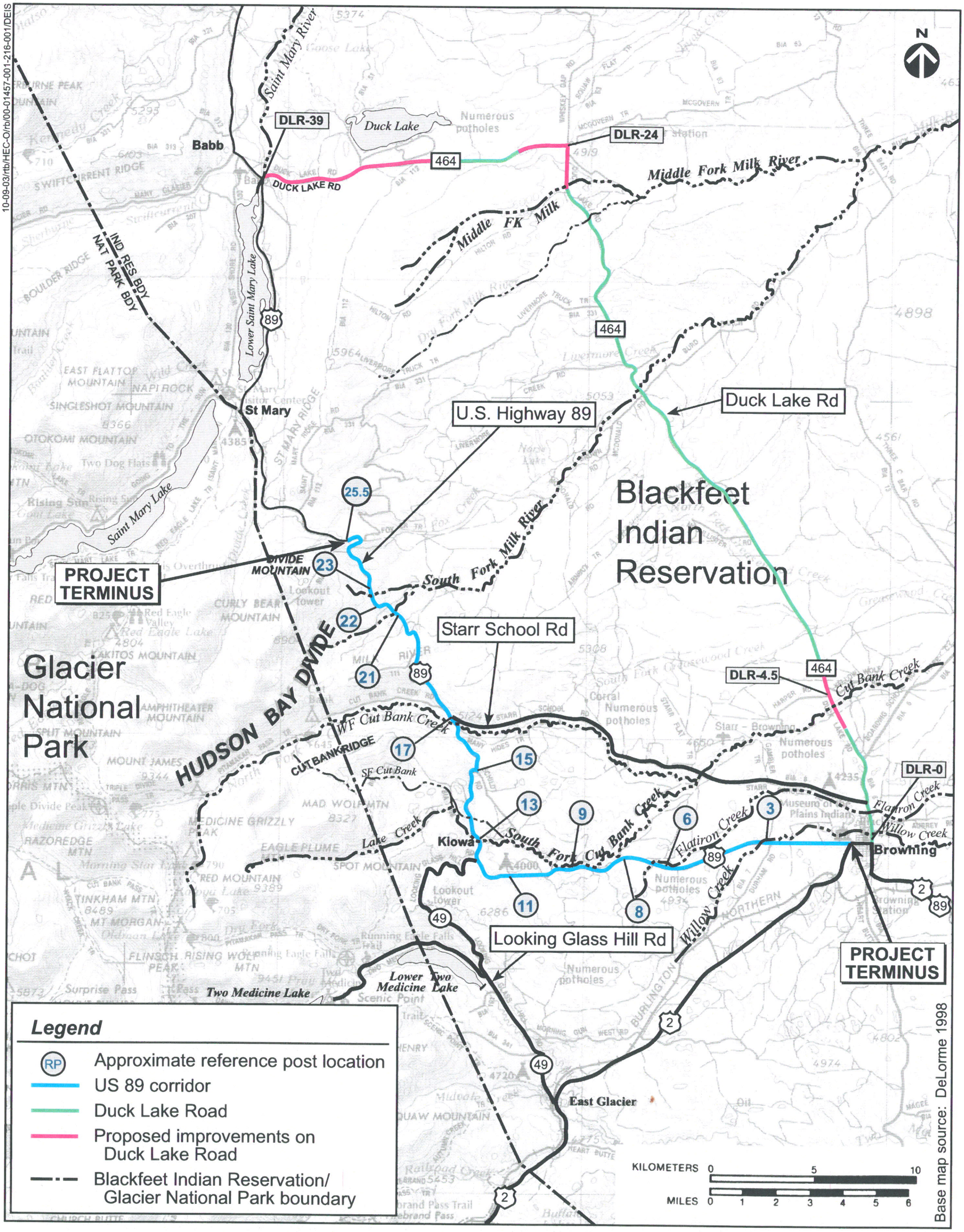

Figure S-2. Location of the US 89 improvement project, Montana.

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- Traffic flow – US 89 accommodates a wide variety of vehicular traffic with different movement characteristics. The existing two-lane roadway is narrow, with sharp curves, steep grades, minimal opportunities for passing slow-moving vehicles, and few pullouts. Because of these roadway characteristics and the variety of vehicles using the roadway, it is not comfortable and frequently not possible to drive at the posted speed limit (maximum legal speed).

- Roadway safety – Many of the factors that contribute to the need for action based on traffic flow are also factors for roadway safety. The diverse mix of traffic and traveling characteristics results in traveler conflicts associated with vehicle speed and frequency of stops. Much of the existing US 89 roadway between Browning and the Hudson Bay Divide does not meet current state and federal roadway design requirements.

- Roadway maintenance – US 89 is both difficult and expensive to maintain during the winter months. Moreover, the current state of the highway does not facilitate easy maintenance during the summer months, when traffic flows are high.

The components of the project purpose and need are described fully in Chapter 1 of this final EIS.

Project Objectives

Based on the project purpose and need, and guided by existing plans, policies, and regulations, the Montana Department of Transportation and the Federal Highway Administration developed an overall mission statement for the proposed US 89 project:

> *Build a roadway that is a pleasure to drive and give it a "look and feel" – a theme – that provides a strong identity for the Blackfeet Nation and complements Glacier National Park. Give people a reason to stop, to enjoy the area, and to want to come back.*

Specific objectives that the Montana Department of Transportation and the Federal Highway Administration would strive to achieve through their improvements to US 89 include:

- Improvement of roadway safety

- Enhancement of traffic flow

- Accommodation of roadway maintenance

- Enhancement of the cultural resources and economic opportunities of the Blackfeet Nation
- Protection of the natural environment
- Providing an appropriate balance between cost efficiency, roadway safety and function, and environmental protection.

Alternatives Considered

Alternative A: No Build

The no-build alternative involves continued maintenance of the existing roadway with road improvements based on need. Existing bridges would receive safety and minimal structural improvements, and roads would have localized rebuilding and spot safety improvements. Travel lanes and paved shoulders would retain their current width. Roadside ditches would be cleaned and reshaped, and fill slopes would remain as they are, with no major changes in the footprint of the road. The roadway alignment would not change under this alternative and no additional right-of-way would be purchased. The 1999 maintenance cost for US 89 in the project corridor was approximately $293,000 and the costs have been increasing $40,000 to $50,000 per year.

Alternative B: Improve US 89 from Browning to Hudson Bay Divide – Increase Road Width to 9.8 Meters (32 Feet)

The length of improvement under this option is 41 kilometers (25.5 miles) from the intersection of US 2 and US 89 at Browning (reference post 0) to the Hudson Bay Divide (reference post 25.5). The Hudson Bay Divide was identified as a logical terminus for this project because it is the point where improvements from this project would match with the recently reconstructed segment of US 89 to the north. Under Alternative B, the existing two-lane configuration of US 89 would remain, but the roadway would be widened to meet the Montana Department of Transportation minimum design standards for a rural minor arterial. The cross-section of the improved roadway would include two 3.6-meter (12-foot) travel lanes with a 1.2-meter (4-foot) shoulder on each side. In addition to being widened, the roadway would be realigned. Additional right-of-way would be required under this alternative, and based on current ownership, would be purchased or an easement would be obtained. Features that are common to this alternative and Alternative C include pullouts and informational kiosks; replacement or widening of existing bridges; fencing of the right-of-way; replacement of some culverts to better accommodate natural streamflow fluctuation and enhance fish passage; moderate cut-and-fill slopes to blend with natural terrain; replanting of disturbed areas beyond the clear zone; and removal and restoration of existing roadway outside the new roadway corridor. The cost of construction of Alternative B (excluding the cost of right-of-way) would be approximately $45.9 million (2010 dollars). Phasing details have not been finalized; however, the expectation is that the project corridor would probably be divided into several segments for construction. At present, the earliest construction would begin is 2010 and the proposed project would likely be constructed in several phases over a period of five to ten years with one or more segments being constructed at a time. Funding will determine the timing and specific phasing for the proposed project.

Alternative C: Improve US 89 from Browning to Hudson Bay Divide – Increase Road Width to 11 Meters (36 Feet)

Alternative C with the Duck Lake Road Option, described below, has been selected as the preferred alternative.

The termini for this alternative are the same as those identified for Alternative B. Under this alternative, US 89 would be widened as in Alternative B except that the shoulders would be 1.8 meters (6 feet) in width rather than 1.2 meters (4 feet). Alignments would be the same as those described for Alternative B. Additional right-of-way would be acquired through easement or purchase under this alternative. The cost of construction of Alternative C (excluding the cost of right-of-way) would be approximately $49.6 million (2010 dollars). Construction phasing of Alternative C would be similar to Alternative B.

Option – Improvements to Duck Lake Road Alternate Route

The Duck Lake Road Option entails the improvement of Duck Lake Road from Browning (reference post DLR-0) to US 89 south of Babb (approximate reference post DLR-34). This option, together with either Alternative B or Alternative C meets the purpose of and need for improving US 89 from Browning to the Hudson Bay Divide. Duck Lake Road provides an alternate to US 89 for vehicles traveling between the Saint Mary-Babb area and the Browning area. As an alternate route to US 89, Duck Lake Road is particularly important for trucks (and other vehicles) in winter, when US 89 can be temporarily snowbound. Duck Lake Road is farther from the Rocky Mountain front than US 89 and has more moderate grades, and so is less often closed due to adverse winter conditions. The proposed improvements to Duck Lake Road address localized inadequate alignment and road surface conditions, and are necessary to maintain safe travel opportunities for all vehicles throughout the year in the Babb to Browning travel corridor. In addition, the improvements to Duck Lake Road would ensure that this road would adequately perform as a truck route throughout the year. By ensuring Duck Lake Road functions as a safe alternative for truck traffic, the proposed improvements to Duck Lake Road would also help meet the project objective of improving roadway safety on US 89 for non-truck vehicles and bicyclists.

Under this option, Duck Lake Road would be improved to perform as a truck route, although trucks would not be restricted from using US 89. Improvements include an access road down the east side of Duck Lake Road near the bridge over Cut Bank Creek and off-road parking (approximate reference post DLR-4.5) north of Browning for people accessing the stream for recreational purposes. The curve at reference post DLR-24 would be realigned for increased safety. The roadbed would be rebuilt, generally along its existing alignment, from approximately reference post DLR-27 to the end of the road at its intersection with US 89 to alleviate damage from frost heaving in the winter and early spring. The profile grade of the roadway would be adjusted to minimize changes in grade and to minimize grades of more than 5 percent. The intersection of US 89 and Duck Lake Road would be realigned and a chain-up area for trucks would be added. The cost of construction of the Duck Lake Road Option (excluding the cost of right-of-way) would be approximately $14.4 million (2006 dollars).

Consultation and Coordination

The planning process for the proposed US 89 project included a steering committee and an interdisciplinary team. The Steering Committee provided one of several forums for Tribal and agency coordination in the process. As part of the National Environmental Policy Act (NEPA) process the Interdisciplinary Team was formed to provide project input and communication among many different technical experts and agency representatives. There has also been ongoing informal communication with staff specialists from government agencies and the Blackfeet Nation related to topics of wetlands, threatened and endangered species, cultural sites, and displacements. Throughout project development, there were several opportunities for public involvement and when the decision was made that an EIS was to be completed, a notice of intent was published in the *Federal Register*. Several public mailings took place, including the posting of an initial scoping letter. Five public scoping meetings were held for the proposed US 89 project, with representatives from the Federal Highway Administration, the Montana Department of Transportation, and the consultant team. At the meetings, purpose of and need for the proposed project were discussed, a question-and-answer period was conducted, and a survey questionnaire was distributed. Key issues related to the proposed project were identified in these meetings.

The public notice for the Draft EIS was published in the Federal Register on August 20, 2004. Public hearings on the Draft EIS were held on September 21, 2004 in Browning, Montana and September 22, 2004 in Babb, Montana. Thirteen citizens attended the public hearing on September 21, and ten citizens attended the public hearing on September 22.

Unresolved Issues and Areas of Controversy

There are no unresolved issues or areas of controversy on this proposed project.

Other Federal Actions Required

Other federal actions that must be completed include:

- A Clean Water Act Section 404 permit is required from the U.S. Army Corps of Engineers (Corps of Engineers) for areas where construction of the proposed action would result in discharge of dredged or fill material into streams, wetlands, or other waters of the United States.

- In compliance with the Endangered Species Act, a biological assessment documenting project impacts on threatened and endangered species was prepared and submitted to the U.S. Fish and Wildlife Service (USFWS). On January 29, 2005, the USFWS issued their biological opinion for the proposed project. The conclusions of the biological opinion are summarized in the Threatened and Endangered Species section of Chapter 4. The biological assessment and biological opinion are contained in Appendix I.

- A National Pollutant Discharge Elimination System (NPDES) permit is required from the U.S. Environmental Protection Agency (U.S. EPA).

Permits

Table S-1 describes the permits required under the action alternatives for the proposed US 89 improvement project.

Summary of Impacts

Table S-2 summarizes the impacts and mitigation measures for each alternative evaluated for the proposed US 89 project.

Table S-1. Permits required under the action alternatives for the proposed US 89 improvement project.

Permit	Issuing Agency	Activities Requiring Permit or Authorization
Montana Stream Preservation Act (SPA) (124 Temporary Facilities Permit)	Montana Fish, Wildlife, and Parks (MFWP)	Any temporary (or permanent) construction facilities such as temporary structures, access or haul roads, and work or detour bridges, or permanent roadway features that may affect the bed or banks of any stream or river drainage but are necessary to complete the proposed project require an SPA permit.
Short-Term Water Quality Standards for Turbidity (318 Authorization)	Department of Environmental Quality (DEQ)	Any activity in any state water that will cause unavoidable short-term violations of water quality standards.
National Pollutant Discharge Elimination System Permit	U.S. Environmental Protection Agency (U.S. EPA)	Any activity in which the discharge, pumping, or dewatering activity during construction can result in discharge to or degradation of water quality in surface waters or ground waters.
Section 404 permit of the Clean Water Act	U.S. Army Corps of Engineers (Corps of Engineers)	Areas where construction of the proposed action would result in discharge of dredged or fill material into streams or wetlands.
Aquatic Lands Protection Ordinance 90A Permit	Blackfeet Environmental Office	Activities in all waters, aquatic lands, wetlands, and riparian lands on the Blackfeet Indian Reservation. Riparian lands include all lands above the mean average high water mark that are adjacent to reservation waters where terrestrial vegetation is present and would be influenced by the presence of water or is critical for groundwater recharge or as habitat for wildlife.
101D Permit	Blackfeet Nation	Withdrawal or diversions of surface or groundwater during implementation of construction activities.

Table S-2. Environmental impacts and mitigation measures by alternative.

No-Build Alternative (Alternative A)	Alternative B	Alternative C (Preferred Alternative)	Duck Lake Road Alternate Route
Geology and Soils			
Impacts ▪ No impacts are expected.	*Impacts* ▪ Excavation and fill activities would expose soils susceptible to erosion, landslides, and seismic hazards (i.e., liquefaction). ▪ Earthwork is estimated to be 1,150,000 cubic meters (1,504,000 cubic yards) of excavation and 1,000,000 cubic meters (1,308,000 cubic yards) of fill.	*Impacts* ▪ Impacts would be generally similar to those described for Alternative B but would affect a slightly larger area. ▪ Earthwork is estimated to be 1,300,000 cubic meters (1,700,000 cubic yards) of excavation and 1,100,000 cubic meters (1,439,000 cubic yards) of fill.	*Impacts* ▪ Impacts would be similar to those described for Alternative B. ▪ Earthwork is estimated to be 500,000 cubic meters (654,000 cubic yards) of excavation and 390,000 cubic meters (510,000 cubic yards) of fill.
Mitigation Measures ▪ No mitigation is required.	*Mitigation Measures Common to All Action Alternatives* ▪ All excavation and grading for roadways and slope stabilization will be designed and executed in accordance with recommendations of a geotechnical engineer based on site-specific soil exploration. ▪ Standard erosion control measures and best management practices (BMPs) will be implemented during the earthwork stages of the proposed project to control surface water drainage and reduce erosion. ▪ Appropriate seismic parameters will be used in final design of the roadway and for slope stabilization. ▪ If liquefaction-prone areas are encountered, soil improvement techniques will be considered during development of the final design to enhance the engineering properties of the soil.		
Floodplains			
Impacts ▪ Existing undersized culverts and bridges would continue to contribute to localized flooding.	*Impacts* ▪ A reduction in stream channel capacity at US 89 crossings in the project corridor is not expected under any of the proposed action alternatives. ▪ Additional impervious roadway areas draining to streams would lead to impacts from increased stormwater flow rates. Although the increased stormwater flows from the project corridor represent a minor amount of the total flow in these streams, the affected streams could experience minor adverse flooding impacts or increased channel scour.	*Impacts* ▪ Impacts would be the same as those described for Alternative B.	*Impacts* ▪ Impacts would be similar to those described for Alternative B.
Mitigation Measures ▪ No mitigation measures are proposed.	*Mitigation Measures Common to All Action Alternatives* ▪ All culverts to be replaced or constructed in the US 89 corridor will be designed in accordance with Montana Department of Transportation guidelines. ▪ All bridges to be replaced or constructed in the US 89 corridor will be designed to pass the 50-year flood and to provide the minimum required 0.3-meter (1-foot) clearance above the 100-year flood elevation to the low beam elevation. ▪ New stormwater outfalls associated with new or reconfigured surface drainage systems will be designed to prevent erosion over the long term, accounting for increased flow rates from the roadway.		

Table S-2 (continued). Environmental impacts and mitigation measures by alternative.

No-Build Alternative (Alternative A)	Alternative B	Alternative C (Preferred Alternative)	Duck Lake Road Alternate Route
Water Resources			
Impacts ▪ Structural and safety improvements at bridges may introduce sediment into surface waters. ▪ There would be continued runoff of vehicle pollutants entering surface waters. ▪ Existing undersized culverts and bridges would continue to contribute to localized flooding. ▪ No impacts on ground water are expected.	*Impacts* ▪ Short-term impacts on surface water quality would occur because of erosion associated with excavation and grading activities, roadway widening, and bridge replacement. ▪ Accidental spills and leaks from heavy equipment may result in decreased water quality in surface waters. ▪ New stormwater outfalls (i.e., drainpipe or ditch discharge points) at bridges would have localized effects on streamflow rates and water quality and would result in long-term erosion of channel bank areas if not maintained appropriately. ▪ A wider roadway would result in greater amounts of surface runoff conveyed to streams and wetlands. ▪ No impacts on ground water are expected. ▪ Increased rates and volumes of stormwater runoff would cause increased erosion in ditches and small streams and potentially would induce localized flooding in drainage conveyance systems if design measures are not implemented adequately to offset those flows. ▪ Improved ditches would increase conveyance efficiency of runoff to desired locations, potentially inducing high flow damage at the discharge points.	*Impacts* ▪ Impacts would be similar to those of Alternative B. ▪ There would be greater potential for soil erosion during construction due to the larger area affected. ▪ The greater impervious surface area under Alternative C would result in slightly greater volumes of runoff entering surrounding surface water.	*Impacts* ▪ Impacts would be similar to those of Alternative B. ▪ Adding off-road parking areas near Cut Bank Creek would result in sedimentation to Cut Bank Creek during construction and may contribute to decreases in water quality if runoff from the parking area is not directed away from the stream.
Mitigation Measures ▪ No mitigation measures are proposed.	*Mitigation Measures Common to Alternatives B and C* ▪ To comply with the Clean Water Act, the Montana Department of Transportation and the contractor will obtain authorization from the U.S. EPA for a National Pollutant Discharge Elimination System permit. This permit requires the completion of a stormwater pollution prevention plan, including a description of BMPs and stormwater management controls appropriate for the construction site. ▪ Appropriate BMPs for the site will be selected from the current version of *Erosion and Sediment Control Best Management Practices: Field Manual*, prepared for Montana Department of Transportation. ▪ In accordance with MDT's standard specifications, the contractor would be required to secure the necessary permits associated with material source sites, including those permits required to prevent a violation of water quality standards. ▪ New stormwater outfalls associated with new or reconfigured surface drainage systems will be designed to prevent erosion over the long term, accounting for increased flow rates from the roadway. ▪ Impacts of high flow damage at discharge points on drainage ditches would be managed by considering erosion prevention in the design of the ditches.		*Mitigation Measures* ▪ Mitigation measures are similar to those for Alternatives B and C. ▪ As appropriate, the off-road parking area at Cut Bank Creek will be sloped to the southeast, so that runoff flows away from the stream. As a result, runoff will move to an area of heavier vegetation and higher filtering capacity, reducing runoff to the stream.

Table S-2 (continued). Environmental impacts and mitigation measures by alternative.

No-Build Alternative (Alternative A)	Alternative B	Alternative C (Preferred Alternative)	Duck Lake Road Alternate Route
Air Quality			
Impacts ▪ Although background traffic volumes are projected to increase under the no-build alternative, future levels of criteria pollutants from highway traffic and maintenance would not be expected to exceed any national ambient air quality standards (NAAQS).	*Impacts* ▪ Roadway construction would generate fugitive dust emissions resulting in localized decreases in air quality. However, exceeding the 24-hour average particulate matter NAAQS is not expected, nor would any short-term impacts on air quality be expected during construction. ▪ Emissions from construction equipment are typically not excessive and would not be expected to exceed any NAAQS or interfere with attainment or maintenance of long-term air quality standards. ▪ Future levels of criteria pollutants attributed to highway traffic and maintenance would not be expected to exceed any NAAQS because of the low background concentrations of criteria pollutants in the project corridor's rural location.	*Impacts* ▪ Impacts would be similar to those described for Alternative B.	*Impacts* ▪ Impacts would be similar to those described for Alternative B.
Mitigation Measures ▪ No mitigation measures are proposed.	*Mitigation Measures Common to All Action Alternatives* ▪ No operational mitigation measures are required. ▪ Controlling and minimizing offsite tracking of sediments as required for the stormwater pollution prevention plan will help to control dust produced by construction. ▪ Implementation of a traffic control plan as submitted by the contractor and approved by the Montana Department of Transportation will minimize prolonged periods of vehicle idling due to traffic delays.		
Noise			
Impacts ▪ Noise levels along US 89 and Duck Lake Road would increase over time as traffic volumes increase.	*Impacts* ▪ There would be temporary increases in noise from construction activities. ▪ Predicted future traffic volumes are the same as those for the no-build alternative. Therefore, increases in noise levels from Alternative B would be the same as those predicted for Alternative A.	*Impacts* ▪ Impacts would be the same as those described for Alternative B.	*Impacts* ▪ Impacts would be similar to those described for Alternative B.
Mitigation Measures ▪ No mitigation measures are proposed.	*Mitigation Measures Common to All Action Alternatives* ▪ No mitigation measures are required.		
Vegetation and Wildlife Habitat			
Impacts ▪ Wildlife would have increasing difficulty crossing the road as traffic volumes increase. ▪ Existing undersized culverts or a lack of culverts would contribute to decreased functions in wetlands over time.	*Impacts* ▪ There would be a direct loss of approximately 55 hectares (135 acres) of wildlife habitat. ▪ A temporary displacement of wildlife from the project corridor would occur due to increased human activity during construction. ▪ Mortality of wildlife with limited mobility would occur during vegetation removal. ▪ There would be increased fragmentation of habitats along the roadway.	*Impacts* ▪ Impacts would be similar to those described for Alternative B. ▪ There would be a direct loss of approximately 59 hectares (146 acres) of wildlife habitat.	*Impacts* ▪ Impacts would be similar to those described for Alternative B. ▪ There would be a direct loss of approximately 18 hectares (45 acres) of wildlife habitat.

Table S-2 (continued). Environmental impacts and mitigation measures by alternative.

No-Build Alternative (Alternative A)	Alternative B	Alternative C (Preferred Alternative)	Duck Lake Road Alternate Route
Vegetation and Wildlife Habitat (continued)			
Impacts (continued)	▪ The value of upland habitat would be reduced and forested areas would be converted into disturbed grasslands. ▪ Disturbed areas could be colonized by noxious weeds.		
Mitigation Measures ▪ No mitigation measures are proposed.	*Mitigation Measures Common to Alternatives B and C* ▪ BMPs will be implemented to minimize construction impacts. ▪ Segments of the existing roadway that currently bisect aspen grovelands and would be abandoned will be reclaimed. These areas occur at approximately reference posts 14 and 15. ▪ Clearing and grubbing will be limited to the minimum amount necessary beyond the construction limits (not the right-of-way limits) at known wildlife crossing locations. ▪ As appropriate, construction plans will specify that contractor stockpiles of topsoil must be contained within the construction limits and may not be stored at environmentally sensitive areas. Locations where this measure will be implemented will be specified in the special provisions for this proposed project. ▪ The project design engineers will continue to involve staff biologists in the design and configuration of the new highway bridge at Lake Creek to enhance its attractiveness as a crossing location for wildlife. ▪ In order to improve the bridge over North Fork Cut Bank Creek for wildlife crossing purposes, shrubs and trees will be planted along the banks of the river at the bridge crossing to enhance the vegetative cover at this site. ▪ If possible, the new highway bridge at South Fork Cut Bank Creek (reference post 13) will be enlarged to provide an area of dry land passage for large mammals underneath the bridge during most months of the year. ▪ V-shaped ditches will be included to the extent feasible in order to minimize vegetation disturbance. ▪ A Montana Department of Transportation staff botanist, in consultation with the Blackfeet Nation will conduct a site visit and prepare a site-specific revegetation plan. This plan will include provisions for a temporary erosion control seed mix to be used during construction as well as provisions for post-construction revegetation of the disturbed road corridor to provide suitable cover for wildlife crossing the road and to minimize colonization by noxious weeds.		*Mitigation Measures* ▪ BMPs similar to those described for Alternatives B and C would be implemented.
Wetlands			
Impacts ▪ Existing undersized culverts or a lack of culverts would continue to limit hydrology in some systems along the corridor.	*Impacts* ▪ Construction activities would result in temporary fill for construction access, temporary vegetation clearing, displacement of wildlife, and temporary increases in sedimentation to wetlands. ▪ A total of approximately 6.4 hectares (16.1 acres) of wetland habitat would be lost under this alternative, as follows: ▫ Loss of approximately 3.8 hectares (9.4 acres) of large riverine wetlands, affecting fish/aquatic habitat, wildlife and threatened and endangered species habitat, and other wetland functions ▫ Loss of approximately 0.6 hectares (1.5 acres) of small riverine wetlands, affecting fish/aquatic habitat, sediment/nutrient/ toxicant retention, and production export/food chain support	*Impacts* ▪ Impacts would be similar to those of Alternative B. ▪ A total of approximately 7.2 hectares (17.9 acres) of wetland habitat would be lost under this alternative, as follows: ▫ Loss of approximately 4.5 hectares (11.0 acres) of large riverine wetlands. ▫ Loss of approximately 0.6 hectares (1.5 acres) of small riverine wetlands. ▫ Loss of approximately 1.4 hectares (3.5 acres) of depressional wetlands	*Impacts* ▪ Impacts would be similar to those of Alternative B. ▪ A total of approximately 0.8 hectares (1.9 acres) of wetland habitat would be lost under this alternative, as follows: ▫ Loss of approximately 0.2 hectares (0.4 acres) of large riverine wetlands ▫ Loss of approximately 0.6 hectares (1.5 acres) of small riverine wetlands.

Table S-2 (continued). Environmental impacts and mitigation measures by alternative.

No-Build Alternative (Alternative A)	Alternative B	Alternative C (Preferred Alternative)	Duck Lake Road Alternate Route
Wetlands (continued)			
Impacts (continued)	□ Loss of approximately 1.3 hectares (3.4 acres) of depressional wetlands, affecting migratory bird habitat and ground water discharge and recharge functions □ Loss of approximately 0.7 hectares (1.8 acres) of slope wetlands, affecting secondary habitat for threatened and endangered species and wildlife habitat.	□ Loss of approximately 0.7 hectares (1.9 acres) of slope wetlands.	
Mitigation Measures ▪ No mitigation measures are proposed.	*Mitigation Measures* ▪ Work in and around wetlands will be performed from an existing roadway or upland site where possible. ▪ Locate staging areas for construction equipment and materials in upland areas a minimum distance of approximately 15 meters (50 feet) from wetlands and stream crossings. ▪ Replace culverts with properly sized culverts, where necessary, and through the final design process determine the need for any equalizer culverts. ▪ A stormwater pollution prevention plan will be prepared prior to construction site disturbance, and it will be updated as necessary as the project proceeds. ▪ The limits of clearing will be clearly marked to minimize intrusion into wetland habitats. ▪ Compensation for wetland impacts will be provided in accordance with current replacement ratios required by the U.S. Army Corps of Engineers and the Blackfeet Nation.	*Mitigation Measures* ▪ Mitigation will be similar to that for Alternative B. A slightly greater amount of wetland compensation is required.	*Mitigation Measures* ▪ Mitigation will be similar to that for Alternative B, although less wetland compensation is required.
Fisheries Resources			
Impacts ▪ Undersized or poorly placed culverts affecting fish passage at Willow Creek, Flatiron Creek, Lake Creek, and an unnamed tributary to South Fork Cut Bank Creek would remain.	*Impacts* ▪ Temporary in-water work could displace fish and aquatic organisms and disturb instream habitat. ▪ Erosion and sedimentation to streams from exposed soils could increase during construction. ▪ Increased stormwater runoff could be conveyed to streams and wetlands. ▪ Road widening would require the relocation of approximately 396 meters (1,300 feet) of the South Fork Cut Bank Creek stream channel near reference post 13. ▪ Road widening at reference post 9 in the vicinity of South Fork Cut Bank Creek would require the relocation of two short segments of stream channel located on the north side of the US 89 project corridor. ▪ Road widening in the vicinity of Willow Creek (reference post 3) would require the relocation of two short segments of stream channel.	*Impacts* ▪ Impacts would be similar to those of Alternative B. However, a slightly greater amount of stream channel habitat would be affected.	*Impacts* ▪ Impacts on streams and fisheries resources would be similar to those described for Alternative B. Existing culverts would be lengthened or replaced and no stream channel relocation would be required.

Table S-2 (continued). Environmental impacts and mitigation measures by alternative.

No-Build Alternative (Alternative A)	Alternative B	Alternative C (Preferred Alternative)	Duck Lake Road Alternate Route
Fisheries Resources (continued)			
Mitigation Measures ▪ No mitigation measures are proposed.	*Mitigation Measures Common to All Action Alternatives* ▪ BMPs and a stormwater pollution prevention plan will be implemented during construction activities. ▪ The contractor will be expected to store and handle petroleum products, chemicals, cement and other deleterious materials to prevent their entering streams and associated wetlands. ▪ MDT will work with resource agencies during the permitting process to avoid and minimize impacts to fish spawning. ▪ Stream banks will be revegetated with appropriate species at bridge and culvert installations. ▪ The use of bottomless culverts or countersunk culverts will be considered to provide a natural streambed for the length of the culvert. ▪ Culverts in fish-bearing streams will be designed and installed to accommodate fish passage. ▪ Culverts will be installed and maintained to avoid inlet scouring and to prevent erosion of stream banks downstream of the project site. ▪ For stream channel impacts, the affected stream reach will be surveyed in order to adequately size, locate, and reconstruct the new stream channel. ▪ Under the Duck Lake Road Option, the proposed parking area adjacent to Cut Bank Creek will be designed and constructed to minimize the adverse impacts related to runoff. As appropriate, drainage of the proposed parking area could be routed to the east of the parking area. The parking area will be sloped to the southeast so that runoff flows away from the stream.		
Rare and Sensitive Species			
Impacts ▪ No impacts on rare plants or animals are expected.	*Impacts* ▪ No impacts on rare plants or animals are expected. ▪ Impacts on rare fish species would be the same as impacts described for Fisheries Resources.	*Impacts* ▪ Impacts would be the same as those for Alternative B.	*Impacts* ▪ Impacts would be the same as those for Alternative B.
Mitigation Measures ▪ No mitigation measures are required.	*Mitigation Measures Common to All Action Alternatives* ▪ Because no rare and sensitive species would be affected by the proposed project, no mitigation measures are required. If rare and sensitive species are identified at the proposed material source sites, mitigation measures would be implemented to avoid or minimize impacts to those species. ▪ Conservation measures for potential effects on pearl dace and westslope cutthroat trout would be the same as those described in Fisheries Resources.		
Threatened and Endangered Species			
Impacts ▪ Increased traffic levels could become a barrier to wildlife movement through the corridor.	*Impacts* ▪ Bald eagles would be temporarily disturbed during their wintering and migratory period. ▪ Grizzly bear foraging habits would be disturbed during construction, grizzly bear habitat would be lost, habitat value would decrease, and, because of the wider roadway, grizzly bears would have more difficulty crossing the US 89 corridor. ▪ Wolf movements would be disrupted through the corridor during construction activities. ▪ This alternative would contribute to the impediment of lynx movement through the US 89 project corridor and loss of conifer habitat at the edge of large tracts of suitable habitat (considered to be fringe habitat). ▪ No impacts on bull trout are expected.	*Impacts* ▪ Impacts would be similar to those for Alternative B. However, a wider roadway would result in incremental increases in fragmentation and difficulty associated with crossing the roadway.	*Impacts* ▪ Construction near reference post DLR-4.5 may disturb bald eagles during the wintering period. Grizzly bears may be deterred from activities between reference post DLR-27 and DLR-34 during construction. ▪ No impacts on Canada lynx or gray wolves are expected. ▪ With implementation of BMPs and a temporary sedimentation and erosion control plan, the proposed project may affect but is not likely to adversely affect bull trout.

Table S-2 (continued). Environmental impacts and mitigation measures by alternative.

No-Build Alternative (Alternative A)	Alternative B	Alternative C (Preferred Alternative)	Duck Lake Road Alternate Route
Threatened and Endangered Species (continued)			
Mitigation Measures ▪ No mitigation measures are proposed.	*Mitigation Measures Common to Alternatives B and C. The following mitigation measures are from the January 28, 2005, biological opinion from the U.S. Fish and Wildlife Service. The project will likely be divided into phases for construction purposes. During the final design of each segment, MDT will coordinate with the USFWS and the Blackfeet Nation to ensure mitigation measures are appropriate and applicable to current conditions.* ***Bald Eagle*** ▪ Because it is the Montana Department of Transportation's standard practice to raptor-proof electric facilities when they are relocated within MDT right-of-way, and the action alternatives would restrict vegetation clearing outside the construction limits, no additional conservation measures are proposed to minimize potential project impacts on bald eagles. ▪ If a nesting pair of bald eagles is identified within a 1.6-kilometer (1-mile) radius of the material source sites, blasting would be restricted to the period outside the nesting season for bald eagles, which extends from mid-March through August 31. ***Grizzly Bear*** ▪ The following corridor-wide conservation measures will be implemented as part of the proposed project to minimize impacts to grizzly bears and facilitate wildlife movement through the US 89 project corridor: □ To ensure that final designs for proposed crossing structures meet minimum requirements for the targeted species, Montana Department of Transportation will consult with Blackfeet Nation and US Fish and Wildlife Service biologists during the design of the structures for comments on approval of the bridge lengths and culvert sizes at Lake Creek and South Fork Cut Bank Creek. □ A new highway structure is proposed at reference post 12 at Lake Creek. This structure will be constructed to incorporate wildlife crossing features. The project design engineers will continue to involve staff biologists in the design and configuration of the highway structure at this location to enhance its attractiveness as a crossing location for wildlife. Along with structure design, a revegetation plan will be implemented at this site to provide additional crossing cover, and wildlife fencing may be incorporated to funnel wildlife through the crossing area. □ A new highway bridge will be constructed at main stem South Fork Cut Bank Creek (reference post 13). This structure will be enlarged from a 9-meter (30-foot) opening to a wider opening, to provide a narrow area of dry land passage underneath the bridge during most months of the year. Wildlife fencing may be incorporated to funnel wildlife toward the crossing area. □ The existing US 89 highway bridge over North Fork Cut Bank Creek (reference post 17) was constructed within the last 10 years in conjunction with improvements to the US 89 intersection with Starr School Road and, therefore, does not require replacement at this time. In order to improve this structure for wildlife crossing purposes, shrubs and trees will be planted along the banks of the river at the bridge crossing to enhance the vegetative cover at this site. □ Contractors and construction crews will be educated regarding the need for proper sanitation in grizzly bear habitat and would be instructed to report all grizzly bear sightings immediately to Tribal wildlife program biologists. □ All food and garbage on the construction site will be stored in bear-proof containers, and all garbage will be removed daily from temporary offices and sleeping quarters. □ Construction staging areas, field offices, and sleeping quarters will be located a minimum of 150 meters (500 feet) from riparian areas and reported grizzly bear crossing areas, such as the riparian area east of Kiowa (reference post 10 to 11), Lake Creek (reference post 12.5), South Fork Cut Bank Creek (reference post 13) and the South Fork Milk River branches (reference posts 21 and 21.7). □ Right-of-way fencing will be installed throughout the project corridor and may result in the natural expansion of some aspen stands within the road right-of-way.		*Mitigation Measures* ▪ Measures are the same as those described for wildlife and vegetation, wetlands, and fisheries resources.

Table S-2 (continued). Environmental impacts and mitigation measures by alternative.

No-Build Alternative (Alternative A)	Alternative B	Alternative C (Preferred Alternative)	Duck Lake Road Alternate Route
Threatened and Endangered Species (continued)			
Mitigation Measures (continued)	***Grizzly Bear (continued)*** □ At all riparian areas throughout the corridor, construction limits and roadway fill widths will be minimized, and as much vegetation as feasible will be retained adjacent to the roadway. □ Scenic pullouts will be located and designed in consultation with Blackfeet wildlife biologists. At a minimum, scenic pullouts will: – Include warnings to visitors that they are in grizzly bear habitat and that they must remove all garbage from the site – Be limited to the project corridor and will not provide access to areas where humans may encounter grizzly bears, such as riparian areas – Be designed to provide viewing opportunities and to discourage picnicking. □ Prior to selection of material source sites, MDT and its contractor will consult with Blackfeet Fish and Wildlife Department so that potential impacts to grizzly bear habitat are minimized in site selection. ▪ The following conservation measures would be implemented as part of the project at the locations specified below to minimize impacts to grizzly bear in the project corridor: □ Segments of the existing roadway that currently bisect aspen grovelands and would be abandoned will be reclaimed. These areas occur at approximately reference post 14 and 15 and require detailed restoration plans including soil treatment, planting specifications, if needed, and fencing provisions. □ Construction will be staged to allow construction (including earthmoving) during any given construction year at only one of the following three locations: the riparian area east of Kiowa (approximately reference post 10 to 11.5), Lake Creek and South Fork Cut Bank Creek (approximately reference post 12.5 to 13), and South Fork Milk River, south and middle branches (approximately reference post 19.5 to 22). During any given construction year, no work will be conducted for the entire construction season at two of the three locations specified above. At the one location per year where construction is allowed, no work will be conducted from 6:00 PM to 9:00 AM from April 1 to June 30. □ Alternative slopes will be analyzed to reduce the impacts of fills at the following locations: the riparian area east of Kiowa (approximately reference post 10 to 11.5), Lake Creek and South Fork Cut Bank Creek (approximately reference post 12.5 to 13), and South Fork Milk River (approximately reference post 19.5 to 22). If, during final design there are areas that slopes can be safely steepened, they would be incorporated into the proposed project plans. □ Construction plans will specify that clearing and grubbing beyond the construction limits (not the right-of-way limits) for the riparian area east of Kiowa (approximately reference post 10 to 11.5), Lake Creek and South Fork Cut Bank Creek (approximately reference post 12.5 to 13), and South Fork Milk River (approximately reference post 19.5 to 22), and any temporary clearing necessary for culvert or utility line installation or similar activities outside the construction limits but within the right-of-way would be kept to the smallest area possible, to be reclaimed following construction. □ As appropriate, construction plans will specify that contractor stockpiles of topsoil must be contained within the construction limits and may not be stored at environmentally sensitive areas. Locations where this measure will be implemented will be specified in the special provisions (modifications to the Standard and Supplemental Specifications applicable to an individual project) for this proposed project and will include cultural sites and high quality wetlands. □ The V-shaped ditch will be applied to minimize vegetation disturbance at the following locations along the project corridor: riparian area east of Kiowa (approximately reference post 10 to 11.5), Lake Creek and South Fork Cut Bank Creek (approximately reference post 12.5 to 13), and South Fork Milk River (approximately reference post 19.5 to 22). □ Onsite visits would be conducted by Montana Department of Transportation and Tribal botanists and biologists to develop appropriate post-construction revegetation plans that include a woody species component to enhance the vegetative cover at the following locations: riparian area east of Kiowa (approximately reference post 10 to 11.5), Lake Creek and South Fork Cut Bank Creek (approximately reference post 12.5 to 13), and South Fork Milk River (approximately reference post 19.5 to 22).		

Table S-2 (continued). Environmental impacts and mitigation measures by alternative.

No-Build Alternative (Alternative A)	Alternative B	Alternative C (Preferred Alternative)	Duck Lake Road Alternate Route
Threatened and Endangered Species (continued)			
Mitigation Measures (continued)	***Gray Wolf*** ▪ As previously described, the proposed crossing structures and vegetation retention guidelines will facilitate wildlife movement through the project corridor. No additional conservation measures are proposed. ***Canada Lynx*** ▪ As previously described, numerous measures are proposed to facilitate wildlife crossing through the US 89 project corridor. Because lynx habitat is limited to the portion of the corridor near Hudson Bay Divide, it is proposed that construction plans specify that from reference post 23.5 to 24.5 clearing and grubbing are limited to the minimum amount necessary beyond the construction limits (not the right-of-way limits), and any temporary clearing necessary for culvert or utility line installation or other similar activities outside the construction limits but within the right-of-way will be kept to the smallest area possible, to be reclaimed following construction. ***Bull Trout*** ▪ Conservation measures are the same as those described in the Fisheries Resources section of this table.		
Socioeconomic Considerations			
Impacts ▪ No impacts are expected.	*Impacts* ▪ For a 4-year construction period, there would be a direct generation of approximately 200 construction-related jobs and an indirect benefit of approximately 25 additional jobs. For a 6-year construction period, there would be a direct generation of approximately 135 construction-related jobs and an indirect benefit of approximately 15 additional jobs. ▪ There would be a direct infusion of approximately $12.8 million to the local economy. ▪ The café/general store at Kiowa may lose some tourist-related business, which would be partially offset by increases in construction-related business. ▪ Privately owned campgrounds would lose some tourist business during the construction period but would gain some business from construction workers.	*Impacts* ▪ For a 4-year construction period, there would be a direct generation of approximately 220 construction-related jobs and an indirect benefit of approximately 25 additional jobs. For a 6-year construction period, there would be a direct generation of approximately 145 construction-related jobs and an indirect benefit of approximately 20 additional jobs. ▪ There would be a direct infusion of approximately $13.9 million to the local economy. ▪ The café/general store at Kiowa may lose some tourist-related business, which would be partially offset by increases in construction-related business. ▪ Privately owned campgrounds would lose some tourist business during the construction period but would gain some business from construction workers.	*Impacts* ▪ There would be a direct generation of approximately 82 construction-related jobs and an indirect benefit of approximately 12 additional jobs. ▪ There would be a direct infusion of approximately $4.0 million to the local economy. ▪ The businesses at reference posts DLR-33 and DLR 33.5 in improvement area 3 could lose business during construction on Duck Lake Road. These businesses would likely benefit from an increase in business during construction on US 89.

Table S-2 (continued). Environmental impacts and mitigation measures by alternative.

No-Build Alternative (Alternative A)	Alternative B	Alternative C (Preferred Alternative)	Duck Lake Road Alternate Route
Socioeconomic Considerations (continued)			
Mitigation Measures ▪ No mitigation measures are required.	*Mitigation Measures Common to Alternatives B and C* ▪ Hiring for project construction will be managed in accordance with the current memorandum of understanding between the Blackfeet Nation and the Montana Department of Transportation. ▪ To minimize impacts on the café/general store at Kiowa and the Aspenwood Café and campground on US 89, the Montana Department of Transportation will keep US 89 open to travel during construction and will minimize traffic delays to the extent feasible during the peak tourist season (Fourth of July through Labor Day).		*Mitigation Measures* ▪ Mitigation measures would be similar to those described for Alternatives B and C. ▪ To minimize impacts on the café at reference post DLR-33.5 and the bed and breakfast establishment at reference post DLR-33, the Montana Department of Transportation will keep Duck Lake Road open to travel during construction and will minimize traffic delays to the extent feasible.
Displacements and Right-of-Way Acquisition			
Impacts ▪ No impacts are expected.	*Impacts* ▪ An area of approximately 151 hectares (373 acres) of unimproved lands would be acquired.	*Impacts* ▪ An area of approximately 154 hectares (381 acres) of unimproved lands would be acquired.	*Impacts* ▪ An area of approximately 37 hectares (91 acres) of unimproved lands would be acquired.
Mitigation Measures ▪ No mitigation measures are required.	*Mitigation Measures Common to Alternatives B and C* ▪ The Montana Department of Transportation will purchase property at the fair market value or will purchase an easement for unimproved trust lands at the fair market value.		*Mitigation Measures* ▪ Measures are similar to those described for Alternatives B and C.
Land Use and Farmlands			
Impacts ▪ No impacts are expected.	*Impacts* ▪ Approximately 151 hectares (373 acres) of additional right-of-way would be acquired either through purchase or easement.	*Impacts* ▪ Approximately 154 hectares (381 acres) of additional right-of-way would be acquired either through purchase or easement.	*Impacts* ▪ Approximately 37 hectares (91 acres) of additional right-of-way would be acquired either through purchase or easement.
Mitigation Measures ▪ No mitigation measures are proposed.	*Mitigation Measures Common to All Action Alternatives* ▪ The Montana Department of Transportation will purchase property at fair market value or will purchase an easement for right-of-way needs on Tribal lands and Indian allotted trust lands.		

Table S-2 (continued). Environmental impacts and mitigation measures by alternative.

No-Build Alternative (Alternative A)	Alternative B	Alternative C (Preferred Alternative)	Duck Lake Road Alternate Route
Transportation			
Impacts ▪ Traffic volumes would increase because of the general increase in background traffic levels. ▪ Duck Lake Road would remain at level of service (LOS) A in 2025. ▪ By 2025, US 89 between Browning and Kiowa falls to LOS C, and US 89 between Kiowa and Saint Mary falls to LOS C. ▪ The existing insufficient roadway shoulders and pullout areas for bicycle and pedestrian use would continue.	*Impacts* ▪ Travel times during construction would increase. ▪ Access to properties adjacent to the construction zone would be less convenient for periods of several weeks to a month or longer. ▪ Motorized traffic volumes are expected to increase at the same rate as under the no-build alternative, although bicycle traffic may increase due to the provision of wider shoulders. ▪ By 2025, US 89 between Browning and Kiowa would function at LOS C (same as the no-build alternative), and US 89 between Kiowa and Saint Mary would function at LOS C (same as the no-build alternative). ▪ Designating Duck Lake Road as an alternate truck route for US 89 would result in approximately 1.3 percent lower traffic volumes on US 89. ▪ Accident frequency would be expected to be less than under the no-build alternative.	*Impacts* ▪ Impacts would be similar to those of Alternative B. However, wider shoulders would result in an incremental increase in safety for bicyclists than that under Alternative B.	*Impacts* ▪ Traffic volumes would increase approximately 1.3 percent as a result of designating Duck Lake Road as an alternative truck route for US 89. Frequency of accidents would be expected to decrease as a result of roadway improvements associated with this option (i.e., better pavement conditions and increased radius of existing curve at reference post DLR-24).
Mitigation Measures ▪ No mitigation measures are proposed.	*Mitigation Measures Common to All Action Alternatives* ▪ A detailed traffic control plan will be prepared and implemented in accordance with Montana Department of Transportation specifications and plans and the most recent Manual on Uniform Traffic Control Devices. ▪ A public information plan will be prepared and implemented by the Montana Department of Transportation that warns motorists in advance of construction activity and indicates possible alternate routes. ▪ Work zone signing will be installed to alert motorists of construction activity. ▪ In the event that Going-to-the-Sun Road reconstruction occurs while US 89 construction is occurring, the Montana Department of Transportation will coordinate with Glacier National Park to minimize traffic delays to the extent feasible, particularly during peak tourist season (Fourth of July through Labor Day).		
Bicycle and Pedestrian Facilities			
Impacts ▪ Under the no-build alternative, the existing insufficient roadway shoulders and pullout areas for bicycle and pedestrian use would remain.	*Impacts* ▪ Bicyclists and pedestrians along US 89 would encounter limited access and delays in construction areas. ▪ This alternative would enhance bicycle safety compared to the no-build alternative and may result in increased use of the roadway by bicyclists compared to current levels of use. ▪ Proposed improvements would create a more relaxed and enjoyable recreational experience for bicyclists.	*Impacts* ▪ Impacts would be similar to those described under Alternative B. ▪ This alternative would enhance bicycle safety slightly more than Alternative B due to the wider shoulder width.	*Impacts* ▪ Construction impacts would be similar to those described under Alternative B. ▪ This option would not result in direct long-term impacts, because the proposed changes would not substantially alter the speed, level, or type of traffic using this roadway. ▪ Construction of an off-road parking area at reference post DLR-4.5 would improve pedestrian access to Cut Bank Creek.

Table S-2 (continued). Environmental impacts and mitigation measures by alternative.

No-Build Alternative (Alternative A)	Alternative B	Alternative C (Preferred Alternative)	Duck Lake Road Alternate Route
Bicycle and Pedestrian Facilities (continued)			
Mitigation Measures ■ No mitigation measures are proposed.	*Mitigation Measures Common to Alternatives B and C* ■ Implementation of a traffic control plan and a public information plan as submitted by the contractor and approved by the Montana Department of Transportation will warn bicyclists and pedestrians of construction activity in advance and indicate possible alternative routes. ■ In the event that Going-to-the-Sun Road reconstruction occurs concurrently with US 89 construction, the Montana Department of Transportation will coordinate with Glacier National Park to minimize traffic delays to the extent feasible, particularly during peak tourist season (Fourth of July through Labor Day). ■ The Montana Department of Transportation will keep US 89 open to travel during construction and will minimize traffic delays to the extent feasible during the peak tourist season (Fourth of July through Labor Day). ■ The use of shoulder rumble strips in accordance with MDT policy (latest revision dated June 23, 2000) will be considered during final design of Alternative C to provide additional safety for bicyclists.		*Mitigation Measures* ■ No mitigation measures are required.
Services and Utilities			
Impacts ■ No impacts are expected.	*Impacts Common to Alternatives B and C* ■ During construction, temporary lane closures would result in traffic delays, affecting the timeliness of emergency service. ■ Blackfeet Transit, Browning Public Schools, and the Eagle Shield meals-on-wheels program may need to develop alternative routes and contingency plans to ensure that transportation and in-home senior services continue during construction. ■ Solid waste collection services would require coordination with construction activities. ■ Relocation of telecommunications cables and utility lines along US 89 may be required, especially in areas where realignments are proposed and in sites where substantial cutting is required.		*Impacts* ■ Impacts would be similar to those of Alternative B. ■ Relocations of telecommunication and electrical services likely would be required in some areas along Duck Lake Road.
Mitigation Measures ■ No mitigation measures are proposed.	*Mitigation Measures Common to All Action Alternatives* ■ Anticipated road closures or schedules during construction will be coordinated with the fire departments on the reservation and in surrounding communities and the local police services to ensure that reliable emergency access is maintained and alternative plans or reroutes (where possible) are developed to avoid significant delays in response times. ■ Precise locations of underground utilities will be identified prior to construction by using base maps, as-built drawings, and field checks. ■ Appropriate use of pipe support systems, trench sheeting and shoring, or other precautionary measures will be used to minimize potential for damage to exposed utilities. ■ The city of Browning, Indian Health Service, Glacier Electric Co-op, Blackfeet Utilities Commission, Montana Power, AT&T, and Three Rivers Disposal will be consulted to minimize any potential utility service disruptions during construction; utility companies will be required to notify customers of any planned disruptions. ■ Any utilities that may be affected during construction will be buried, if feasible.		
Hazardous Materials			
Impacts ■ No impacts are expected.	*Impacts* ■ Potential short-term impacts could result from the use of hazardous materials (lubricants, fuels, solvents, etc.) during construction. ■ There would be a low likelihood of impacts (releases) from construction activities or from encountering sites with existing soil or ground water contamination.	*Impacts* ■ Impacts would be similar to those of Alternative B.	*Impacts* ■ Impacts would be similar to those of Alternative B.

Table S-2 (continued). Environmental impacts and mitigation measures by alternative.

<table>
<tr><th>No-Build Alternative
(Alternative A)</th><th>Alternative B</th><th>Alternative C (Preferred Alternative)</th><th>Duck Lake Road Alternate Route</th></tr>
<tr><td colspan="4">Hazardous Materials (continued)</td></tr>
<tr><td>Mitigation Measures
▪ No mitigation measures are proposed.</td><td colspan="3">Mitigation Measures Common to All Action Alternatives
▪ There will be special provisions included in the contract documents to address management of contaminated soil and ground water, as needed.
▪ If hazardous materials are encountered during construction, the contractor will stop work and coordinate with the MDT Project Manager to ensure the material is managed in accordance with applicable laws and regulations.
▪ Long-term maintenance of the roadways will include standard operating procedures to address management of hazardous materials if hazardous materials are encountered.</td></tr>
<tr><td colspan="4">Historic and Cultural Resources</td></tr>
<tr><td>Impacts
▪ No impacts are expected.</td><td>Impacts
▪ Based on preliminary investigations, the historic bridge at South Fork Milk River, a Section 4(f) resource and historic site, would be left in place and widened. However, if the bridge cannot be brought to current standards through modification of the existing structure, it would be replaced.
▪ The historic bridge at South Fork Cut Bank Creek, a Section 4(f) resource and historic site, would be removed.
▪ Segments of the historic Blackfeet Highway would be removed within the US 89 construction limits.
▪ Construction would disturb several cloth-offering sites in the project corridor.</td><td>Impacts
▪ Impacts would be similar to those of Alternative B.</td><td>Impacts
▪ Segments of the historic Browning to Babb to Saint Mary Stage Road, Browning to Peskan Road, and Old Duck Lake Road within the Duck Lake Road construction limits would be removed.</td></tr>
<tr><td>Mitigation Measures
▪ No mitigation measures are proposed.</td><td colspan="3">Mitigation Measures Common to All Action Alternatives
▪ If a cultural resource is encountered during construction, the contractor will stop work and coordinate with the MDT Project Manager, who will notify the MDT cultural resource specialist. The MDT cultural resource specialist will coordinate with the Blackfeet Cultural Department and the State Historic Preservation Office, as appropriate.
▪ The bridges will be documented in accordance with Historic American Buildings Survey and Historic American Engineering Record standards.
▪ Any historic bridge intended for removal would first be offered for adoption, if required, in accordance with the requirements of USC Title 23 Section 144(o)(4).
▪ Cloth-offering sites within the project corridor will be moved by the Blackfeet Cultural Department.</td></tr>
<tr><td colspan="4">Recreation</td></tr>
<tr><td>Impacts
▪ No impacts are expected.</td><td>Impacts
▪ Short-term impacts on recreation would stem from construction-related noise encroaching on scenic overlooks, wildlife viewing areas, hunting and fishing areas, and local campgrounds.
▪ Construction delays or detours would decrease user enjoyment or use of recreational areas accessible from US 89.</td><td>Impacts
▪ Impacts would be similar to those of Alternative B.</td><td>Impacts
▪ Impacts would be similar to those of Alternative B, although intensity and duration of short-term impacts would be slightly less due to the smaller construction area.</td></tr>
<tr><td>Mitigation Measures
▪ No mitigation measures are proposed.</td><td colspan="2">Mitigation Measures Common to Alternatives B and C
▪ Construction materials and equipment will be stored in designated stockpile and staging areas. Only equipment being used in the area of active construction will be located in the construction area, other equipment will be stored at staging areas.
▪ US 89 will remain open to travel during construction, and traffic delays will be minimized to the extent feasible during peak tourist season (Fourth of July through Labor Day).
▪ In the event that Going-to-the-Sun Road reconstruction occurs while US 89 construction is occurring, the Montana Department of Transportation will coordinate with Glacier National Park to minimize traffic delays to the extent feasible, particularly during peak tourist season (Fourth of July through Labor Day).
▪ Provide scenic pullouts for tourists.</td><td>Mitigation Measures
▪ Duck Lake Road will remain open to travel during construction, and traffic delays will be minimized to the extent feasible during the peak tourist season.</td></tr>
</table>

Table S-2 (continued). Environmental impacts and mitigation measures by alternative.

<table>
<tr><th>No-Build Alternative
(Alternative A)</th><th>Alternative B</th><th>Alternative C (Preferred Alternative)</th><th>Duck Lake Road Alternate Route</th></tr>
<tr><td colspan="4">Visual Quality</td></tr>
<tr><td>Impacts
▪ No impacts are expected.</td><td>Impacts
▪ Visual quality in the corridor for both viewers of the road and viewers from the road would be compromised due to construction stockpiling and equipment storage, exposed soils from clearing and grading activities, traffic congestion in areas of active construction, and reduced visibility resulting from dust, exhaust, and airborne debris in areas of active construction.
▪ Expanded roadway width, new structures and signage, and clearly marked center and fog lines would slightly diminish the rural character of the US 89 corridor.</td><td>Impacts
▪ Impacts would be similar to those of Alternative B. The impacts would be slightly greater in duration and intensity due to increased roadway width and the construction area.</td><td>Impacts
▪ Impacts would be similar to those of Alternative B, but of shorter duration and less intensity, because improvements would be limited to three locations and the overall roadway width would not change substantially.</td></tr>
<tr><td>Mitigation Measures
▪ No mitigation measures are proposed.</td><td colspan="3">Mitigation Measures Common to All Action Alternatives
▪ Sections of the corridor will be replanted in accordance with the Montana Department of Transportation Standard Specifications.
▪ Erosion control structures will be maintained and removed as soon as the area is stabilized.
▪ During construction, when dry periods occur, water will be applied to exposed soils as needed to minimize airborne sediment.
▪ Construction materials and equipment will be stored in designated stockpile and staging areas. Only equipment being used in the area of active construction will be located in the construction area; other equipment will be stored at staging areas.
▪ Placement of fill that would block unique views will be minimized.
▪ Adjacent cut-and-fill slopes will be planted with desirable grasses and other low-profile plants.</td></tr>
</table>

CHAPTER 1

Purpose of and Need for Action

Introduction

The Montana Department of Transportation and the Federal Highway Administration propose to improve a 41-kilometer (25.5-mile) segment of US Highway 89 (US 89) east of Glacier National Park in Glacier County, Montana (Figure 1). US 89 is on the Montana Primary Highway System. The US 89 Browning to Hudson Bay Divide project initially considered improvement of a network of roadways that perform some of the transportation functions that might otherwise be performed by US 89 if it met current roadway standards. As a result of this initial consideration, MDT and FHWA concluded that the most pressing need for roadway improvements within this roadway network exists in the transportation corridor between the Saint Mary-Babb area (including points north of Babb and west of Saint Mary) and the Browning area (including points south and east of Browning). US 89 and Duck Lake Road function as the primary transportation links between these two areas. Therefore, the project has focused on potential improvements to US 89 between Hudson Bay Divide and Browning as well as improvements to Duck Lake Road between US 89 south of Babb and Browning. The project has not included consideration of the portion of US 89 north of Hudson Bay Divide because this segment of US 89 has recently been widened and is not in need of improvement. Further detail on the alternative development and selection process, including a description of those alternatives that were initially considered but then eliminated from further study is contained in Chapter 2.

The US 89 improvement project analyzed in this final environmental impact statement (EIS) would improve the segment of US 89 from the city of Browning to Hudson Bay Divide by increasing the roadway width to either 9.8 meters (32 feet) or 11 meters (36 feet) and would consider optional improvements at three areas along Duck Lake Road (Montana Secondary Highway 464). All proposed improvements are located within the Blackfeet Indian Reservation. The purpose of the project is to improve traffic flow, roadway safety, and roadway maintenance within the transportation corridor between Browning and Saint Mary-Babb. The proposed project would improve US 89 to meet current Montana Department of Transportation minimum design standards for a rural minor arterial.

For the purposes of this final EIS, the *project corridor* is defined as the area to be disturbed by reconstruction and is generally the area within 60 meters (200 feet) of the centerline of the existing roadway. The *project area* includes the areas immediately adjacent to the project corridor that have the potential to be affected by actions within the project corridor. The *project vicinity* is the regional area, which influences the conditions within the project area.

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Figure 1. **Vicinity map of the US 89 improvement project, Montana.**

Project Purpose and Need

This section describes the purpose and need for the US 89 improvement project, identifies the project objectives, and describes the current traffic conditions in the project area.

Project Purpose and Need

The purpose of the proposed project is to improve traffic flow, roadway safety, and roadway maintenance within the transportation corridor between Browning and Saint Mary-Babb. Hudson Bay Divide was identified as a logical terminus for the improvements on US 89 because it is the point where improvements from this project will match with the recently reconstructed segment of US 89 to the north.

This project is needed for the following reasons:

- US 89 from Browning to Hudson Bay Divide is a critical portion of the roadway network serving the Blackfeet Indian Reservation and the east entrances of Glacier National Park.
- US 89 serves a wide variety of vehicle types and users with a diverse mix of traffic and traveling characteristics and needs, that are currently not met by the existing roadway configuration.
- The diverse mix of traffic and traveling characteristics results in traveler safety issues associated with vehicle speed, frequency of stops, and proximity of bicyclists to vehicles.
- US 89 is narrow, with sharp curves and few turnouts. Large areas of the highway are rough and uneven. Pavement overlays are no longer a viable option because of the narrow roadway. It is becoming increasingly difficult and expensive to maintain. Design features of the roadway contribute to drifting snow and make snow removal slow and expensive.

US 89 from Browning to Hudson Bay Divide is a critical portion of the roadway network serving the Blackfeet Indian Reservation and Glacier National Park (Figure 2). This corridor extends north to the Port of Piegan at the Canadian border and southeast to Yellowstone National Park, representing an important recreational and truck route (Figure 1).

Because of its location on the Blackfeet Indian Reservation, and its connection to several National Parks and the Port of Piegan border station, US 89 accommodates a wide variety of vehicular traffic, including cars, trucks, and recreational vehicles. All of these types of vehicles have different movement characteristics (e.g., speed and frequency of stops) resulting in different sets of desirable roadway characteristics (e.g., speed limit designations, site distances, location and frequency of turnouts, rest facilities). The existing two-lane roadway is narrow, with sharp curves and few turnouts, providing few opportunities for passing slow-moving vehicles and bicyclists. Because of these roadway characteristics and the variety of vehicles using the roadway, vehicles must travel more slowly at times. Average daily traffic volumes are projected to increase over the next 25 years, exacerbating the effects of the roadway configuration on traffic flow.

Many of the factors affecting traffic flow in the corridor are also factors affecting roadway safety. Sharp curves, narrow shoulders, and numerous roadside obstacles such as steep cut-and-fill slopes reduce the overall safety of the roadway. None of the existing US 89 roadway between Browning and Hudson Bay Divide meets current state and federal roadway design requirements. The diverse mix of traffic and traveling characteristics results in traveler safety issues associated with vehicle speed and frequency of stops. The roadway has insufficient roadway shoulders and pullout areas for bicycle and pedestrian use. There are few places where it is suitable to pass slow-moving vehicles or for slow-moving vehicles to pull off the road and stop. Accidents have become increasingly common, especially in the mountainous section of the roadway north of Kiowa. The accident rate on US 89 from 1994 to 1999 was 1.81 accidents per million vehicle miles of travel, compared with a Montana state average accident rate of 1.55 for similar roads. The absence of right-of-way fencing allows large domestic animals to enter the roadway. Poor sight distance and lack of adequate clear zone contribute to collisions with wild and domestic animals.

US 89 is becoming increasingly difficult and expensive to maintain. The structural section of the roadway has deteriorated to the extent that large areas are rough and uneven. Pavement overlays are no longer a viable option for roadway maintenance because the paved surface, which becomes narrower with each successive overlay, is already dangerously narrow. Snow removal, particularly in the segment of US 89 from Kiowa to Hudson Bay Divide, is complicated by a lack of snow storage areas. Steep cut slopes and vegetation within a few feet of the roadway contribute to drifting and make snow removal slow and expensive.

To address the need for improved traffic flow and safety on US 89, this project also addresses the potential for designating Duck Lake Road as an alternate route for truck traffic traveling between Babb (and points north of Babb) and Browning (and points west, south, and east of Browning). Designating Duck Lake Road as an alternate truck route would shift some truck traffic from US 89 to Duck Lake Road, thereby improving traffic flow and safety on US 89. Improvements would be required at several locations on Duck Lake Road to make it a fully functional truck route.

Project Objectives

In undertaking any action pursuant to the project purpose and need, the Montana Department of Transportation must adhere to all applicable state, federal, and Tribal adopted plans, policies, and regulations that address any of the following issues:

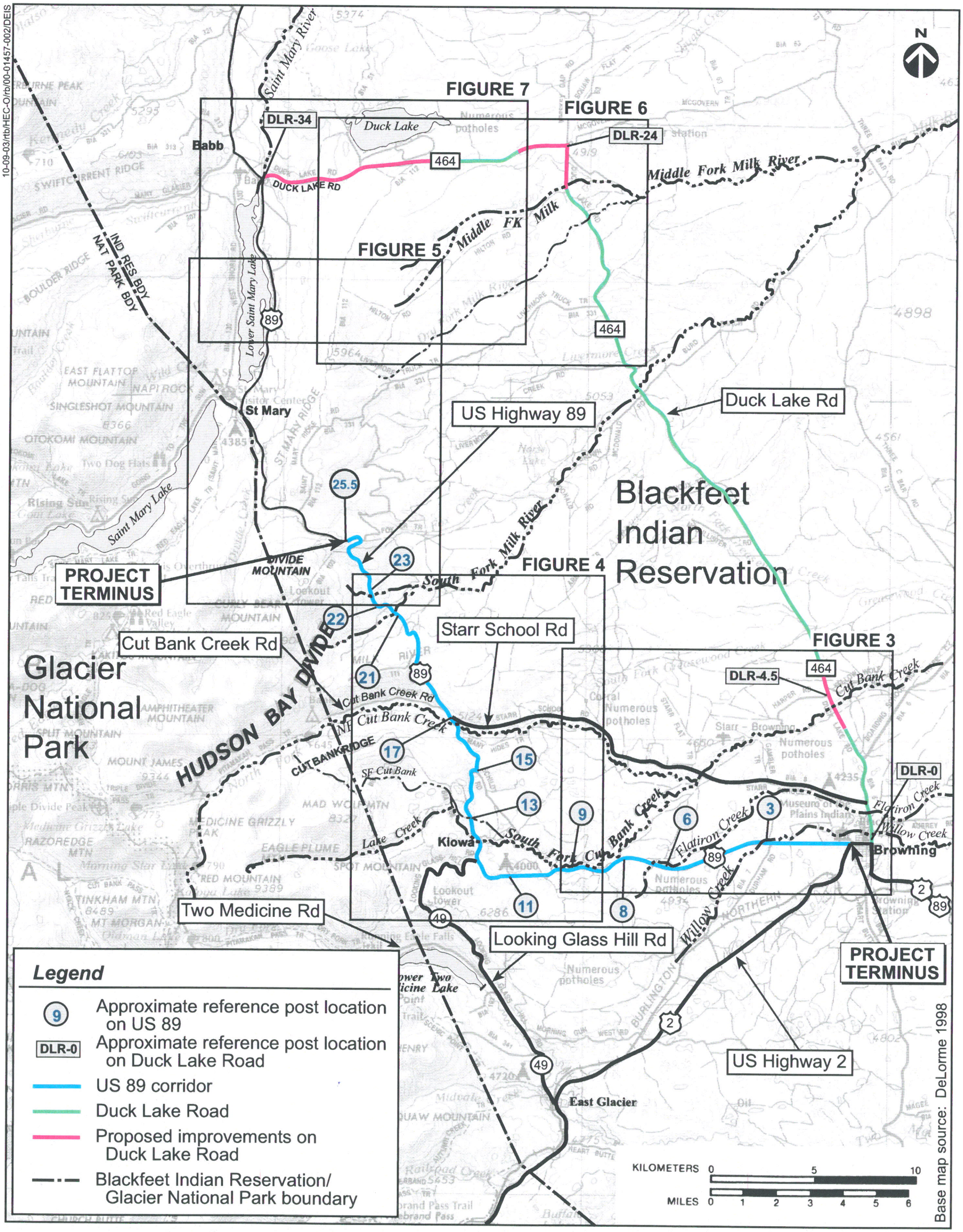

Figure 2. **Roadway network showing segments proposed for improvements in the US 89 project area.**

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- Roadway location, design, and construction
- Environmental protection, including the federal Endangered Species Act
- Public health and safety
- Trust responsibilities for protecting Native American treaty rights.

Based on the project purpose and need, and guidance from existing plans, policies, and regulations, the Montana Department of Transportation developed an overall mission statement for the US 89 project:

> *Build a roadway that is a pleasure to drive and give it a "look and feel" – a theme – that provides a strong identity for the Blackfeet Nation and complements Glacier National Park. Give people a reason to stop, to enjoy the area, and to want to come back.*

Through its improvements to US 89, the Montana Department of Transportation would strive to achieve specific objectives that include:

- Improve roadway safety.
  - Make US 89 safer and more comfortable.
  - Remedy roadway conditions associated with known design deficiencies.
  - Undertake roadway safety improvements consistent with required roadway standards.
  - Provide safer opportunities for bicycles and pedestrians.
  - Provide fencing to keep domestic animals off the roadway and reduce animal and vehicular conflicts, thereby enhancing safety.
- Enhance traffic flow.
  - Maintain or improve traffic circulation patterns that use the US 89 corridor, consistent with adopted plans and policies.
  - Maintain and enhance traffic flow on all tourist travel corridors.
  - Accommodate commercial traffic along US 89 or parallel routes.
  - Ensure that critical links in the roadway network are available on a year-round basis.
- Accommodate roadway maintenance.
  - Develop a roadway that requires less regular maintenance.
  - Allow for easier maintenance and snow removal during the winter months.

- Enhance the cultural resources and economic opportunities of the Blackfeet Nation.
  - ☐ Showcase the culture and history of the Blackfeet Nation.
  - ☐ Preserve artifacts and locations of cultural significance to the Blackfeet Nation.
  - ☐ Provide economic opportunities for the Blackfeet Nation.
- Protect the natural environment.
  - ☐ Showcase the natural beauty of the area.
  - ☐ Project activities would be conducted to minimize impacts on legally protected habitats and species.
  - ☐ Comply with requirements of all applicable environmental regulations, including the Endangered Species Act.
  - ☐ Minimize environmental impacts to the extent practicable, and provide appropriate mitigation for identified unavoidable significant adverse environmental impacts.
- Provide an appropriate balance between cost efficiency, roadway safety and function, and environmental protection.

Existing Traffic Conditions

This section summarizes existing traffic conditions in the US 89 project area. A detailed analysis of existing and future traffic conditions is included in Appendix A.

Road Network

US 89 connects communities and recreational areas in western Wyoming, western Montana, and Alberta, Canada (Figure 1). This highway extends between major recreational areas, including Yellowstone National Park, the Bob Marshall Wilderness Area, and Glacier National Park. The highway continues north into Alberta, Canada, where it becomes Alberta Provincial Route 2, and provides vehicular access from Glacier National Park to Waterton Lakes National Park, Jasper National Park, and Banff National Park. Within the project area, US 89 is part of an important loop, which also includes US Highway 2 (US 2), Going-to-the-Sun Road, and Looking Glass Hill Road that is frequently traveled by tourists visiting the project area (Figure 3). The seasonal tourist traffic contributes significantly to traffic congestion during the summer season.

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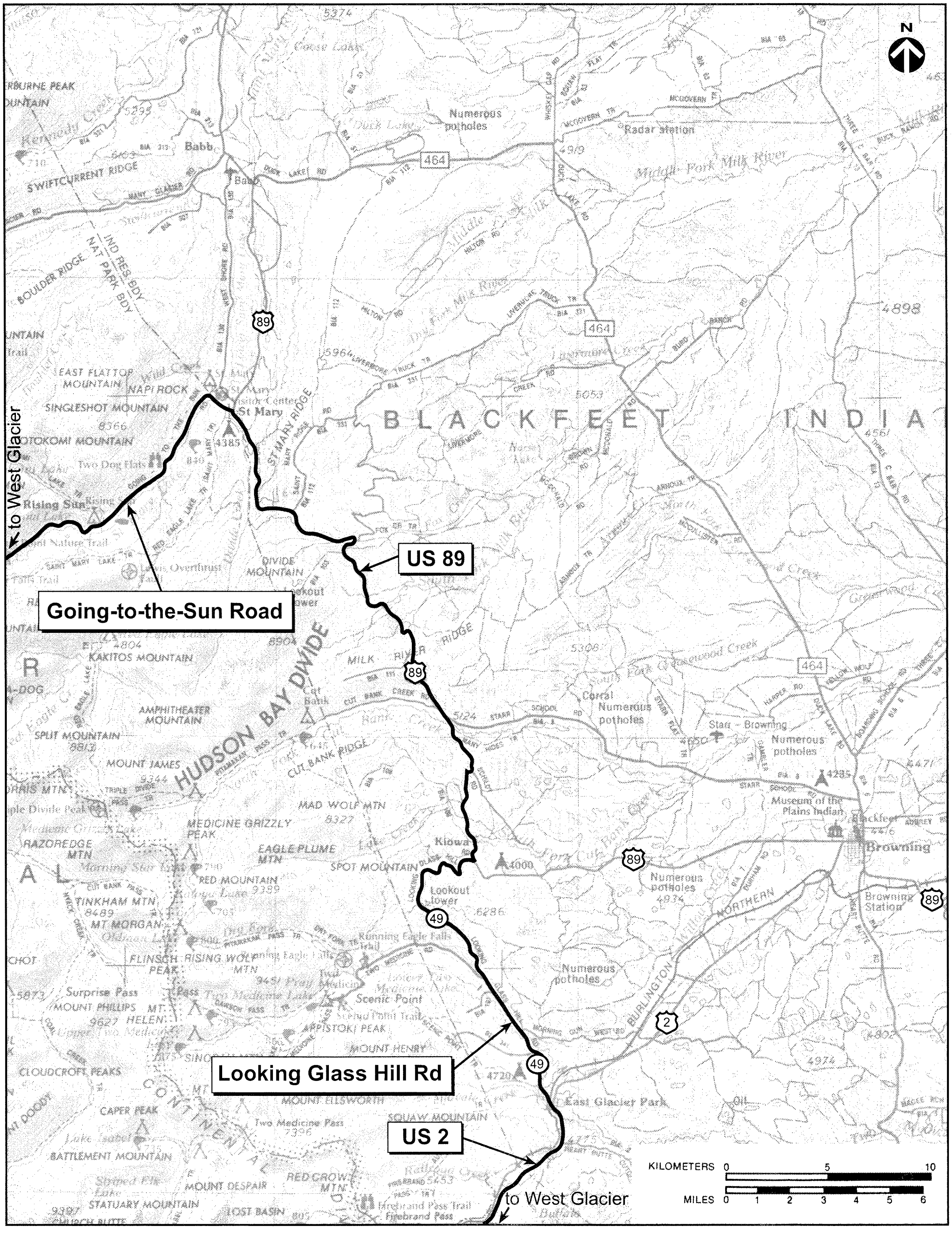

Figure 3. Eastern entrances and portion of summer season scenic loop in Glacier National Park vicinity.

In the project area, several roads intersect US 89 (Figure 2). At the west edge of Browning, US 89 joins US 2. From this junction, US 89/US 2 extends through Browning to a point southeast of town where US 89 continues southeast toward Great Falls, and US 2 continues east toward the town of Cut Bank. US 2 is a major roadway in Montana extending east-west through the northern portion of the state.

Approximately 19.3 kilometers (12 miles) west of the US 89/US 2 junction, the two-lane Looking Glass Hill Road (Montana Highway 49) enters US 89 from the west at Kiowa. Looking Glass Hill Road extends from this junction southward approximately 19 kilometers (12 miles) south to the town of East Glacier. The north portion of the Looking Glass Hill Road is not plowed in winter.

Approximately 7.7 kilometers (4.8 miles) north of Kiowa and immediately north of the North Fork Cut Bank Creek, Starr School Road enters US 89 from the east. The two-lane Starr School Road extends east from this junction 19 kilometers (12 miles) to Browning. Cut Bank Creek Road extends west from the Starr School Road/US 89 junction into Glacier National Park. Cut Bank Creek Road is an unpaved road and is not plowed in winter.

The proposed US 89 improvement project comprises the two-lane, 41-kilometer (25.5-mile) segment of US 89 between its junction with US 2 in the city of Browning, Montana, and the height of land at Hudson Bay Divide approximately 8.7 kilometers (5.4 miles) south of the town of Saint Mary. It also includes portions of the two-lane Duck Lake Road (Montana Secondary Highway 464). Duck Lake Road extends from Browning north and west 53 kilometers (33 miles) to US 89 immediately south of the town of Babb (Figure 2).

Roadway Conditions

The roadway section on US 89 between Browning and Hudson Bay Divide is substandard throughout. Lane widths on the two-lane roadway vary from 3 meters (10 feet) to 3.6 meters (12 feet). The roadway has paved shoulders from 0.3 meters (1 foot) to 1 meter (3 feet) wide. Roadside ditches are narrow and typically located within the clear zone. The clear zone is an area adjacent to the paved roadway that is maintained clear of shrubs and trees. Stopping sight distance is inadequate in many locations, and adequate passing sight distance is almost nonexistent. US 89 from Browning to Hudson Bay Divide traverses rolling terrain from Browning to Kiowa and mountainous terrain from Kiowa to Hudson Bay Divide. The Federal Highway Administration has functionally classified US 89 between Browning and Hudson Bay Divide as a minor arterial. According to the *Montana Department of Transportation Design Manual* (MDT 2001a) the design speed for minor arterials in rolling terrain should be 90 kilometers per hour (55 miles per hour) and in mountainous terrain should be 70 kilometers per hour (45 miles per hour).

The 19.3-kilometer (12-mile) segment of US 89 from Browning to Kiowa, which is located in rolling terrain, includes 59 vertical curves, 25 of which are substandard for a 90-kilometer per hour (55-mile per hour) design speed. In this segment, five of the 18 horizontal curves are substandard for the 90-kilometer per hour design speed. A horizontal curve refers to a flat roadway curve. A vertical curve refers to an up-and-down roadway curve. Many roadway curves are combinations of horizontal and vertical curves.

The 21.7-kilometer (13.5-mile) segment of US 89 between Kiowa and Hudson Bay Divide, which is located in mountainous terrain, has long grades of 6 percent to 7 percent. In this segment, seven of the 33 vertical curves and 52 of the 103 horizontal curves are substandard for a 70-kilometer per hour (45-mile per hour) design speed. Superelevation is substandard on almost all of the horizontal curves and proper transitions between adjoining reverse curves (S-shaped curves) are lacking in most cases. Superelevation describes the tilt of a curved roadway where the roadway edge at the outside of the curve is high with a slope down across the road toward the inside of the curve.

The roadway surface on US 89 within the project corridor is fair. The roadway has been recently resurfaced, much of the resurfacing having taken place in 2000. The structural section, consisting of gravels and asphalt mixes placed over native material, is degrading and beginning to fail at many locations.

Traffic Volumes

Calculated annual average daily traffic (AADT) volumes and related data for the year 2000 at various locations in the project area are shown in Table 1. These volumes are based on available AADT information for 1998 and 1999 as well as annual growth rate factors provided by the Montana Department of Transportation.

Table 1. Existing annual average daily traffic volumes, expected annual growth rates, and percentage of heavy vehicles in the US 89 project vicinity.

Location	2000 AADT	Annual Growth Rate (percent)	Percentage of Average Annual Daily Traffic Consisting of Heavy Vehicles		
			Truck	Bus	RV
US 89 – west of US 2/US 89 junction	1,000	1.1	3.8	0.5	7.7
US 2 – east of US 2/US 89	4,790	2.9	3.5	0.08	1.1
US 89 – southeast of Kiowa	640	3.0	9.0	1.5	18
Looking Glass Hill Rd. – southwest of US 89	710	2.2	4.6	NA	NA
US 89 – north of Kiowa	690	3.0	5.7	0.8	11.4
Starr School Rd. – midway between US 89 and Browning	310	1.6	NA	NA	NA
US 89 – south of Saint Mary	890	3.0	4.3	0.05	8.8
US 89 – north of Saint Mary	1,630	2.0	1.8	0.03	4.5
US 89 – north of Duck Lake Rd.	1,600	2.0	1.8	0.03	4.5
Duck Lake Rd. – east of US 89	660	1.6	NA	NA	NA
Duck Lake Rd. – north of Starr School Rd.	785	1.6	9.9	NA	NA
Duck Lake Rd. – south of Starr School Rd.	6,500	1.7	NA	NA	NA

NA= Not available.

In summary, the AADT along US 89 ranges from approximately 640 to more than 1,630 vehicles depending on the location. West of the US 89/US 2 intersection the AADT is approximately 1,000 vehicles. The AADT on Duck Lake Road, north of the intersection with Starr School Road and within the proposed improvement areas, ranges from approximately 660 to 785, depending on location. According to the analysis presented in Appendix A, traffic volumes on US 89 are typically higher during the summer tourist season than at other times of the year.

Level of service is a qualitative measure describing operational conditions along a roadway or at an intersection based on measures such as speed and travel time, freedom to maneuver, traffic interruptions, comfort, convenience, and safety. Rankings range from level of service (LOS) A (indicating free flow), to LOS E (indicating full capacity), to LOS F (indicating forced flow). The level of service values calculated for the year 2000 for all intersections on US 89 and Duck Lake Road function at LOS A or B during both the morning and evening peak hours. LOS B is considered acceptable for all intersections.

Calculated levels of service for the year 2000 for roadway segments in the US 89 corridor show that US 89 between Browning and Kiowa operates at LOS A; Duck Lake Road operates at LOS A; and US 89 between Kiowa and Hudson Bay Divide operates at LOS B. The Montana Department of Transportation level of service goal for each of these roadway segments is a minimum of LOS C.

Accidents

Based on data from the Montana Department of Transportation and the Emergency Medical Services of the Blackfeet Nation, Table 2 summarizes the accident history along US 89 and Duck Lake Road.

Table 2. Accident data from 1994 to 1999 for US 89, Duck Lake Road, and the state of Montana.

Roadway Segment	Total Accidents 1994 – 1999	Total Injuries 1994 – 1999	Total Fatalities 1994 – 1999	Accident Rate 1994 – 1999	Montana State Accident Rate for Similar Roads
US 89 – Browning to Duck Lake Road	115	130	2	1.81	1.55
Duck Lake Road	56	86	5	1.24	1.77

A review of the information in Table 2 and Appendix A indicates the accident history along US 89 and Duck Lake Road has the following characteristics:

- There is an especially high frequency of single-vehicle accidents on both US 89 and Duck Lake Road.
- Domestic animals on roadways contribute to 23 percent of accidents on US 89.

- A high frequency of accidents (19) between 1994 and 1999 on US 89 occurred at approximately reference post 20.5. This roadway segment is on the north side of Milk River Ridge and includes a sharp double curve.

- The accident rate for US 89 is higher than the accident rate for similar roads in the state of Montana.

Nonmotorized Traffic

Nonmotorized traffic consists primarily of bicycles and pedestrians. No counts of bicycle or pedestrian numbers along US 89 or Duck Lake Road are available, but the numbers appear to be low. In 1999, 640 bicyclists crossed Going-to-the-Sun Road in tour groups. The number of individual bicyclists (those not participating in tour groups) crossing Going-to-the-Sun Road is probably somewhat greater than the number of bicyclists in tour groups. Informal observation suggests that the number of bicyclists along US 89 and Duck Lake Road is considerably less than the number of bicyclists along the Going-to-the-Sun Road. (The foregoing information is based on the Recreation section in Chapters 3 and 4). The condition of US 89 (e.g., limited shoulder width, limited sight distances) may be an impediment to bicycle use of the roadway, but the extent of this potential effect is unknown. Pedestrian traffic along US 89 is incidental.

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CHAPTER 2

Alternatives

Alternative Development Process

This section provides background on the alternative development process and gives a comparison of the three alternatives and one option analyzed in this final EIS. Other alternatives that were considered but are not analyzed in detail in this final EIS are also described and the reasons they were eliminated from further study are presented.

Alternatives for this final EIS were developed to address issues raised through the public involvement process and to meet the project purpose and need for action. The alternatives were developed and refined collaboratively by key project stakeholders, including members of the Steering Committee, the Interdisciplinary Team (responsible for technical advice), and the public. The Steering Committee is made up of representatives from Montana Department of Transportation, Blackfeet Nation, Bureau of Indian Affairs, city of Browning, Glacier County, Glacier National Park, and Glacier-Waterton Visitors Bureau. The Interdisciplinary Team consists of representatives from the Montana Department of Transportation, Federal Highway Administration, Blackfeet Nation, Bureau of Indian Affairs, U.S. Environmental Protection Agency (U.S. EPA), Glacier County, Glacier National Park, Glacier-Waterton Visitors Bureau, Saint Mary KOA, State Department of Commerce, Saint Mary Lodge, State Historical Preservation Office, U.S. Army Corps of Engineers (Corps of Engineers), and U.S. Fish and Wildlife Service (USFWS). During the scoping process, the general public provided input into the development of the preliminary alternatives.

During the EIS scoping process, it was determined that the analysis of US 89 needed to consider the complete roadway network in the vicinity of the proposed project. Issues such as vehicle composition of traffic, travel speeds, and roadway requirements by vehicle type, seasonal versus year-round uses of the roadway network, and maintainability of the roadway network were determined to be critical in deciding appropriate improvements to US 89. These roadways are US 89, Duck Lake Road, Looking Glass Hill Road, and Starr School Road (Figure 2). These roads perform some of the transportation function that might otherwise be performed by US 89 if it met current roadway standards. All US 89 alternatives would originate at the intersection of US 89 and US 2 at Browning and extend to Hudson Bay Divide (reference post 25.5). At that point, the project would match with the recently reconstructed segment of US 89 to the north.

Various roadway segments were combined to create the preliminary alternatives. Some roadway combinations were eliminated early in the review process because they did not meet the purpose and need of the project or would cause significant adverse environmental effects. A total of seven action alternatives were formulated in addition to the no-build alternative, and all are listed below:

- No build
- Widen US 89 to 8.5 meters (28 feet)
- Improve US 89 and Looking Glass Hill Road to standards

- Improve part of US 89, improve all of Looking Glass Hill Road, and make limited improvements to Duck Lake Road
- Improve US 89 to standards and substantially realign US 89 outside the existing road corridor
- Improve US 89 to standards, substantially realign US 89 and Looking Glass Hill Road, and make limited improvements to Duck Lake Road
- Improve US 89 to standards and make limited improvements to Duck Lake Road
- Designate Starr School Road as US 89, improve remaining section of US 89 northward to standards.

The first six alternatives listed above were formulated during the initial phase of alternative development. Additional Steering Committee discussions resulted in the addition of the last two alternatives for preliminary examination. Discussions included alternative roadway alignments (in particular, the importance of meeting the Montana Department of Transportation design standards), opportunities to justify design exceptions if warranted, the need to accommodate bicycle traffic, and effects on protected species and habitats.

The eight preliminary alternatives were reviewed by the Steering Committee and the Interdisciplinary Team. The review also incorporated feedback from the public on the eight preliminary alternatives presented during a public scoping meeting. The review focused on whether the alternatives met the project purpose and need, and how they addressed the project objectives discussed in Chapter 1. Those that met the purpose and need were advanced for consideration in the draft and final EIS. The Steering Committee recommended the following three alternatives, plus one option, for detailed analysis and consideration:

- Alternative A: No Build
- Alternative B: Improve US 89 from Browning to Hudson Bay Divide – Increase Road Width to 9.8 Meters (32 Feet)
- Alternative C: Improve US 89 from Browning to Hudson Bay Divide – Increase Road Width to 11 Meters (36 Feet)
- Option: Improvements to Duck Lake Road Alternate Route.

The Duck Lake Road Option could be combined with either Alternative B or C, and would designate a portion of Duck Lake Road as an alternate truck route for US 89. These three alternatives and the option are discussed below. The remaining alternatives were eliminated from further consideration because some or all of the improvement components that they are composed of did not meet the purpose and need or because they would cause significant environmental effects. Alternatives eliminated from detailed study are discussed at the end of this chapter.

Alternatives Considered in Detail

Alternative A: No Build

The no-build alternative would involve continued maintenance of the existing roadway, including resurfacing, re-striping, repairing failed pavement, replacing damaged guardrail (on an as-needed basis), and removing snow on a seasonal basis.

In addition to maintenance, road improvements would include localized rebuilding of the existing roadbed and spot safety improvements. Road improvements are based on need and would have to compete with other regional projects for funding; therefore, it is difficult to predict the extent and frequency of improvements. Travel lanes would remain approximately 3 meters (10 feet) to 3.6 meters (12 feet) wide and paved shoulders would remain approximately 0.3 meters (1 foot) to 1 meter (3 feet) wide. Roadside ditches would be maintained on a periodic basis.

The roadway alignment would not change under this alternative, and all sharp curves would remain in their current state. No additional right-of-way would be purchased under this alternative.

Under the no-build alternative, no improvements would be made to Duck Lake Road. The Duck Lake Road Alternate Route option, discussed below, could be combined with either of the action alternatives (Alternatives B and C) but would not be implemented under the no-build alternative.

Alternative B: Improve US 89 from Browning to Hudson Bay Divide – Increase Road Width to 9.8 Meters (32 Feet)

The southeastern terminus for this alternative is the intersection of US 2 and US 89 at Browning and is shown in Figure 4, which presents reference posts 0 to 9 of the US 89 improvement project. Figures 5 through 8, which follow, give a complete view of the project area by reference post. The northern terminus is the Hudson Bay Divide (approximately 8.7 kilometers [5.4 miles] south of Saint Mary). Hudson Bay Divide was identified as a logical terminus for the project because it is the geographic high point of the project area, and at the divide, US 89 within the project area transitions to a recently reconstructed segment of the roadway. The total length of the segment proposed for improvement is 41 kilometers (25.5 miles).

Under Alternative B, the existing two-lane configuration of US 89 would remain, but the roadway would be widened to meet the Montana Department of Transportation minimum design standards for a rural minor arterial (Figure 9). The widened roadway cross-section would include two 3.6-meter (12-foot) travel lanes with a 1.2-meter (4-foot) shoulder on each side. The

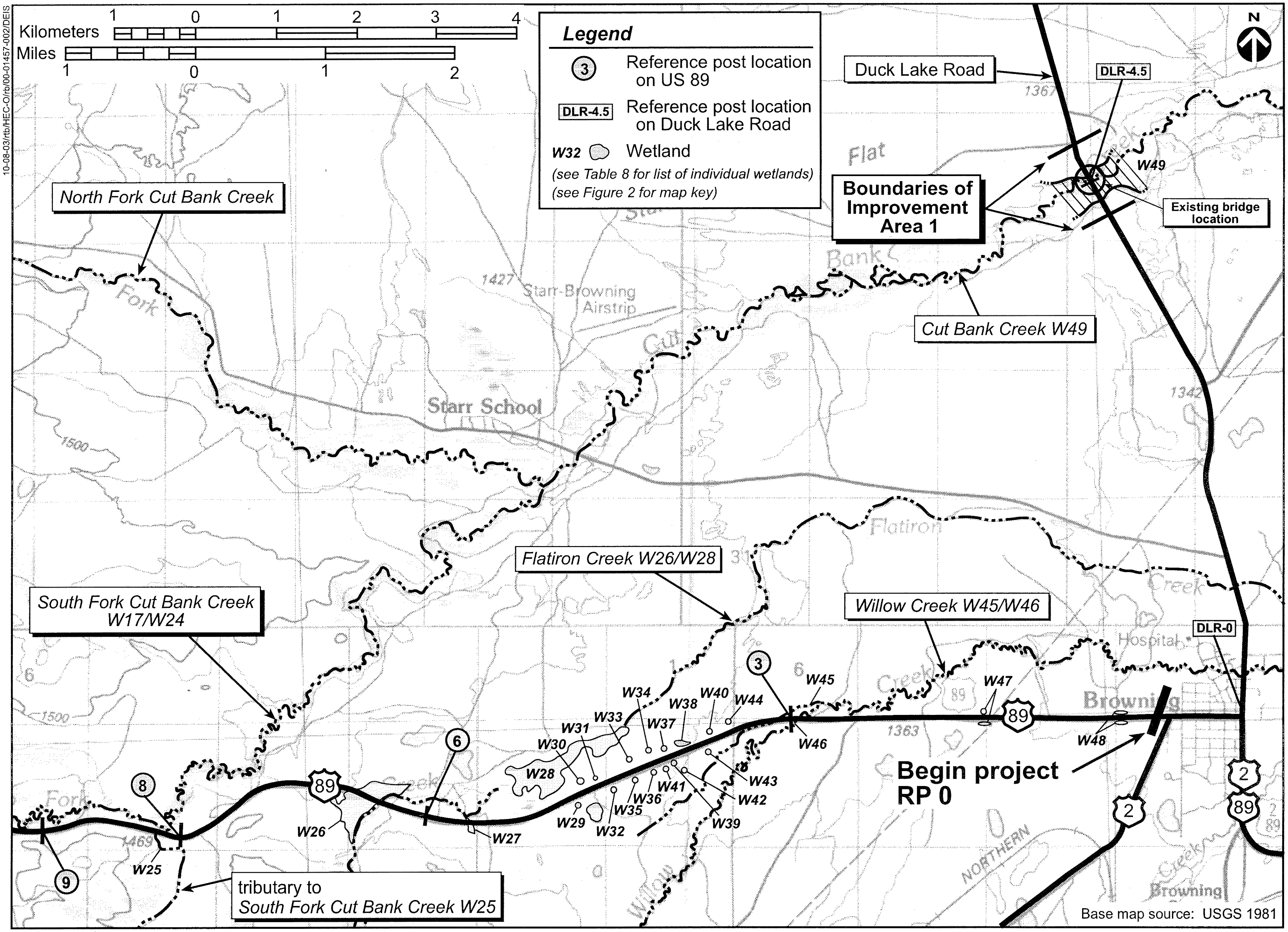

Figure 4. Reference posts 0 to 9 on US 89 and improvement area 1 on Duck Lake Road.

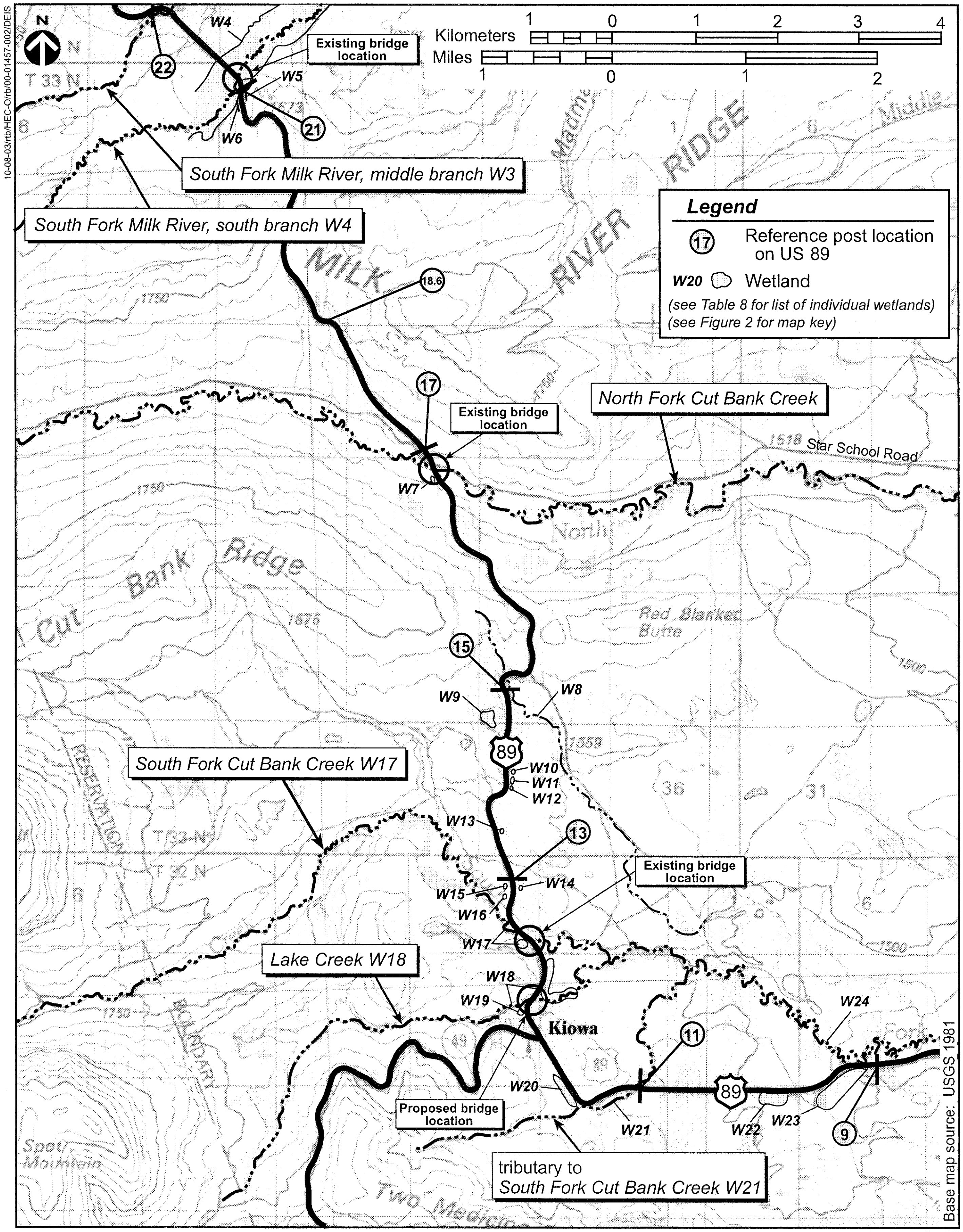

Figure 5. Reference posts 9 to 22 on US 89.

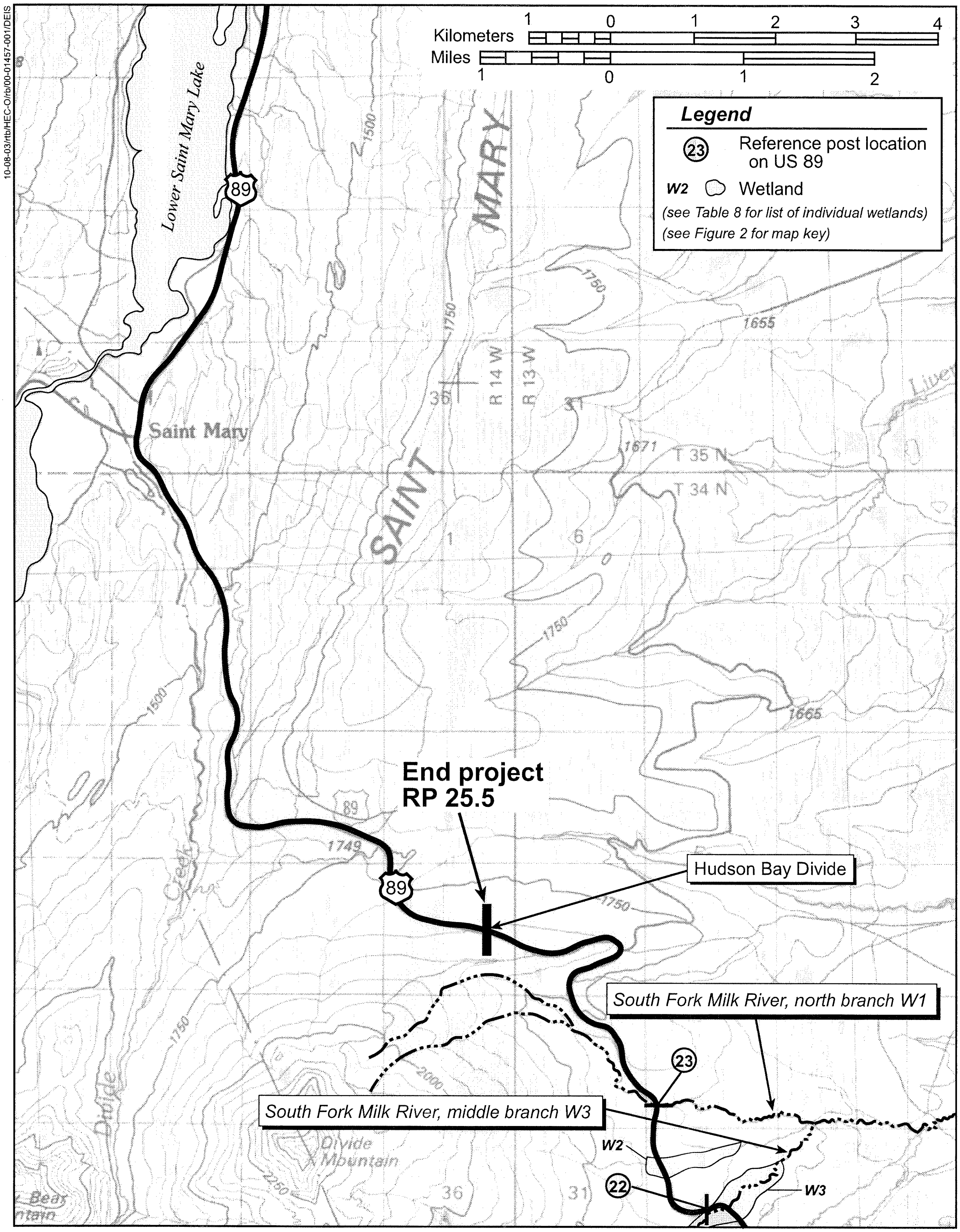

Figure 6. Reference posts 22 to 25.5 on US 89.

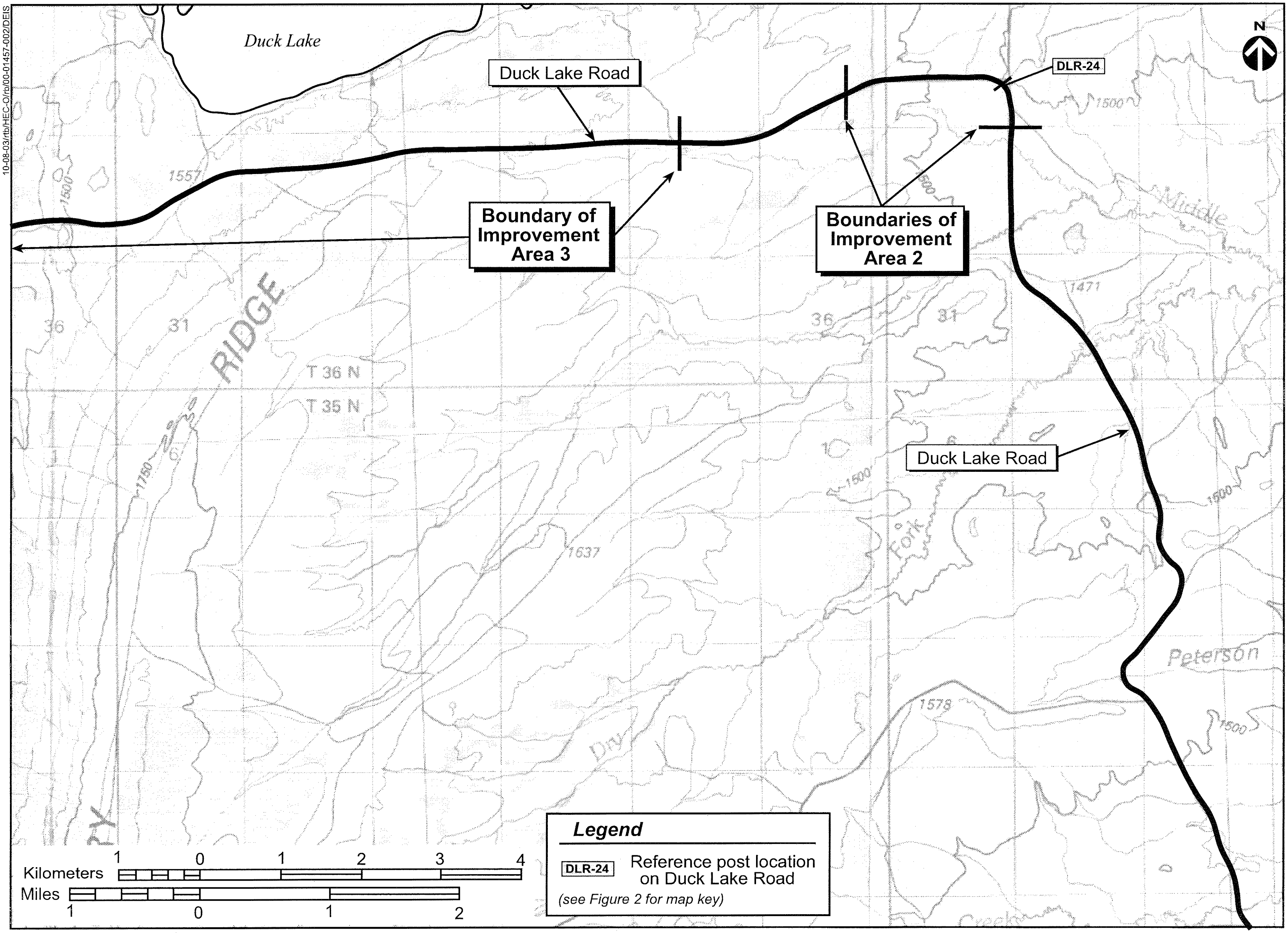

Figure 7. Improvement areas 2 and 3 on Duck Lake Road.

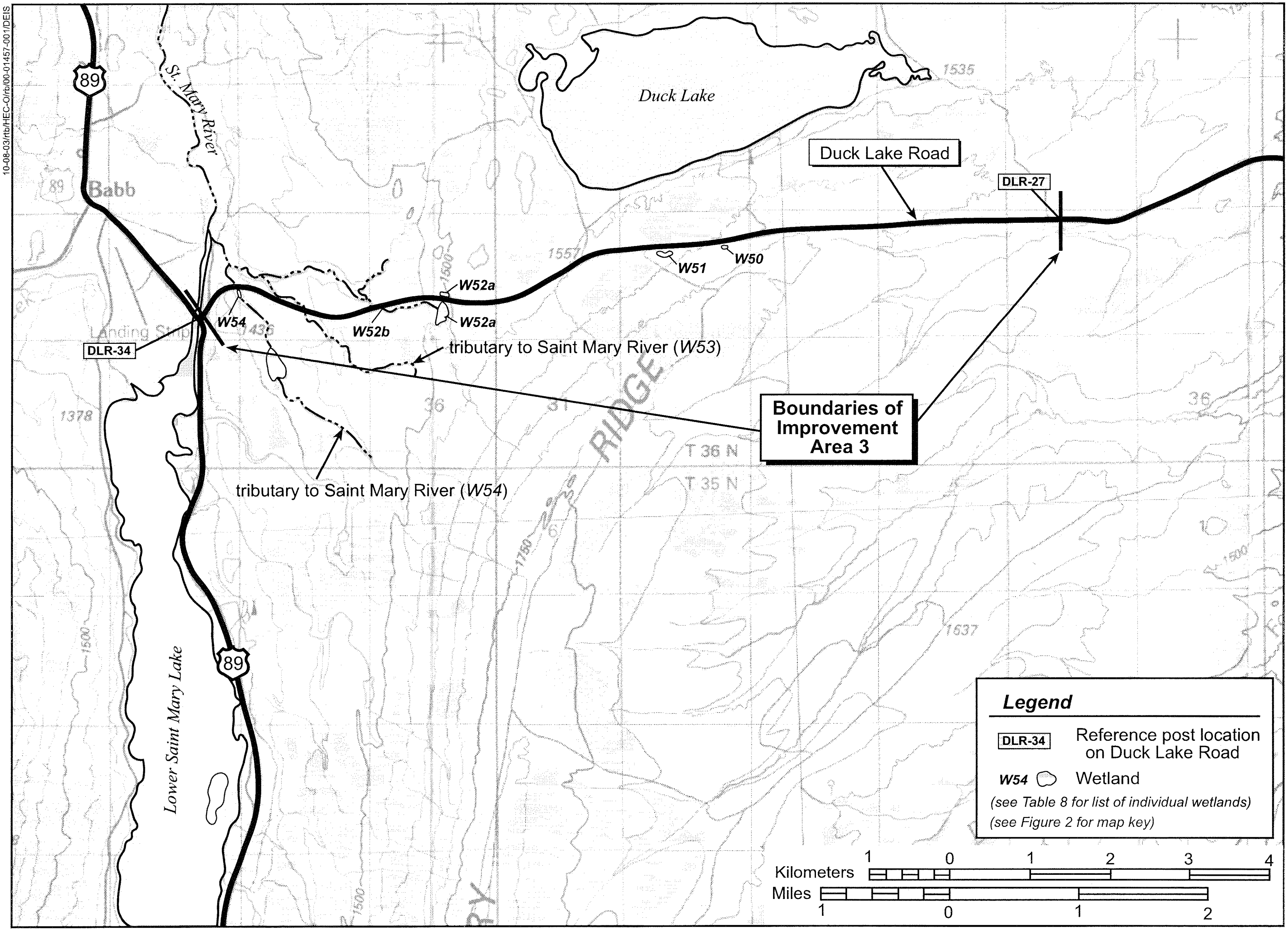

Figure 8. Improvement area 3 on Duck Lake Road.

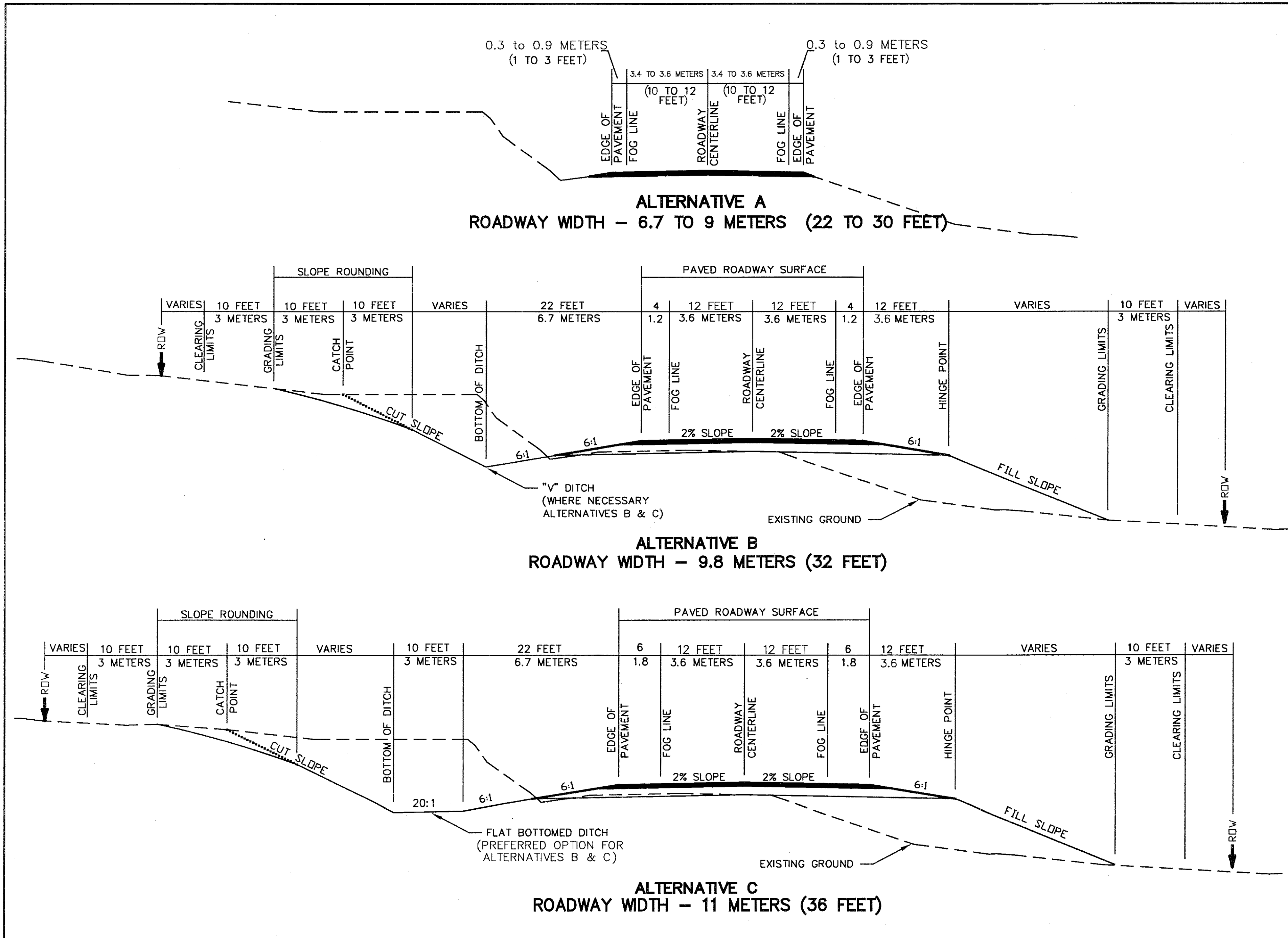

Figure 9. Typical cross-sections of the existing and proposed lane configurations for US 89.

shoulder includes a 0.45-meter or 1.5-foot rumble strip for an overall roadway width of 9.8 meters (32 feet). A uniform crown section would be established, along with superelevations at curves. From the edge of paving, a 6:1 slope would extend down and outward for a distance of 3.6 meters (12 feet). An additional clearing of 3 meters (10 feet) of vegetation would occur outside the catch points.

The optimal ditch design is a flat-bottomed ditch, 3 meters (10 feet) wide. This ditch is designed to provide for snow storage, reduce snow drifting, improve safety by removing roadside obstacles, and be relatively easy to maintain.

In areas where there is a lack of right-of-way or there is a need to avoid sensitive areas or more extensive earthwork, design adjustments may include: low retaining walls, raising or lowering the roadway profile, slight alignment shifts, or alternate ditch designs.

The overall width of the roadway plus adjoining resloped ground would vary from a minimum of approximately 22 meters (72 feet) to a maximum of approximately 75 meters (about 250 feet) depending on the topography adjacent to the roadway. Design exceptions may be sought based on adequate justification (such as the extent of effects on different categories of wetlands and issues associated with other environmental and cultural factors).

The footprint of the road would be as large as 192 hectares (474 acres). The amount of earthwork under this alternative is estimated to be 1,150,000 cubic meters (1,504,000 cubic yards) of excavation and 1,000,000 cubic meters (1,308,000 cubic yards) of fill.

In addition to being widened, the roadway would be realigned to eliminate or increase the radius of existing horizontal curves that are below standard. These locations are listed below.

- At approximately reference post 9.5, approximately 0.6 kilometers (0.4 miles) of the existing roadway would be shifted up to 30 meters (100 feet) northward (Figure 5).

- At approximately reference post 11.5, the existing radius of the horizontal curve would be increased by shifting approximately 0.5 kilometers (0.3 miles) of the existing roadway up to approximately 65 meters (215 feet) northward (Figure 5).

- At approximately reference post 12 (this location is immediately north of the US 89/Looking Glass Hill Road junction at Kiowa), the existing curve would be replaced by a gentle curve by shifting approximately 0.6 kilometers (0.4 miles) of the existing roadway up to approximately 95 meters (310 feet) eastward (Figure 5).

- At approximately reference post 14, the radii of the existing double curve would be increased by shifting approximately 0.4 kilometers (0.25 miles) of the existing roadway up to about 50 meters (165 feet) mostly eastward (Figure 5).

- At approximately reference post 15 (this location is on the south slope of the Cut Bank–Red Blanket Butte Ridge), the existing double curve would be eliminated by shifting approximately 1.6 kilometers (1 mile) of the existing roadway up to about 175 meters (575 feet) mostly westward (Figure 5).

- At approximately reference post 18.6 (this location is on the south slope of the Milk River Ridge), the existing triple curve would be replaced by a broad double curve by shifting approximately 0.5 kilometers (0.3 miles) of the existing roadway up to about 30 meters (100 feet) eastward (Figure 5).

- At approximately reference post 20 (this location is on the north slope of the Milk River Ridge), the existing double curve would be eliminated by shifting approximately 2 kilometers (1.2 miles) of the existing roadway up to about 250 meters (820 feet) mostly westward (Figure 5).

- At approximately reference post 25, the existing triple curve would be replaced by a single curve by shifting approximately 0.7 kilometers (0.45 miles) of the existing roadway up to about 30 meters (98 feet) (Figure 6).

- At approximately reference post 25, the radius of the existing 180-degree hairpin curve just south of the crest of Hudson Bay Divide would be increased by shifting approximately 0.8 kilometers (0.5 miles) of the existing roadway up to about 75 meters (250 feet) mostly northward (Figure 6).

The horizontal alignment would be consistent with design speeds of 90 kilometers per hour (55 miles per hour) from Browning to Kiowa, and 70 kilometers per hour (45 miles per hour) from Kiowa to Hudson Bay Divide. The design speed is based on the functional classification of the road and on the terrain. The vertical alignment would be adjusted as necessary to accommodate the changes to the horizontal alignment. Exceedance of maximum allowable grades (the steepest road allowed by design guidelines) would be minimized (4 percent from Browning to Kiowa, 7 percent from Kiowa to Hudson Bay Divide). The road would be designed and constructed so it can be driven safely and comfortably at the design speed. During final design, where maximum allowable grades would be exceeded, a design exception would be required from the Montana Department of Transportation Preconstruction Engineer.

The road would be rebuilt with imported gravels and crushed rock and placed over the compacted native soils. Additional right-of-way would be required under this alternative, and based upon current ownership, would be purchased or an easement obtained. The cost of construction of this alternative (excluding the cost of right-of-way) would be approximately $45.9 million (2010 dollars). The proposed project would likely be constructed in phases over a period of several years. Phasing details have not been finalized; however, the expectation is that the project corridor would probably be divided into several segments for construction. At present, the earliest construction would begin is 2010. The proposed project would likely be constructed in several phases over a period of five to ten years and one or more segments would be constructed at a time. Funding will determine the timing and specific phasing for the project.

Both Alternative B and Alternative C include the following additional features:

- Pullouts and informational kiosks would be built at scenic areas or areas of cultural significance, with locations to be determined based on stakeholder input. At least five pullouts are anticipated. Potential informational sites include crossings of the Old North Trail and Hudson Bay Divide. Potential vista sites include views of the north and south forks of Cut Bank Creek valley, the South Fork Milk River valley, and the Rocky Mountains.

- Existing bridges would be replaced or widened with the exception of the bridge over North Fork Cut Bank Creek (immediately south of the US 89/Starr School Road intersection just south of reference post 17), which already meets Montana Department of Transportation standards.

- The right-of-way would be fenced. The intent of fencing would be to reduce vehicle-livestock collisions.

- Where new bridges are proposed in the project corridor (Lake Creek-reference post 12 and South Fork Cut Bank Creek-reference post 13), the final design stage would attempt to incorporate wildlife crossing features for passage underneath the roadway while balancing the need to minimize impacts on wetlands.

- During the final design stage, culverts would be sized to accommodate natural streamflow fluctuations and enhance fish passage. Culverts immediately north of Kiowa on Lake Creek (reference post 12) would be replaced with a bridge (Figure 5).

- Where cultural or habitat concerns are not a constraint, cut-and-fill slopes would be moderated to blend with the natural terrain.

- Disturbed areas beyond the clear zone would be replanted with vegetation to reduce the width of visible disturbance and to provide cover for wildlife.

- Outside the new roadway corridor, the existing roadway would be removed and the area restored.

- Snow fences would be used prudently in limited locations to reduce snow drifting on the highway where snow drifting is a known problem.

Alternative C: Improve US 89 from Browning to Hudson Bay Divide – Increase Road Width to 11 Meters (36 Feet) (Preferred Alternative)

The termini for this alternative are the same as those identified for Alternative B.

Under this alternative, US 89 would be widened as in Alternative B except that road shoulders would be 1.8 meters (6 feet) in width rather than 1.2 meters (4 feet) (Figure 9). The additional shoulder width is intended to better accommodate bicycle traffic, addressing safety concerns associated with bicyclists sharing the roadway with automobiles. Ditch design would be the same as that for Alternative B. Because the combined width of the shoulder and ditch section are wider under this alternative than under Alternative B, the footprint of the roadway would be approximately 208 hectares (514 acres), or approximately 10 percent greater than that of Alternative B. Alignments would be the same as those described for Alternative B. The amount of earthwork estimated under this alternative would be approximately 1,300,000 cubic meters (1,700,000 cubic yards) of excavation and 1,100,000 cubic meters (1,439,000 cubic yards) of fill. Additional right-of-way would be acquired through easement or purchase under this alternative. The cost of construction of this alternative (excluding the cost of right-of-way) would be approximately $49.6 million (2010 dollars). Similar to Alternative B, Alternative C would likely be constructed in phases over a period of several years.

Option: Improvements to Duck Lake Road Alternate Route

The Duck Lake Road Option could be combined with either of the action alternatives listed above. Improvements would be made to Duck Lake Road that would make it more attractive for truck use. This option, together with either Alternative B or Alternative C, meets the purpose and need of improving US 89 from Browning to Hudson Bay Divide. Enticing trucks to use this road by providing new surfacing and long stretches of straight roadway would conceivably improve safety on US 89.

The following improvements have been identified as the minimum necessary to improve Duck Lake Road to adequately accommodate commercial truck traffic and would be completed in three improvement areas:

- Within improvement area 1, an off-road parking area would be added near the bridge over Cut Bank Creek at approximately reference post DLR-4.5 (Figure 4).
- Within improvement area 2, the radius of the curve at approximately reference post DLR-24 would be increased to 400 meters (1,312 feet) (Figure 7).

- Within improvement area 3, from approximately reference post DLR-27 to DLR-34), the roadway would be reconstructed to current standards and would include the use of non-frost-susceptible materials (Figure 8).
- Within improvement area 3, at approximately reference post DLR-34, the angle of the intersection of Duck Lake Road with US 89 would be realigned. Improving the angle of intersection would allow southbound trucks on US 89 to safely turn east onto Duck Lake Road (Figure 8).
- Within improvement area 3, a chain-up area would be provided near the Duck Lake Road intersection with US 89 at reference post DLR-34 (Figure 8).

The segment of Duck Lake Road between its intersection with US 2 in Browning and its intersection with Starr School Road, 2.4 kilometers (1.5 miles) north, has a different character and function than the remaining 50.7 kilometers (31.5 miles) to US 89 near Babb. This southernmost 2.4-kilometer (1.5-mile) section is an urban four-lane facility with an intermediate design speed. Under this option, no improvements are proposed for this section of roadway. The following description of existing and proposed conditions applies only to the 50.7-kilometer (31.5-mile) segment north of the Starr School Road intersection.

Duck Lake Road, as it exists today, is a two-lane Secondary Highway. The proposed improvements would take place in three separate locations (Figures 4, 7, and 8). The first area of improvement would be in the vicinity of the bridge over Cut Bank Creek, approximately 7.7 kilometers (4.5 miles) north of Browning. People accessing the stream for recreational purposes (fishing, swimming, etc.) currently park their vehicles along the roadway. Under this option, an access road would be constructed along the east side of the Duck Lake Road embankment 30 meters (100 feet) south of the bridge, and up to five off-road parking spaces would be provided. The footprint of the proposed improvements would be less than 5,000 square meters (53,820 square feet). The work would require approximately 600 cubic meters (790 cubic yards) of excavation and 500 cubic meters (650 cubic yards) of fill. This improvement would require additional right-of-way. Because this facility would not be a typical roadway feature, it is likely that the Montana Department of Transportation would seek to turn over operation and maintenance responsibilities to the Blackfeet Nation, the Bureau of Indian Affairs, or to Glacier County.

The second area of improvement would be the substandard 90-degree curve at reference post DLR-24. The radius of the existing curve is approximately 250 meters (820 feet). Improvements would include realignment along a curve with a 400-meter (1,312-foot) radius. The total realignment would be approximately 900 meters (2,953 feet) in length. The new section of roadway would conform to the current design standards for a rural minor arterial and include the same cross-sectional elements as described for Alternative B (two 3.6-meter (12-foot) lanes, two 1.2-meter (4-foot) shoulders, 6:1 safety slopes, 3-meter (10-foot) flat-bottomed ditches, variable cut-and-fill slopes, and slope rounding) (Figure 10). Total excavation required for the realignment would be approximately 64,100 cubic meters (83,800 cubic yards), total fill would be approximately 4,600 cubic meters (6,000 cubic yards), and the footprint, or newly disturbed area, would be approximately 6 hectares (14.8 acres).

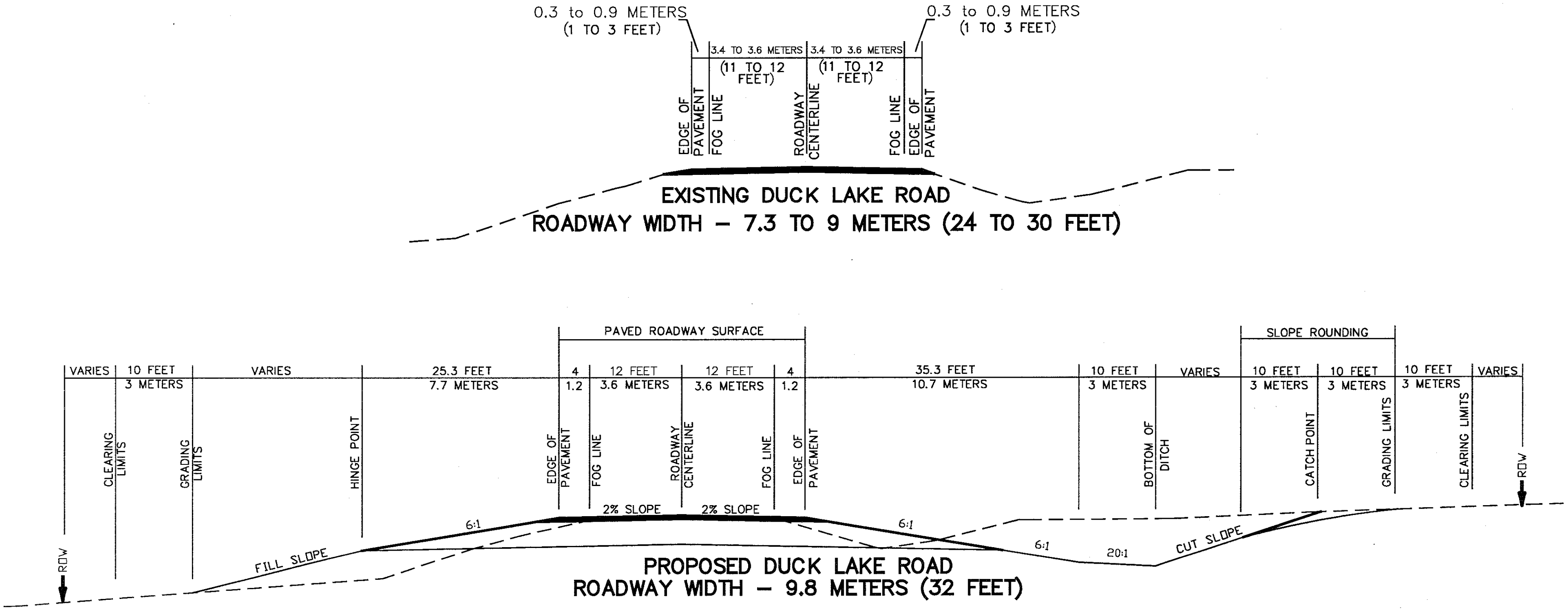

Figure 10 Typical cross-sections of the existing and proposed lane configurations for Duck Lake Road.

The third and largest area of improvement is from approximately reference post DLR-27 to the end of the road at its intersection with US 89, a distance of approximately 11.3 kilometers (7 miles). Throughout this length the roadway is subject to frost heaves. These heaves, in conjunction with the relatively steep grades (4 percent to 6.3 percent) produce a very hazardous condition in the winter and early spring. To alleviate this condition, the roadbed would be reconstructed, generally along its existing alignment, but using a much thicker structural section. Cross-sectional elements would be the same as those described for Alternative B, but the structural section would be approximately 1 meter (3.3 feet) thick (Figure 10). Most of this thickness would be made up of imported, free-draining gravels that are resistant to frost heaves. The profile grade of the roadway would be adjusted to minimize changes in grade and to minimize grades of more than 5 percent. The addition of climbing lanes was considered but rejected as not warranted because of low traffic volumes. Included in this segment would be two additional changes. The intersection with US 89 would be realigned to allow trucks to make the turn from southbound US 89 onto Duck Lake Road. Currently the intersection is almost 45 degrees from perpendicular. Under this option, the intersection would move approximately 25 meters (82 feet) south and become perpendicular. This would require the addition of a horizontal curve near the intersection with a radius of 100 meters (328 feet).

In addition, a chain-up area for trucks would be added. The elevation at the intersection of Duck Lake Road with US 89 is 1,374 meters (4,508 feet), while 0.7 kilometers (0.5 miles) to the east the elevation is 1,654 meters (5,427 feet). This is a significant climb, even with the steepest grades removed, and vehicles need a safe place to attach tire chains. The design for the proposed chain-up area would follow the requirements of the version of the *Montana Department of Transportation Design Manual* in place at the time final designs are completed.

Reconstruction of improvement area 3 is expected to require an estimated 435,300 cubic meters (569,400 cubic yards) of excavation and 384,900 cubic meters (503,300 cubic yards) of fill.

The total amount of earthwork under this option for all three improvement areas is estimated to be 500,000 cubic meters (654,000 cubic yards) of excavation and 390,000 cubic meters (510,000 cubic yards) of fill. The cost of construction for this option (excluding the cost of right-of-way) would be approximately $14.4 million (2006 dollars).

Summary of Alternatives

Table 3 summarizes the key features of the alternatives considered in this final EIS. The difference between the Alternatives B and C is in the width of the roadway, with Alternative B having a 1.2-meter (4-foot) shoulder, and Alternative C having a 1.8-meter (6-foot) shoulder. Duck Lake Road has the same roadway width as Alternative B. Alternatives B and C follow the same alignment and have a similar preliminary bridge design. Duck Lake Road has one major realignment and replaces no bridges.

Table 3. Summary of the key features of the proposed US 89 improvement project alternatives.

	Alternative A	Alternative B	Alternative C	Duck Lake Road
Roadway width	6.7 – 9 meters (22 – 30 feet)	9.8 meters (32 feet)	11 meters (36 feet)	9.8 meters (32 feet)
Travel lane width	3 – 3.6 meters (10 – 12 feet)	3.6 meters (12 feet)	3.6 meters (12 feet)	3.6 meters (12 feet)
Shoulder width	0.3 – 1 meter (1 – 3 feet)	1.2 meters (4 feet)	1.8 meters (6 feet)	1.2 meters (4 feet)
Cost		$45,900,000 (2010 dollars)	$49,600,000 (2010 dollars)	$14,400,000 (2006 dollars)
Earthwork volumes	0			
Excavation		1,150,000 cubic meters (1,504,000 cubic yards)	1,300,000 cubic meters (1,700,000 cubic yards)	500,000 cubic meters (654,000 cubic yards)
Fill		1,000,000 cubic meters (1,308,000 cubic yards)	1,100,000 cubic meters (1,439,000 cubic yards)	390,000 cubic meters (510,000 cubic yards)
Additional right-of-way required	0	151 hectares (373 acres)	154 hectares (381 acres)	37 hectares (91 acres)
Area of roadway footprint	164 hectares (405 acres)	192 hectares (474 acres)	208 hectares (514 acres)	65 hectares (160 acres)

Note: All quantities and costs are approximate. Costs do not include right-of-way.

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Selection of the Preferred Alternative

Alternative C with the Duck Lake Road Option has been selected as the preferred alternative for the US 89 Browning to Hudson Bay Divide project. The selection of a preferred alternative is based on several factors, including how well it meets the purpose of and need for the project, and the nature and extent of the environmental impacts. The Federal Highway Administration in conjunction with the Montana Department of Transportation has defined the purpose of and need for the proposed project in the US 89 corridor from Browning to Hudson Bay Divide based on three specific issues concerning the exiting roadway:

- Traffic flow
- Roadway safety
- Roadway maintenance.

The two action alternatives chosen for further study have the same horizontal and vertical alignment, which closely follows the current alignment of the highway. Some minor alignment modifications in certain locations have been introduced to bring the highway up to current design standards. All of the design parameters used were the same for both alternatives. The difference between the two alternatives is the width of the shoulders. Alternative B provides a 1.2-meter (4-foot) shoulder and Alternative C provides a wider 1.8-meter (6-foot) shoulder. Each alternative meets the purpose and need of the project.

With both action alternatives meeting the purpose and need of the project, the FHWA and MDT, with input from the Blackfeet Tribal representatives, the Steering Committee, and the Interdisciplinary Team, went through a process of selecting the preferred alternative that best fulfilled the objectives of the project. The group concurred that Alternative C met the objects of the purpose and need better than Alternative B.

Roadway safety and traffic flow are two of the key components for the selection of Alternative C as the preferred alternative. The annual roadway maintenance issue was not a factor because the issues are equal for either action alternative. The width of the paved shoulders is one of the components that affect the safety and traffic flow of the highway.

Although Alternative B provides adequate safety and shoulder width as defined by AASHTO's design guidelines, narrower shoulders force motorists to drive closer to vehicles in the opposing lane than they would normally desire, as drivers shy away from roadside objects or point restrictions perceived to be close enough to the roadway to pose a hazard. Motorists compensate for driving closer to opposing vehicles by slowing down and/or by leaving larger headways between vehicles in the same lane. This reaction results in lower flow rates being sustained at any given speed. Alternative C was selected as the preferred alternative because the wider shoulders offer an added safety benefit when compared to an alternative with a narrower shoulder.

Alternative C provides a 1.8-meter (6-foot) shoulder adjacent to the roadway with a 0.5-meter (1.5-foot) rumble strip to audibly warn motorists they are drifting off the roadway. The remaining 1.3-meter (4.5-feet) could be used by bicyclists or pedestrians. This additional shoulder width would better accommodate bicyclists than the narrower 1.2-meter (4-foot) shoulder proposed for Alternative B. Providing a wider shoulder and a rumble strip that provides separation between vehicles and bicycles increases the safety for bicycles and improves efficiency of traffic flow and roadway safety that is not available with Alternative B. It also improves the separation between stopped, stalled, or disabled vehicles using the shoulder area and traveling vehicles, offering improved safety. Slower moving vehicles may temporarily use the shoulder to permit faster vehicles to pass, returning to the travel lane when passing maneuvers have been completed.

Implementing the Duck Lake Road Option in conjunction with Alternative C would provide a suitable alternate route for truck traffic. The proposed improvements to Duck Lake Road would make it a more attractive route for trucks because it does not have steep road grades like US 89. The reduction of truck traffic on US 89 could be 100 percent, about one percent of the total traffic volume, but the improvements on Duck Lake Road would also reduce the likelihood that existing truck traffic on Duck Lake Road would shift to US 89 when that road is improved. By reducing truck traffic on US 89, conflicts with other traffic would decrease and traffic flow and safety on US 89 would be enhanced. During the winter months, Duck Lake Road is critical to the north / south regional movement of traffic when US 89 is closed to travel because of drifting snow.

Implementation of all or part of the preferred alternative would depend on several factors including the availability of funding. The estimated $14.4 million (2006 dollars) in improvements to Duck Lake Road would not be eligible for funding through the program that provides most of the funding for projects on the Primary Highway System. The Secondary Highway Program funding for improvements to Duck Lake Road would require the approval of the counties in the Great Falls transportation district and the Montana Transportation Commission.

Although Alternative C has slightly greater environmental impacts due to its wider footprint, the differences are minor and can be mitigated by grade/slope adjustments in sensitive areas. These impacts are offset by the greater improvements to roadway safety and traffic flow rules. The environmental impacts of each alternative are discussed in detail in Chapter 4, Environmental Consequences.

Alternatives Considered But Not Studied in Detail

Several preliminary alternatives were considered for this project, but were not studied in detail. The alternatives that were eliminated from further study in the draft and final EIS are listed below.

- Widen US 89 to 8.5 meters (28 feet)
- Improve US 89 and Looking Glass Hill Road to standards
- Improve part of US 89, improve all of Looking Glass Hill Road, and make limited improvements to Duck Lake Road
- Improve US 89 to standards, substantially realign US 89 and Looking Glass Hill Road, plus make limited improvements to Duck Lake Road
- Improve US 89 to standards and substantially realign US 89 outside existing road corridor
- Designate Starr School Road as US 89, improve remaining section of US 89 northward to standards.

Each of these preliminary alternatives included improvement components that either did not meet the purpose of and need for the project or had significant environmental consequences. This section briefly describes the improvement components of the preliminary alternatives and why they were eliminated from further study.

Widen US 89 to 8.5 Meters (28 Feet)

A combined roadway width of 8.5 meters (28 feet) includes two 3.6-meter (12-foot) lanes with a 0.6-meter (2-foot) shoulder on either side. This width is less than the minimum Montana Department of Transportation roadway design standard and does not meet the safety aspect of the purpose of and need for the proposed action. A 0.6-meter shoulder width would not adequately accommodate bicycle traffic and would not provide adequate space for vehicles to pull off the roadway. Based on these issues, this alternative was eliminated from detailed study.

Improve Looking Glass Hill Road to Standards

This improvement component was included in several of the alternatives listed above. For these alternatives, modifications to Looking Glass Hill Road would be made in several areas to increase the radii of curves and eliminate compound curves. Travel lanes would be 3.6 meters (12 feet) wide with paved shoulders. A uniform crown section would be established. The footprint of the road would be much wider.

After discussion and evaluation, it was determined that improvements to Looking Glass Hill Road did not meet the purpose and need for the proposed action in that they do not improve the traffic flow or safety on US 89. For approximately 6 kilometers (4 miles), Looking Glass Hill Road traverses the north and west sides of Two Medicine Ridge where slopes range up to approximately 50 percent (27 degrees). These slopes are underlain by very friable mudstone and exhibit limited soil development and little vegetation cover. The combination of steep slopes, highly erodible underlying bedrock, and limited soil and vegetation results in very unstable slope conditions. This portion of Looking Glass Hill Road is also closed in winter. A preliminary evaluation of this alternative indicated that construction of Looking Glass Hill Road across this slope to current engineering standards would be extremely expensive. Because of the cost of potential improvements and the likelihood that the road would still require frequent maintenance because of slope instabilities that would probably not be completely resolved through reasonable engineering methods, it was concluded that this alternative did not meet the project objective to provide an appropriate balance between cost efficiency, roadway safety and function, and environmental protection. A substantial realignment to the north of Looking Glass Hill Road, while possibly avoiding the unstable slope on the north side of Looking Glass Hill, would require disturbance of currently undisturbed habitat in or adjacent to Lake Creek (the informal name for the unnamed creek at this location on the USGS Kiowa quad). This drainage contains important grizzly bear habitat (noted in the Chapter 3 discussion of grizzly bear occurrence in the project area), and relocating the Looking Glass Hill Road to that area would not meet the project objective of providing an appropriate balance between cost efficiency, roadway safety and function, and environmental protection. In addition, Looking Glass Hill Road is outside the primary traffic flow between Babb (including points north into Canada) and Browning (including points south and east of Browning), and improvements to Looking Glass Hill Road would not improve the function of US 89, which is the overall purpose of the proposed action.

In contrast to Looking Glass Hill Road, Duck Lake Road does provide an alternate route for traffic between Babb (including points north into Canada) and Browning (including points south and east of Browning). Duck Lake Road is currently used by numbers of trucks in preference to traveling the curvier alignment of US 89 north of Kiowa and to avoid conflicts with tourist traffic on US 89. As an alternate route to US 89, Duck Lake Road is particularly important for trucks (and other vehicles) in winter, when US 89 can be temporarily snowbound. Duck Lake Road is farther from the Rocky Mountain front than US 89 and has more moderate grades, and so is less often closed due to adverse winter conditions. The proposed improvements to Duck Lake Road address localized inadequate alignment and road surface conditions, and are necessary to maintain safe travel opportunities for all vehicles throughout the year in the Babb to Browning travel corridor. For these reasons, improvements to Duck Lake Road are studied in detail in this EIS, whereas improvements to Looking Glass Hill Road are not studied in detail.

Improve Part of US 89

A roadway improvement component was considered that would improve only part of US 89 (in addition to all of Looking Glass Hill Road and spot improvements on Duck Lake Road). This improvement component was included in the third preliminary alternative listed above. For this improvement component, the section of US 89 from Browning to Kiowa would remain largely in its current condition. Therefore, there would continue to be safety issues and maintenance concerns along the section of US 89 that would not be improved. As a result, a partial improvement of US 89 does not meet the purpose of and need for the proposed action, and this preliminary alternative was eliminated from further study.

Major Realignment of US 89 Outside the Existing Road Corridor

The fourth and fifth alternatives listed above included an improvement component that would have located a new US 89 corridor along the historic route of the Old North Trail. This improvement component was eliminated from further consideration because of potential concerns associated with construction along a new corridor. These concerns included preservation of cultural artifacts and effects on historic sites, as well as potential negative effects on protected species and sensitive habitats.

A major realignment would probably obliterate at least portions of the Old North Road and would shift US 89 closer to cultural sites that currently experience little impact from the present US 89. As described in Chapter 3, much of the area north and east of US 89 in the project corridor is grassland habitat with some wetlands and areas of deciduous, mixed, and coniferous forests. Although much of the area has been influenced by human activities, it currently sustains low levels of human activity and remains valuable wildlife habitat. Any major realignment of US 89 would necessarily result in substantial impacts to this wildlife habitat including the likelihood of new stream crossings where none currently exist. A major realignment would likely require construction in aspen grovelands and riparian areas that currently experience low levels of human activity and that are important habitat for grizzly bear, a threatened species under the Endangered Species Act.

Starr School Road Designated as US 89

The last preliminary alternative listed above was based on this improvement component, which entailed the designation of Starr School Road (currently maintained by the Bureau of Indian Affairs) as US 89 and the reclassification of the current US 89 from Browning to the intersection of US 89 and Starr School Road as a rural collector. Responsibilities for maintenance of these two road sections would shift, with the Montana Department of Transportation having responsibility for the newly designated US 89 and the Bureau of Indian Affairs having responsibility for the re-designated portion of the current US 89. Modifications to Starr School

Road would be made to meet the minimum Montana Department of Transportation design standards. The new rural collector, formerly US 89, would require some maintenance work.

This preliminary alternative was eliminated from detailed study for several reasons. US 89 and Starr School Road fall under different ownership (the Bureau of Indian Affairs owns Starr School Road) and a trade of the road sections is unlikely to occur. Money for purchase and maintenance of the existing US 89 section (the new rural collector) is unavailable. Starr School Road would require improvement if it was taken over by MDT and designated as US 89. The existing US 89 would also require improvement before it would be accepted by the BIA. Therefore, if Starr School Road were redesignated as US 89, two roads between Browning and the US 89/Starr School Road junction would need to be improved, greatly increasing the cost of the project. Rerouting US 89 through the residential area of Starr School (there is no comparably dense residential area within the US 89 project corridor) would greatly increase safety concerns. Therefore, this preliminary alternative would not meet the safety aspect of the purpose of and need for the project.

Comparison of Impacts and Mitigation

To assist decision-makers and the public in understanding the environmental choices among alternatives, a comparison of the environmental impacts of the alternatives is included in the summary at the beginning of this document (see Table S-2). The details of the impacts and mitigation are documented in Chapter 4 – Environmental Consequences.

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CHAPTER 3

Affected Environment

Introduction

This chapter describes the setting of the project area and the social, economic, and natural environments that may be affected by the alternatives being considered. The setting for the proposed action is described in broad categories: the physical environment, the biological environment, and the human environment. Current literature, field data collection, documented studies, and information received from stakeholders helped identify the existing conditions. The discipline studies prepared in support of the draft and final EIS and listed in Chapter 5 – References are incorporated herein by reference and are available for public inspection.

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Physical Environment

Climate

Weather in the project area is characterized by variable conditions. The project area lies in the rain shadow of the northern Rocky Mountain range, within 32 kilometers (20 miles) of the Continental Divide. Weather in the project area is primarily influenced by Pacific storm systems moving from west to east across the project area; however, the rain shadow effect results in a dry climate. Storm systems moving from north to south through the project area also occur. The interaction of these two weather patterns can create combined weather systems characterized by rapid changes in temperature and wind strength. Extreme cases during the summer and winter have been observed with temperatures dropping 17 to 22 degrees Celsius (ºC) (30 to 40 degrees Fahrenheit [ºF]) within several hours and wind gusting up to 193 kilometers per hour (120 miles per hour).

Prevailing winds are from the west, south, and southwest. Chinook winds also have been observed in the region. Chinook winds are warm, dry winds created as air currents descend the east slope of the Rocky Mountains that can change subarctic temperatures to temporal conditions over short periods of time.

Normal conditions include clear hot days in the summer and clear cold days in the winter. The average maximum temperature recorded at Babb from 1948 to 2001 is 11.6ºC (52.9ºF). The average minimum temperature recorded at Babb from 1948 to 2001 was –2.8ºC (26.9ºF). Average annual precipitation recorded at Babb from 1948 to 2001 was 46.4 centimeters (18.3 inches) and average annual snowfall was 145.8 centimeters (57.4 inches) (Western Regional Climate Center 2003). The average maximum temperature recorded at Browning from 1984 to 1989 was 11ºC (52ºF). The average minimum temperature recorded at Browning from 1984 to 1989 was –2.4ºC (27.7ºF). Average annual precipitation recorded at Browning from 1984 to 1989 was 38 centimeters (15 inches) and average annual snowfall was 151 centimeters (59.5 inches) (Western Regional Climate Center 2003). Winds typically gust at approximately 32 kilometers per hour (20 miles per hour).

Geology and Soils

Project Location and Topography

Topography within the project area includes rolling grasslands to the east, near the city of Browning, at approximately 1,340 meters (4,400 feet) above sea level, and valleys and rugged glaciated mountains ranging in altitude from 1,310 to 2,590 meters (4,300 to 8,500 feet) above sea level, respectively, to the west, near Saint Mary and Babb. Regional physiographic boundaries include the north-south Continental Divide to the west and Hudson Bay Divide parallel to and along the western and northern sides of the project area (Cannon 1996).

In general, stream and glacial action has dissected and modified the bedrock surface producing a series of parallel east-west ridges and valleys. Three distinct terrain features of glacial origin have been observed:

- High and moderate flat-topped, gravel-capped benches 30 to 305 meters (100 to 1,000 feet) above the irregular lowland area, gently sloping eastward
- Lowland areas of upturned bedrock lying in a northerly and northwesterly direction
- Lowland areas of morainal deposits with many small lakes, depressions, and large and small rounded hummocks.

In addition to these features, postglacial erosion and deposition have created stream entrenchment and modern floodplains, fans, deltas, and slopes (Terracon 2000).

Bedrock Geology

The project area is located within the structurally complex Disturbed Belt of Montana (Cannon 1996). The geologic units are in a zone of closely spaced, westward-dipping thrust faults, with many folds and some normal faults. Prolonged stream erosion, followed by extensive glaciation, has produced an extremely irregular mountain front and a dissected rolling topography east of the Rocky Mountain base.

Bedrock geology in the project area is predominantly sedimentary and is composed of three main geologic units: the Two Medicine formation, the Virgelle Sandstone and Telegraph Creek formation, and the Saint Mary River formation. The Two Medicine formation is a massive nonmarine mudstone with some sandstone. It is exposed north and south of the South Fork Milk River and along sections of Cut Bank Creek. Where outcrops are extensive, this formation erodes into badland topography.

The Virgelle Sandstone and Telegraph Creek formation is composed of two units: the Virgelle Sandstone unit and the Telegraph Creek transitional unit of gray mudstone interbedded with fine-grained sandstone. This combined formation is exposed north and south of the South Fork Milk River, along sections of Cut Bank Creek, and in road cuts along US 89. Where not exposed, these two main geologic units underlie most of the project area.

At the eastern edge of the project area lies the Saint Mary River formation, a nonmarine mudstone thick with thin beds of fine-grained sandstone. This unit is similar to the Two Medicine formation, a nonmarine sedimentary rock that weathers to badlands topography when exposed. The Saint Mary River formation underlies the city of Browning and is exposed in a north-south band observed in road cuts along US 89.

Surficial Geology

Pleistocene-epoch deposits, along with some landslide deposits and exposed bedrock, dominate surficial geology. Terracon (2000) performed a geological and soil survey reconnaissance of the project corridor based on surficial geology units described in geologic survey maps (Cannon 1996) as follows:

- *Qal, Alluvium* – Unconsolidated gravel, sand, silt, and clay beneath floodplains of major streams
- *Qlt, Landslide Deposits and Till* – Areas of landslides and glacial till with many rock outcrops
- *Qtp, Till Deposited by Piedmont Glaciers* – Gravelly to clayey till in ground moraine and in terminal, recessional, and lateral moraines; includes gravel deposits in narrow buried channels and meltwater channels; typically from 0.3 to 5 meters (1 to 15 feet) thick, although in small areas thickness may be more than 15 meters (50 feet)
- *Qd, Drift of Pre-Wisconsin Mountain Glaciers* – Mostly unsorted subrounded to subangular gravel, cobbles, and boulders with minor amounts of sand, silt, and clay.
- *QTg, Terrace and Pediment Gravel* – Predominantly coarse gravel and cobbles with some sand and silt. The deposits typically overlie planated erosional surfaces cut into the bedrock.

Along US 89, recent alluvium was encountered adjacent to South Fork Cut Bank Creek east of Kiowa and adjacent to North Fork Cut Bank Creek and the two branches of South Fork Milk River north of Kiowa (Figure 11). No alluvium is present along Duck Lake Road. An area of landslide deposits is located adjacent to US 89 on Milk River Ridge. The deposits appear to be located away from the right-of-way with bedrock outcrops in and adjacent to the right-of-way. Along US 89, till deposits were encountered from Browning west to the crossing of Flatiron Creek, approximately 10 kilometers (6 miles), and north of Kiowa from the crossing of South Fork Cut Bank Creek north to South Fork Milk River, approximately 13 kilometers (8 miles). Along Duck Lake Road, till deposits were traced from the intersection of US 89 and Duck Lake Road east to the top of Saint Mary Ridge, approximately 8 kilometers (5 miles). Pre-Wisconsin drift was found along Duck Lake Road on top of Saint Mary Ridge, for a distance of approximately 1.6 kilometers (1 mile) (Terracon 2000).

Soils

According to the United States Department of Agriculture Natural Resources Conservation Service soil survey titled *Soil Survey of Glacier County Area and Part of Pondera County, Montana* (USDA 1980), 12 soil types occur within the project corridor. For general mapping

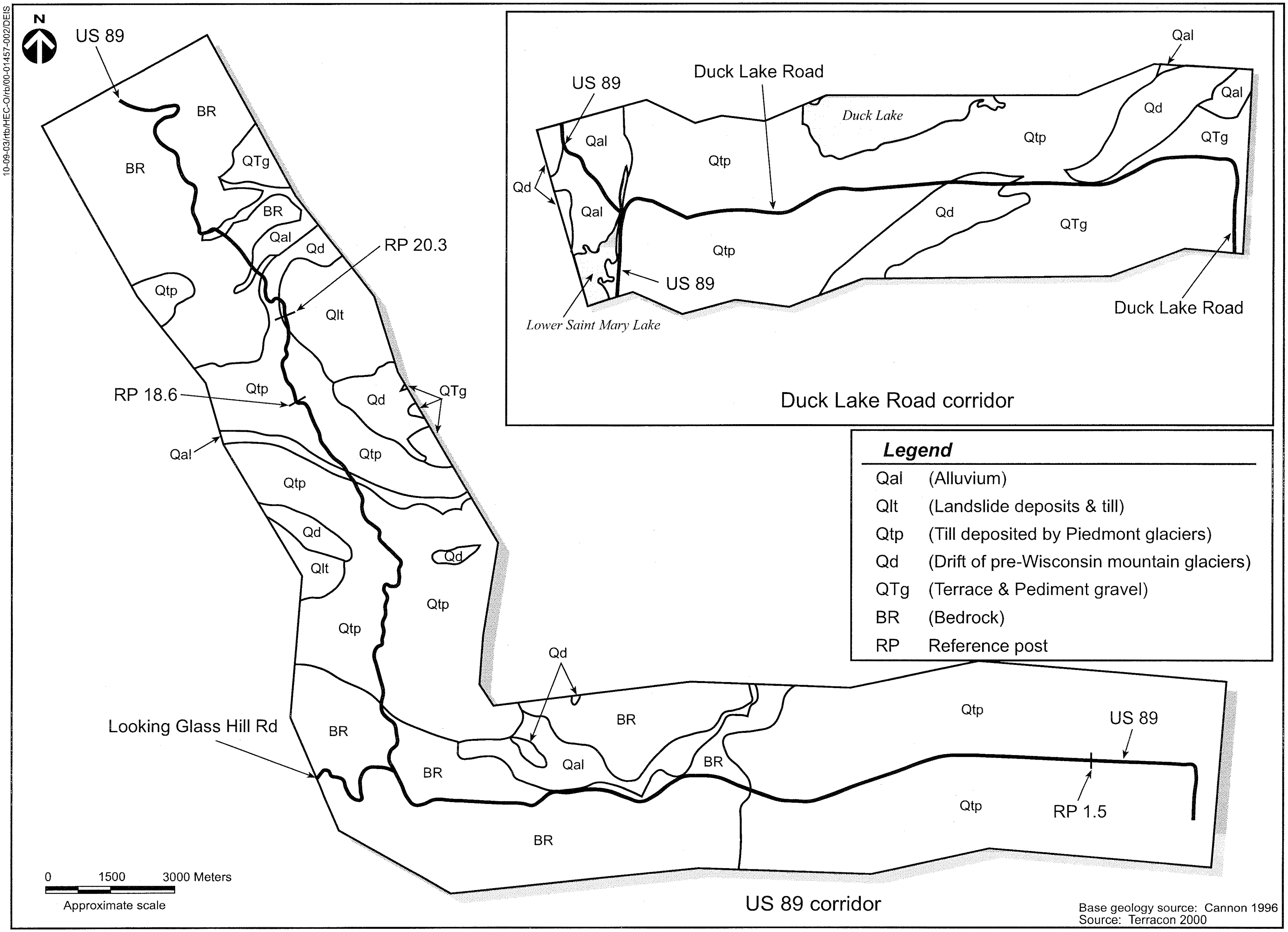

Figure 11. **Surficial geologic map of the US 89 project area.**

purposes, the 12 soil types have been grouped into six soil associations and are illustrated in Figure 12. A soil association has a distinctive proportional pattern of soils within a landscape. An association normally consists of one or more major soils and at least one minor soil, and is named for the major soil.

Seismicity and Other Geologic Hazards

A belt of seismicity known as the Intermountain Seismic Belt extends through western Montana, from the Flathead Lake region in the northwest corner of the state through Idaho, Wyoming, Utah, and into southern Nevada. In western Montana, the Intermountain Seismic Belt is up to 100 kilometers (62 miles) wide and parallels the Rocky Mountains. The Centennial Tectonic Belt, a branch of the Intermountain Seismic Belt, includes at least eight major active faults. It has been the site of the two largest historic earthquakes in the northern Rocky Mountains: the Hebgen Lake, Montana, earthquake (magnitude of 7.5 on the Richter scale) on August 18, 1959; and the Borah Peak, Idaho, earthquake (magnitude of 7.3 on the Richter scale) on October 28, 1983. Small earthquakes are common in the region, occurring at an average rate of seven to ten earthquakes per day (MBMG 2002).

The state of Montana adopted the seismic standards set by the Uniform Building Code (which establishes building design standards used by architects and engineers) to assess seismic risk in northwestern Montana. These standards were adopted in order to provide earthquake design standards for regional construction. The project area is currently classified as seismic zone 2B (moderate) on the Uniform Building Code seismic risk scale of 0 (low risk) to 4 (high risk) (Leyendecker et al. 1995). The Intermountain Seismic Belt appears to be predominantly classified as zone 2B.

When shaken by an earthquake, certain soils are susceptible to liquefaction; that is, they lose strength and temporarily behave like liquids. The seismically induced loss of strength can result in failure of the ground surface, most typically expressed as lateral spreads, surface cracks, settlement, or sand boils. Structures, including roadways, can sustain substantial damage during a large seismic event if they are supported in or on a soil susceptible to liquefaction. Seismically induced liquefaction typically occurs in loose, saturated, sandy material commonly associated with recent river, lake, and beach sedimentation. In addition, seismically induced liquefaction can be associated with areas of loose, saturated fill (USGS 1992). Several areas along the project corridor are underlain by alluvium and consequently susceptible to liquefaction (Figure 11).

Landslide-prone or slump-prone areas were identified based on surficial geology and slope observations and measurements made by Terracon during its reconnaissance trip (Terracon 2000). An area of landslide deposits is located adjacent to US 89 on Milk River Ridge at reference post 20.3 (Figure 11). Slopes in Quaternary period till deposits are generally stable when at slope angles of less than 35 degrees. Steep slopes (45 degrees) in till with active shallow slumping were observed along US 89 at reference post 1.5. Stable cut slopes in competent bedrock with angles of up to 45 degrees were observed in six cut slopes at reference posts 13.2, 16.0-16.5, 18.0, 18.7, 20.3, and at the intersection of US 89 and Duck Lake Road near

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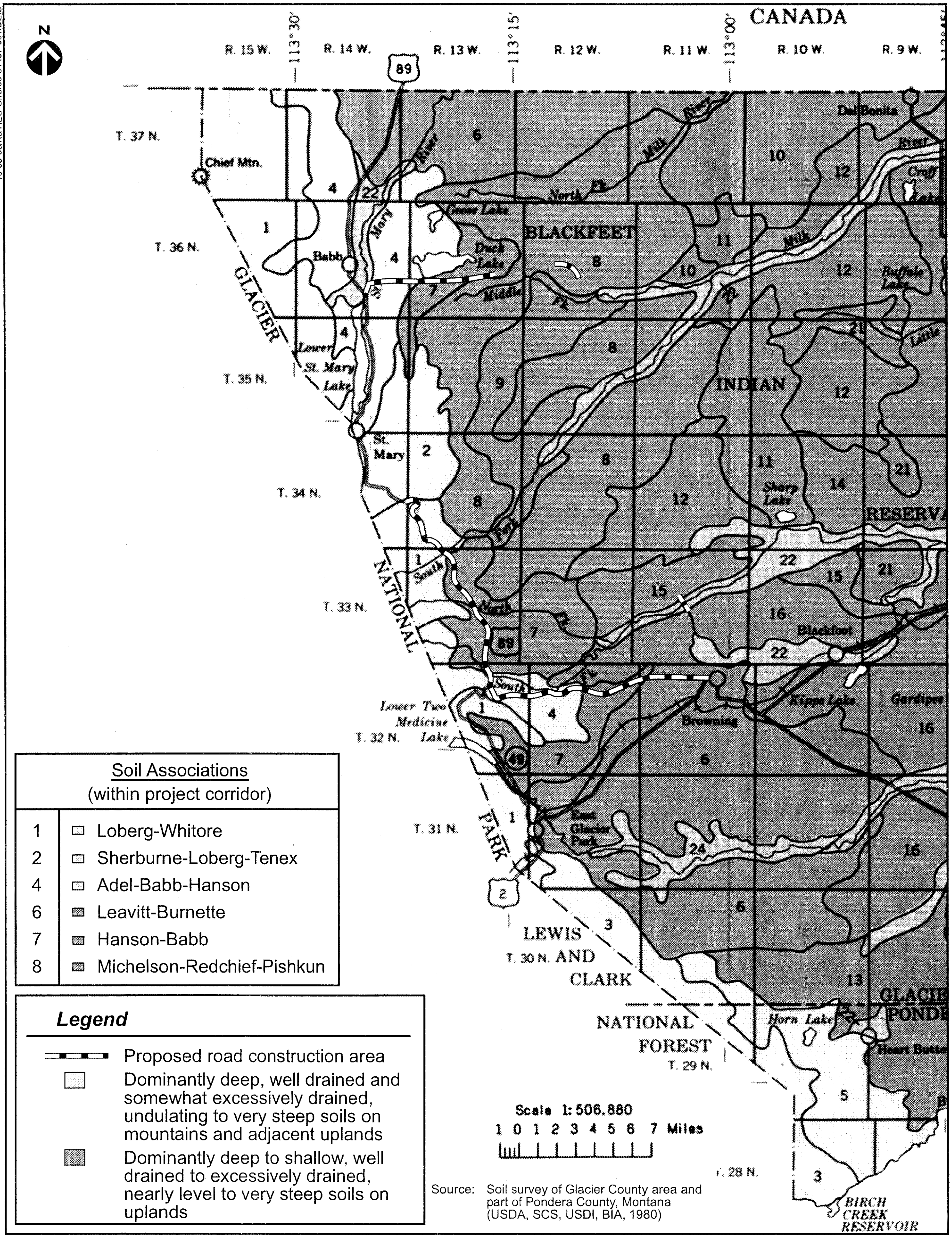

Figure 12. Soil survey map of the US 89 project area.

reference post DLR-34. Some bedrock toppling was observed in cut slopes where friable sandstone underlies competent bedrock at reference post 18.6. Erosional gullies are prevalent in cut slopes in fine-grained soils. Gullying was observed at the intersection of US 89 and Duck Lake Road near reference post DLR-34 on a 12-meter- (40-foot-) high, 32-degree slope that has a thin veneer of glacial till over sandstone bedrock.

Floodplains

Federal Highway Administration floodplain regulations establish standards for cost-effective designs of highways in floodplains. The regulations are consistent with the National Flood Insurance Program standard that allows encroachments into a designated floodway to result in as much as a 0.3-meter (1-foot) increase in flood stages for particular flow volumes.

Floodplains are typically found near surface waters (streams and lakes). A search of Federal Emergency Management Agency (FEMA) floodplain maps and contact with the Blackfeet Environmental Office and Glacier County did not unearth any floodplain information or mapping within the project corridor. In Montana, the local floodplain administrator administers floodplain development permits for the individual county. Correspondence with the local floodplain administrator indicates they do not issue permits for activities on the Blackfeet Indian Reservation. Floodplain activities would be reviewed as an element of the Aquatic Lands Protection Ordinance 90A permit from the Blackfeet Tribe.

While no floodplain mapping is available for the project corridor, field reviews and the analysis prepared for the *US 89 Browning to Hudson Bay Divide Hydraulics Report* (Skillings-Connolly 2002) provide an indication of floodplain conditions in the project area. No floodplain mapping was available along Duck Lake Road and no flooding issues were identified. However, in the vicinity of the Duck Lake Road bridge crossing of Cut Bank Creek, the system supports an associated floodplain. The following discussion of stream crossings does not include Flatiron Creek (reference post 6.5), North Fork Cut Bank Creek (reference post 16.8), and Middle Branch South Fork Milk River (reference post 21.7) because there is either no mapped floodplain or no evident floodplain at these locations.

Willow Creek

Willow Creek is conveyed underneath US 89 through a series of culverts in the vicinity of reference post 3. Due to livestock trampling, the Willow Creek floodplain is not evident. The primary culvert conveying Willow Creek is unable to convey spring runoff in most years. Excess flows are diverted to adjacent culverts and scouring of the roadway embankment on the south side of US 89 is evident.

Tributary to South Fork Cut Bank Creek

US 89 parallels South Fork Cut Bank Creek in the vicinity of reference post 9 and a tributary to this system is conveyed under the roadway through a culvert at this location. The roadway does not appear to be within the South Fork Cut Bank Creek floodplain. Flooding is reported downstream of the existing culvert but is likely attributable to other conditions downstream of this location rather than roadway fill in the floodplain.

Lake Creek

Lake Creek is conveyed through four culverts underneath US 89 at approximately reference post 12. Immediately upstream of the culverts, the floodplain appears narrow and is confined by topography, but spreads out beyond the road right-of-way. Downstream of the culverts, Lake Creek meanders through a large wetland complex confined by topography to the east, but expanding and connecting with the South Fork Cut Bank Creek system to the north and east. The existing culverts are undersized and improperly aligned; however, no overtopping of the roadway is reported at this site. Debris does build up at the culvert inlets, requiring diligent removal by the highway maintenance program.

South Fork Cut Bank Creek

US 89 crosses the South Fork Cut Bank Creek on a concrete bridge at approximately reference post 13. In the immediate area of the bridge crossing, the stream channel meanders within a floodplain measuring approximately 200 meters (660 feet) in width. The stream appears to change its flow path during major storm events. The floodplain widens to the east downstream of the bridge and connects with the floodplain associated with Lake Creek. The approach roads to the bridge are constructed on approximately 2.0 meters (6.6 feet) of fill. Flood flows overtop the approach roads periodically. It is estimated that overtopping occurs when storms are greater than the 10-year event. There is significant beaver activity both upstream and downstream of the bridge. Beaver dams may help contribute to flood flows overtopping the roadway.

South Fork Milk River, South Branch

US 89 crosses the South Fork Milk River, south branch on a concrete bridge at approximately reference post 21. Upstream of the bridge, the stream flows through an approximately 80-hectare (200-acre) wetland complex. In addition to the bridge, there are three culverts within this wetland complex. This area has a high degree of beaver activity that contributes to the structure of the wetland. The beaver dams also attenuate the peak flows resulting from storm events, due to the ponding created by the beaver dams. No overtopping of the roadway or problems with the existing drainage structures are reported at this site.

Water Resources

Studies and Coordination

An extensive literature review was performed to document existing water resources within the project area. In addition, sources of relevant hydrologic and hydraulic information used in this report are summarized below.

- The Blackfeet Environmental Office was contacted for hydrologic and biological data for streams within the Hudson Bay and Upper Missouri River drainages.

- Information on drainage systems, surface water, ground water, and streamflows in the project area was obtained from the USGS website (http://www/usgs.gov), and from the Montana Rivers Information System, which is updated and maintained by Montana Department of Fish, Wildlife, and Parks (MFWP).

- Streamflow measurements were recorded at major stream crossings on US 89 and Duck Lake Road on October 19, 2000.

Existing Ground Water Conditions

Aquifer Systems

The USGS (Cannon 1996) prepared the most comprehensive report on ground water resources of the Blackfeet Indian Reservation to date. Information from that report and information obtained directly from the USGS website is summarized in this section.

The Blackfeet Indian Reservation consists mainly of fine-grained, low-permeability bedrock aquifers overlaid in areas with unconsolidated-deposit aquifers of moderate to high permeability. In general, aquifers on the reservation are classified either as bedrock aquifers or as unconsolidated-deposit aquifers.

Unconsolidated deposits are widespread throughout Montana, and associated aquifers may occur on the land surface or beneath low-permeability material. Unconsolidated deposits include alluvium, gravel terraces, gravel pediments, glacial outwash, and sand and gravel associated with glacial till deposits (Hydrometrics 1999). Associated aquifers are particularly widespread on the surface in the valleys in mountainous areas of Montana (Whitehead 1996a) and are the primary water sources for many shallow wells (Whitehead 1996b). These important aquifers consist primarily of sand and gravel and may contain clay and silt either mixed with the sand and gravel, or as beds.

Course-grained unconsolidated deposits of Quaternary and Tertiary periods comprise some of the most important aquifers on the Blackfeet Indian Reservation. Unconsolidated deposits, where bedrock consists of unproductive mudstone or shale, may be the only source of potable water.

Aquifer recharge is greatest to unconsolidated-deposit aquifers in the western portion of the reservation. Large amounts of precipitation, combined with slow melting of thick snowpack, help recharge these aquifers. The recharge to bedrock aquifers is much lower than that to unconsolidated-deposit aquifers, primarily because of the low permeability of the bedrock.

Within the project area, unconsolidated-deposit aquifers discharge to springs, streams, lakes, wells, and underlying bedrock aquifers, and these unconsolidated-deposit aquifers likely contribute to the base flow of streams. Bedrock aquifers may also discharge to wells, springs, and regional ground water flow, but the amount discharged to major streams is likely small and difficult to measure.

In the western portion of the reservation, springs are numerous along contacts between unconsolidated deposits and underlying bedrock aquifers. When these springs occur in unconsolidated deposits, greater permeability and ground water circulation may be observed.

Buried gravel deposits are a water source for many wells near Browning, as well as for some in the vicinity of Duck Lake. Information obtained online from EnviroNET shows that from 30 to 50 wells exist within the project area (Montana Natural Resource Information System/Montana Department of Environmental Quality 2000). Most wells in the project area are located near US 89, and many of those are clustered around Browning.

Gravel deposits may discharge to springs or small seeps, and in the higher western portion of the reservation, snowmelt from large snowdrifts recharges shallow ground-flow systems, resulting in numerous springs.

Ground Water Quality

According to Cannon (1996), the quality of water in unconsolidated-deposit aquifers on the Blackfeet Indian Reservation is generally very good. Dissolved solids range from 37 to 347 milligrams per liter, based on nine samples from wells and springs on the reservation.

The U.S. EPA has established a secondary maximum contaminant level of 500 milligrams per liter total dissolved solids. This regulation is a secondary drinking water regulation and is not enforceable by law. Rather, the U.S. EPA recommends this limit to protect against cosmetic or aesthetic effects on drinking water. Montana does not have a statewide numeric total dissolved solid standard, but does have a narrative standard of 1,000 milligrams per liter to protect water for irrigation (Horpestad 2000 personal communication).

Water for the city of Browning comes from wells located in surface water drainages. Ground water production from these wells is likely highly dependent on the surface water in those drainages (Hydrometrics 1999). Water contained in deep aquifers may have a high mineral content and therefore may be unsuitable for most uses.

Existing Surface Water Conditions

Among the primary surface water bodies in the affected environment are streams and tributaries within the Hudson Bay and Missouri River basins. Within the Hudson Bay basin, these waters are the Saint Mary River and its tributaries near Babb. Within the Missouri River basin, these waters are the north, middle, and south branches of the South Fork Milk River, the Dry Fork Milk River, Cut Bank Creek (including its north and south forks), and their tributaries. Named tributaries in the project corridor include Willow Creek, Flatiron Creek, and Lake Creek. All of the major systems and their tributaries are waters of the U.S. and are regulated by the Corps of Engineers. The proposed project also includes two crossings of an irrigation canal. This system does not return flows to a water of the U.S. and therefore activities affecting the canal are not regulated by the Corps of Engineers, but may be regulated by the Blackfeet Nation. Lastly, the project corridor also crosses numerous unnamed drainages. The location of these drainages and their Corps of Engineers jurisdictional status are provided in Table 4. These drainages may be regulated by the Blackfeet Nation through the Aquatic Lands Protection Ordinance 90A.

Table 4. Unnamed drainages in the US 89 project corridor and their Corps of Engineers jurisdictional status.

Drainage Location [a]	Corps of Engineers Jurisdictional / Non-jurisdictional [b]
Reference post 2	Non-jurisdictional
Reference post 4.5	Non-jurisdictional
Reference post 7	Jurisdictional
Reference post 17.3	Non-jurisdictional
Reference post 18.5	Jurisdictional

[a] Reference post locations are approximate.
[b] Corps of Engineers jurisdictional status was determined by project biologists and has been confirmed by the Corps of Engineers (see Attachment A in Appendix E). Drainages on the Blackfeet Indian Reservation are also regulated by the Blackfeet Nation.

Streamflow

The project area contains three flow gauging stations previously or currently operated by the USGS: Cut Bank Creek near Browning, Saint Mary River near Babb, and South Fork Milk River near Babb.

The Cut Bank Creek station (station number 06098500) is located 6.1 meters (20 feet) downstream from the bridge on Duck Lake Road, about 6 kilometers (4 miles) north of Browning at approximately 1,335 meters (4,380 feet) above sea level. Total area included in this drainage is 319 square kilometers (123 square miles). The Cut Bank Creek station is the only station within the project area currently collecting streamflow data.

Average gauge height for the period 1918-1999 was 1.2 meters (3.9 feet) and average annual peak discharge for the same period was 41.2 cubic meters per second (1,455 cubic feet per second). The annual peak discharge ranged from 12.7 to 155.1 cubic meters per second (448 to 5,477 cubic feet per second) during this period (USGS 2000a).

The following information on streamflows is summarized from *USGS Water Resources Data Montana Water Year 1999* (Shields et al. 2000). The Saint Mary River gauging station (station number 05017500) is located on the Blackfeet Indian Reservation, on the river's right bank 1.1 kilometers (0.7 miles) upstream (at an elevation of 1,361.9 meters [4,468.2 feet] above sea level) from the outlet of lower Saint Mary Lake and 3.2 kilometers (2.0 miles) southeast of Babb. Total drainage area above this gauge is 715 square kilometers (276 square miles).

The available flow data for Saint Mary River near Babb are sporadic from July 1901 to October 1950. Annual mean discharge for the period 1951 to 1999 was 21.6 cubic meters per second (764 cubic feet per second). The highest daily mean flow ranged as high as 441 cubic meters per second (15,600 cubic feet per second); the instantaneous peak flow reached 467 cubic meters per second (16,500 cubic feet per second) on June 9, 1964; and the highest annual mean flow, which occurred in 1951, measured 30 cubic meters per second (1,073 cubic feet per second).

The South Fork Milk River gauging station (station 06132200) is located on the Blackfeet Indian Reservation, on the right bank of the river 0.6 kilometers (0.4 miles) upstream from the bridge (at 1,442.2 meters [4,731.6 feet] above sea level) on Duck Lake Road, 23.2 kilometers (14.4 miles) southeast of Babb, 24.4 kilometers (15.2 miles) northwest of Browning, at river mile 17.3. Total drainage area above this gauge is 182.3 square kilometers (70.4 square miles).

The available period of record for this station includes seasonal records from May 1961 to October 1999. The highest daily mean flow for this period is 158 cubic meters per second (5,580 cubic feet per second) and occurred on June 20, 1975. Annual mean discharge for the period May 1961 to October 1999 is not available.

In addition to information obtained from various water resource reports, streamflow data collected during a visit to the project area are presented in Table 5. Data were collected on October 19–20, 2000 from stream crossings on Duck Lake Road and US 89.

Table 5. Streamflow measurements at surface water crossings on US 89 and Duck Lake Road.

Water Body	Reference Post Location	Streamflow cms[a] (cfs[b])
US 89		
Tributary to South Fork Cut Bank Creek [c]	11.3	<0.1 (0.06)
Lake Creek	12	<0.1 (0.3)
South Fork Cut Bank Creek	13	0.3 (8.7)
South Fork Milk River	21	<0.1 (0.5)
South Fork Milk River	23	<0.1 (0.09)
Duck Lake Road		
South Fork Cut Bank Creek	4.5	1.2 (41.9)

[a] Cubic meters per second.
[b] Cubic feet per second.
[c] A beaver pond located upstream was retaining most of the streamflow in this reach.

Surface Water Quality

Surface water on the Blackfeet Indian Reservation is primarily used for irrigation, livestock, and domestic water supply. The quality of surface water on the reservation is generally high enough for most uses (Hydrometrics 1999). It is likely that all of the streams in the project area exhibit good water quality due to the low level of development in the area.

Water-use classifications for surface waters within the project area were obtained from Montana Department of Environmental Quality (MT DEQ 2000a). The surface waters of the project area fall under two classifications, B-1 and B-2. The B-1 category indicates a higher quality of water conditions, specifically, conditions allowing for higher propagation among salmonid fishes and associated aquatic life. Waters classified as B-2 allow for only marginal propagation among salmonids.

Streams in the Hudson Bay drainage (which includes the Saint Mary drainage) outside Glacier National Park are classified as B-1. Streams classified as B-1 are defined by the Montana Department of Environmental Quality as suitable for drinking, culinary and food processing purposes (after conventional treatment); bathing, swimming, and recreation; growth and propagation of salmonid fishes and associated aquatic life, waterfowl, and furbearers; and agricultural and industrial water supply. Surface waters occurring within the project area in the Milk River drainage are classified as B-1.

Surface waters in the Cut Bank Creek drainage are also classified as B-1, with one exception. Main stem Willow Creek is classified as B-2 from its crossing with Duck Lake Road approximately 0.8 kilometers (0.5 miles) north of Browning to Cut Bank Creek. B-2 waters are defined as suitable for drinking, culinary, and food processing purposes (after conventional treatment); bathing, swimming, and recreation; growth and marginal propagation of salmonid fishes and associated aquatic life, waterfowl, and furbearers; and agricultural and industrial water supply. A review of *Index of Watershed Indicators,* (U.S. EPA 2000a, 2000b, 2000c), and of the Montana Department of Environmental Quality 303(d) list (MT DEQ 2000b) of impaired and threatened water bodies indicates the following:

- Water quality data for watersheds within the project area are too incomplete for a thorough analysis. The USGS is currently analyzing the surface water resources of the Blackfeet Indian Reservation and is examining streamflow characteristics, surface water quality, basin characteristics, and relationships between surface water and ground water in the basins (USGS 2000b).

- The U.S. EPA indicates that there is a lack of data pertaining to the Cut Bank Creek watershed (U.S. EPA 2000a). However, significant sources of water impairment (i.e., of drinking water) have been identified for this watershed (U.S. EPA 2000b). In addition, the *Index of Watershed Indicators* suggests that there is a moderate level of potential impact from agricultural runoff in this watershed (U.S. EPA 2000c).

Air Quality

Air Pollution Sources

The Clean Air Act, last amended in 1990, requires the U.S. EPA to set national ambient air quality standards (NAAQS) for priority pollutants considered harmful to public health and the environment. Air contaminants that may concentrate in rural areas include carbon monoxide, ozone, sulfur dioxide, nitrogen dioxide, and particulate matter, all priority pollutants included under the NAAQS. Two types of particulate matter are monitored and regulated by the U.S. EPA: total suspended particulates, having a diameter of less than 10 micrometers (abbreviated as PM_{10}), and fine particulate matter, having a diameter of less than 2.5 micrometers (abbreviated as $PM_{2.5}$). Volatile organic compounds (VOCs) are not included on the list of priority pollutants, but some VOCs are considered hazardous air pollutants under the Clean Air Act as precursors of ozone. VOC emissions are part of technology-based emissions standards regulated by the Clean Air Act through the U.S. EPA Operating Permit Program.

Typical existing sources of priority air pollution in the project area include vehicular traffic and home space heating (typically wood burning). Crude oil and natural gas pipelines within the project area also contribute VOCs at their stations and bulk fuel facilities. Vehicular traffic produces carbon monoxide with levels generally highest during the winter months. Fuel burning from vehicles and space heating also creates hydrocarbons, nitrogen oxides, and sulfur oxides, although the relative amount is not high except near large industrial facilities. Wood smoke, wind-blown dust, and industrial emissions are the major sources of PM_{10} and $PM_{2.5}$. PM_{10} and $PM_{2.5}$ can also be emitted from vehicle exhaust; however, the majority is produced from wood burning for home heating (PSCAA 2000). Oil and gas works located nearby in Canada have considerable impacts on air quality in parts of the project area, especially during the winter (Michaels 2001 personal communication).

Regulations and Standards

The Blackfeet Indian Reservation is located within the boundaries of the state of Montana; however, the state of Montana does not have jurisdiction over air quality standards on Tribal lands. The U.S. EPA is responsible for enforcing air quality standards on Tribal lands, and the tribe and the U.S. EPA are currently working cooperatively to monitor air quality on Tribal lands. The Blackfeet Environmental Office has adopted all federal NAAQS for air quality within reservation boundaries. These regulations (40 CFR 50) govern both the concentrations of pollutants in the outdoor air and contaminant emissions from air pollution sources. The tribe also administers an open burning program and monitors point sources regulated by operating permits (Sinclair 2000 personal communication).

Air Pollutants

The U.S. EPA lists six criteria pollutants to be monitored as indicators of air quality and has identified a maximum concentration for each above which adverse human health effects may occur. These criteria pollutants are carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), lead (Pb), particulate matter (PM), and sulfur dioxide (SO_2). Primary standards are limits set for each criteria pollutant and are designed to protect public health, including the health of sensitive populations such as asthmatics, children, and the elderly. Secondary standards are limits set for some criteria pollutants and are designed to protect public welfare, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings. Primary and secondary standards for criteria pollutants are presented in Table 6.

Key elements of the 1990 Clean Air Act amendments include defining *nonattainment* areas, controlling hazardous pollutants at the source, reducing acid rain, requiring air quality permits and annual reporting for industrial polluters, instituting automobile tailpipe emission standards and oxygenated fuels, and phasing out ozone-depleting chlorofluorocarbons. Nonattainment is the term applied to areas where concentrations of pollutants exceed public health and environmental safety standards.

Blackfeet Nation ambient air quality standards also are presented in Table 6. The U.S. EPA established new standards for particulate matter ($PM_{2.5}$) and ozone in July 1997, and these were adopted by the tribe. These new standards are included in Table 6.

Local Air Quality

Air quality monitoring is performed in the project area by the tribe, and regional air quality is monitored through the U.S. EPA Aerometric Information Retrieval System (AIRS). The tribe monitors particulate matter using seven PM_{10} monitors placed in five agricultural areas and two industrial areas, for areas assumed to have higher than average levels of particulate matter. Monitoring began in 1994 with two PM_{10} instruments. In addition, the tribe performs stack emissions testing on regulated point sources and coordinates its own open burning program. Data collected by the Blackfeet Nation are part of the AIRS network (Sinclair 2000 personal communication).

In 1999, the Montana air quality summary for Glacier County showed that carbon monoxide, ozone, sulfur dioxide, and nitrogen dioxide were not detected. $PM_{2.5}$ was not specifically monitored; however, PM_{10} was monitored and the second-highest 24-hour value for the year was detected at 64 $\mu g/m^3$ (micrograms per cubic meter). This value did not exceed the 24-hour standard of 150 $\mu g/m^3$. The annual mean value detected was 23.4 $\mu g/m^3$. This value did not exceed the standard of 50 $\mu g/m^3$. The Blackfeet Environmental Office is in the planning stages for installing $PM_{2.5}$ monitoring equipment (U.S. EPA 2000d and Sinclair 2000 personal communication).

Data for point source emissions in Glacier County during 1999 were also reviewed from the AIRS database. Data covered the six NAAQS priority pollutants, VOCs, and lead. Carbon monoxide, nitrogen dioxide, and VOCs were detected in 13 industrial sources, 10 of which are pipeline stations or bulk fuel facilities. An emissions estimate is based on the normal operating schedule of a source and includes the effects of installed pollution control equipment and regulatory restrictions on operating conditions. Carbon monoxide, nitrogen dioxide, and VOC

Table 6. Federal and Blackfeet Nation ambient air quality standards.

Criteria Pollutants	Federal (National Ambient Air Quality Standards) Primary	Secondary	Blackfeet Nation
Nitrogen dioxide (ppm)			
Annual arithmetic mean	0.053 [a]	0.053 [a]	0.053 [a]
Sulfur dioxide (ppm)			
Annual arithmetic mean	0.03 [a]	–	0.03 [a]
24-hour average	0.14 [b]	–	0.14 [b]
3-hour average	–	0.50 [b]	0.50 [b]
1-hr, 2 times/7 days	–	–	0.25 [c]
1-hr, 1 time/8 hours	–	–	0.40 [b]
Carbon monoxide (ppm)			
8-hour average	9 [b]	–	9 [b]
1-hour average	35 [b]	–	35 [b]
Ozone (ppm)			
8-hour average [d]	0.08 [b]	0.08 [b]	0.08 [b]
1-hour average [e]	0.12 [b]	0.12 [b]	0.12 [b]
Lead ($\mu g/m^3$)			
Calendar quarterly average	1.5[a]	1.5 [a]	1.5 [a]
Particulate matter ($\mu g/m^3$)			
Total suspended particulates			
Annual geometric mean	–	–	60 [a]
24-hour average	–	–	150 [b]
Particulate matter (PM_{10})			
Annual arithmetic mean	50	50	50
24-hour average	150 [b]	150 [b]	150 [b]
Particulate matter ($PM_{2.5}$)d			
Annual arithmetic average	15	15	15
24-hour average	65	65	65

[a] Never to be exceeded.
[b] Not to be exceeded more than once per year.
[c] Not to be exceeded more than twice in 7 days.
[d] New federal regulation adopted July 1997.
[e] Currently, the 1-hour ozone standard is revoked and replaced by the new 8-hour standard when an area is shown to meet the 1-hour standard for 3 consecutive years. However, U.S. EPA has proposed to reinstate the 1-hour standard in nearly 3,000 counties in which the standard has been revoked since 1998.
ppm = parts per million.
$\mu g/m^3$ = micrograms per cubic meter.
Source: United States Environmental Protection Agency (U.S. EPA 2000d) and the Blackfeet Nation Environmental Office (Sinclair 2000 personal communication).

emissions were calculated to be 90 metric tons (100 tons), 118 metric tons (130 tons), and 364 metric tons (401 tons), respectively, and the county's total emissions were 572 metric tons (631 tons) (U.S. EPA 2000d).

Based on monitoring information compiled on a continuous basis, the U.S. EPA has established that none of the NAAQS is exceeded in the project area, and the project area is thus considered an unclassified/attainment area (40 CFR 81.327 as amended). Thus, no air quality modeling is required.

The project area is adjacent to Glacier National Park, a federally designated Class I airshed. The National Park Service monitors air quality in the park at West Glacier. However, no air quality monitoring is performed by the Park Service east of the Continental Divide (Michaels 2001 personal communication).

Noise

The US 89 project area is rural. US 89 and Duck Lake Road provide access to Glacier National Park, and the communities of Browning, Kiowa, Saint Mary, and Babb. The primary source of noise within the project area is automobile traffic. US 89 and Duck Lake Road are major routes through the project area, and are the principal contributors to noise in the project corridor.

The Montana Department of Transportation Traffic Noise Analysis and Abatement: Policy and Procedure Manual (MDT 2001b) provides guidance for the analysis and abatement of highway traffic noise and fulfills requirements stemming from the following state and federal environmental statutes and regulations:

- FHWA regulations found at 23 CFR Part 771, which prescribe procedures for implementing the National Environmental Policy Act (NEPA)
- 23 CFR 772, which prescribes procedures for abatement of highway traffic noise and construction noise
- Montana Environmental Policy Act (MEPA), Montana Code Annotated Title 75.

The manual describes noise analysis procedures applicable to Montana Department of Transportation highway projects. The first step in the noise analysis is preliminary screening to determine if a detailed noise analysis is needed. Detailed analysis, if needed, includes measurements of ambient noise levels, modeling of future noise levels after implementation of the proposed project, and discussion of proposed abatement measures. Preliminary screening of the US 89 project in accordance with the manual determined that a detailed noise analysis is not required. The results of the screening are described in Appendix B.

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Biological Environment

Vegetation and Wildlife Habitat

The US 89 project area is located on the Blackfeet Indian Reservation, in north-central Montana on the eastern front of the Rocky Mountains (Figure 1). Montana consists of two distinct physiographic regions (Hansen et al. 1995). The northern Great Plains occupy the eastern two-thirds of the state and the northern Rocky Mountains occupy the western third of the state. The US 89 project area is located at the boundary of these two distinct physiographic regions. The northern Great Plains are predominantly mixed-grass prairie (Hansen et al. 1995). Trees and shrubs occur where there is adequate moisture. Open coniferous forests occur at higher elevations and northern aspects. Deciduous forests are restricted to floodplains and stream courses (Hansen et al. 1995), although the western edge of the reservation is also the southernmost reach of the aspen groveland habitat type originating at the foot of the Canadian Rockies (Pfister et al. 1977). The northern Rocky Mountains are 80 percent forested (Hansen et al. 1995). Forests habitats are highly variable and are influenced by elevation, aspect, and climatic conditions.

Study Methods

Color infrared aerial photographs, topographic maps, National Wetlands Inventory maps, and onsite field inspections were used to map terrestrial resources, aquatic resources, and wetlands present in the project vicinity. Onsite field inspections were conducted in May, June, and October 2000 to verify the results of the aerial photography interpretation.

Characterization of vegetation communities in the project area are consistent with habitat types described by Cooper (1981) in *Forest Habitat Types of the Blackfeet Indian Reservation*. The Cooper report provides a complete description of the vegetation communities on the Blackfeet Indian Reservation and identifies common plant associations within these communities. Wildlife use and existing habitat conditions were observed and recorded during field investigations and analyzed from a review of the scientific literature, existing reports, and studies previously conducted in the project area.

Additional information on general wildlife use in the project area was obtained from interviews with biologists representing the Blackfeet Environmental Office and Fish and Wildlife Department; Glacier National Park; U.S. Fish and Wildlife Service (USFWS); Montana Department of Transportation; Montana Natural Heritage Program; Montana Fish, Wildlife, and Parks; and other federal and state agency biologists.

For additional information on vegetation and wildlife habitat in the US 89 project area, refer to the *Biological Resources Report: US 89 Browning to Hudson Bay Divide* (Herrera 2002).

Habitat Descriptions

Habitat types in the project area have been described by Pfister et al. (1977) and Cooper (1981). Based on these reports and observations made during field reconnaissance, the project area can be divided into six major habitat types: grasslands, wetlands, upland shrubs, deciduous forests, mixed forests, and coniferous forests. In addition, several habitat subtypes occur within each of these major groups.

Grasslands

Most of the project area consists of grassland habitats. Grassland communities in the project area include grazed prairies and disturbed roadside areas. These habitats dominate the eastern portion of the project area from Browning to just north of Kiowa along US 89, and from Browning to Duck Lake along Duck Lake Road (Figures 4, 5, and 8). From Kiowa to Hudson Bay Divide, grasslands are less dominant but are still a major component of the western portion of the US 89 project area.

Grasslands in the project area are characterized by broad, rolling hills and the presence of a variety of grass species, including *Festuca* sp., *Bromus* sp., needlegrass (*Stipa* sp.), oatgrass (*Danthonia*), gramma (*Bouteloua*), and wheatgrass (*Agropyron*). Some grassland communities include scattered individual shrubs or dense pockets of shrubs such as shrubby cinquefoil (*Pentaphylloides floribunda*), snowberry (*Symphoricarpos albus*), and *Rosa* sp. At higher elevations, particularly above Kiowa, and under dry and windswept conditions, some limber pine (*Pinus flexilis*) may occur in these grasslands (Pfister et al. 1977).

At lower elevations, from Browning to Kiowa along the US 89 corridor, and near Duck Lake along Duck Lake Road, grasslands communities contain glaciated prairie potholes. Prairie potholes are described in the Wetlands section, which follows. Grassland habitats and many of the potholes in the project area are disturbed or degraded by crop production and livestock grazing (Lesica 1989).

Grasslands also encompass disturbed areas along the road corridors, including ditches, driveways, and gravel pits. These areas are dominated by Eurasian grasses and herbs, including prairie crocus (*Pulsatilla patens*), purple geranium (*Geranium viscosissimum*), shooting star (*Dodecatheon pulchellum*), vetch (*Astragalus* sp.), timothy (*Phleum* sp.), *Yarrow* sp., and chickweed (*Cerastium arvense*). Shrubs occur sporadically in these areas and include shrubby cinquefoil, snowberry, rose, and shrubby penstemon (*Penstemon fruticosus*).

Wetlands

Four types of wetlands occur throughout the project area and can be categorized as large riverine systems, small riverine systems, depressional systems, and slope systems. Wetland types are discussed in greater detail in the Wetlands section.

Upland Shrubs

Several shrub-dominated communities occur in upland areas along US 89 at transitions between wetlands and aspen grovelands, within riparian communities, and at sites that were once flooded by beaver activity and have since been drained. These sites contain willow (*Salix* spp.), bog birch (*Betula nana*), and stunted aspen (*Populus tremuloides*). Chokecherry (*Prunus virginiana*), *Spirea* sp., and serviceberry (*Amelanchier alnifolia)* are also common, as well as various grasses and herbs.

Deciduous Forests

Deciduous forests in the project area consist of bottomland hardwood forests and aspen grovelands.

Bottomland Forests

Bottomland forests occur in riparian areas and floodplains of major river systems extending from the mountains into the grasslands. Despite the frequent flood events that occur in these systems, a relatively stable and diverse community often develops (Pfister et al. 1977). Bottomland forests are uncommon in the project area and are found only at South Fork Cut Bank Creek near reference post 13 on US 89 and at Cut Bank Creek near reference post DLR-4.5 on Duck Lake Road. At these locations this habitat type is dominated by black cottonwood (*Populus balsamifera*) with some aspen. This system also contains a diverse understory of shrubs and emergents, including willow, bog birch, honeysuckle (*Lonicera*), cherry, serviceberry, horsetail (*Equisetum*), bedstraw (*Galium*), *Aster*, meadow rue (*Thalictrum*), and various grasses and sedges.

Aspen Grovelands

The stands of aspen found in the project area are reported to be the southward extension of the aspen groves found at the foot of the Canadian Rockies in Alberta and extending east through Saskatchewan into southwestern Manitoba and adjacent Minnesota (Pfister et al. 1977). Aspen grovelands on the Blackfeet Indian Reservation represent the southwestern extremity of this habitat type. While this habitat type is generally not considered to be unique, it is more special than other habitat types in the project area because of its limited distribution and importance to grizzly bears, a threatened species. The value of the stands varies depending on the size, health, and proximity to other habitat types. Many of the aspen stands along US 89 and Duck Lake Road are small patches that were isolated from larger aspen stands when the road was initially constructed. At other locations the roadway fragments large, complex aspen stands: along US 89 between reference posts 10 and 11, at reference post 15, and between reference posts 21 and 22, and along Duck Lake Road between reference posts DLR-31.4 and DLR-33.4.

Mixed Forests

Along US 89, mixed forests occur between elevations of 1,646 meters (5,400 feet) and 1,707 meters (5,600 feet). Mixed forests in the project area are predominantly aspen grovelands with a strong component of conifer tree species and occur in a transition zone from pure aspen grovelands to pure conifer forests. It is not known which types of aspen groveland communities readily support conifer species and which types do not, or what influences invasion rates of conifer species in aspen stands (Cooper 1981). This habitat type provides continuous cover between the aspen grovelands and conifer forests and supports numerous species of wildlife.

Coniferous Forests

Coniferous forests occur in the US 89 corridor beginning in the vicinity of reference post 22 as the elevation of the project area increases and Hudson Bay Divide is ascended. Along Duck Lake Road, patches of coniferous forests occur from reference post DLR-33.4 west to the intersection with US 89, and typically are associated with steep ravines.

Four climax conifer forest types occur on the eastern front, including limber pine (*Pinus flexilis*) forests, Douglas-fir (*Pseudotsuga menziesii*) forests, subalpine fir (*Abies lasiocarpa*) forests, and spruce (*Picea* sp.) forests (Pfister et al. 1977).

Wildlife Occurrence

This section describes the wildlife species expected to occur in the project area based on the habitat types identified in the project area. Expected wildlife use is based on field observations, bird surveys, published reports, and interviews with Tribal, state, and federal biologists. Table G-1 in Appendix G contains a list of the wildlife species observed during field surveys and reconnaissance as well as species that are expected to occur in the project area.

In addition to habitat type availability and land uses, surrounding land management areas greatly influence wildlife use of the project area. The project area lies on the eastern front of the Rocky Mountains, bordering Glacier National Park, which extends into Canada as the Waterton Lakes National Park (Figure 1). Glacier National Park is bordered mostly by publicly owned and Indian reservation lands (USDI 1999). The close proximity of these natural areas helps to increase the number and diversity of species occurring in the project area. Animals can move relatively freely between publicly owned and reservation lands (USDI 1999). Therefore, some species occur in the project area on a seasonal basis. Other wildlife species are transients, making their way to more suitable habitat in the park or adjacent forests. Still other species reside year-round on the Blackfeet Indian Reservation within the project area.

Birds

Fifty-seven bird species were observed within the project area, and more than 150 bird species could use habitat types in the project area. Table G-1 in Appendix G contains a list of the bird species observed during field surveys as well as species that are expected to occur in the project area. Expected occurrence was determined by field observations of suitable habitat and published literature, including McEneaney (1993), Skarr (1996), and National Geographic Society (1999).

The diverse habitat types in the project area support a wide variety of bird species. Grasslands provide nesting habitat for savannah and vesper sparrows, bluebirds, meadowlarks, kingbirds, and blackbirds, and foraging habitat for hawks and owls. Roadside areas are commonly used by grassland birds in the project area. Fence posts provide perch sites within the grassland habitat where perches are generally lacking. These perches are used by male meadowlarks and sparrows attracting females or defending their territory, and by hawks foraging for food. The complex of potholes within the grassland habitats near Browning provides critical breeding habitat for mallards and other waterfowl and migration habitat for shorebirds, waterfowl, and water birds. This complex of potholes is considered one of five significant pothole areas in the state of Montana (Lesica 1989).

More than 50 bird species occur in the large and small riparian wetland systems that support scrub-shrub vegetation and shrublands in the project area. Commonly observed species in these habitat types include common snipe, belted kingfisher, yellow warbler, Wilson’s warbler, swallows, song sparrow, and red-winged blackbird. Other species expected to occur in wetlands with scrub-shrub vegetation and riparian wetland systems include flycatchers, hummingbirds, gray catbird, veery, sparrows, waterfowl, and herons.

Commonly observed species in the aspen groveland and bottomland hardwood habitat types include woodpeckers, wood-pewee and other flycatchers, crows, robins, and orange-crowned warblers. Coniferous and mixed forests provide habitat for woodpeckers, hawks, owls, chickadees, kinglets, and grouse.

Mammals

Previous studies and conversations with local biologists indicate the presence and abundance of mammals in the project area. Table G-1 in Appendix G provides a list of mammals observed during field studies and identifies species expected to occur in the project area. Species occurrence is summarized below and is based on habitat availability, observations, and information from Blackfeet Fish and Game Department staff (Carney 2000a personal communication).

Numerous ground squirrel colonies were observed throughout the grasslands and disturbed areas within and adjacent to the project area. Other small mammals expected in these habitats include mice, shrews, and moles. Small- to medium-sized mammals using grasslands, shrublands, and aspen groveland habitats include voles, pocket gophers, weasels, striped skunks, raccoons, badgers, and red fox. Coyotes were observed in the grasslands and aspen grovelands along Duck Lake Road.

In riparian areas, evidence of deer, moose, and beaver were observed on a regular basis. Mink, raccoon, skunk, weasel, and grizzly bear are also expected in the wetland and riparian areas of the project corridor. Beavers are common in the project corridor and play an important role in maintaining wetland habitat. Beaver ponds increase edge habitat, stabilize water flows, and create cover and habitat for numerous other wildlife species, including waterfowl, songbirds, water birds, and small mammals such as otters, raccoons, minks, and muskrats (USDA 2000). However, beavers also block fish passage and eliminate stream habitat for fish.

Snowshoe hare and red fox were observed in the mixed and conifer forests along US 89. Other species expected in the mixed and conifer habitats include chipmunk, red squirrel, marten, black bear, and porcupine.

Year-round populations of mule deer, white-tailed deer, elk, and moose occur on the Blackfeet Indian Reservation lands. Elk occur on the western portion of the reservation year-round. Within the project area, elk move between Glacier National Park and habitats east of US 89. Elk are also reported on Cut Bank Ridge and areas west of Kiowa, including the Milk River drainage. White-tailed deer use all of the habitat types available in the project area. Deer cross the roadway corridor at random locations to access habitats (Morehead 2000 personal communication). Moose are reported primarily along US 89 in the Milk River, Cut Bank Creek, and Lake Creek drainages, and the extensive wetlands systems east of Kiowa. Known moose crossing locations occur east of Kiowa (from reference post 10 to 11), Lake Creek at Kiowa (reference post 12), North Fork Cut Bank Creek (reference post 17), and the South Fork Milk River, middle branch (reference post 21) (Morehead 2000 personal communication) (Figure 5).

Winter tracking surveys conducted in the project vicinity by the Blackfeet Nation commonly report lynx and marten in the conifer forests west of the project area. On occasion, fisher are also reported in conifer forests, and rarely, wolverines. Incidental use of the habitats in the project area is expected for these species and is likely related to snowshoe hare populations.

Grizzly bears den in Glacier National Park, but move onto the reservation in spring and summer to take advantage of the diverse habitats and food availability. The riparian areas and aspen grovelands in the project area are important foraging sites for grizzly bears. Black bears are also present throughout the project area. Their use of available habitats is not as well understood as use by grizzly bears, but their occurrence typically is related to grizzly bear use patterns (USDA 1997). Black bears avoid the immediate presence of grizzly bears, but both species often use the same habitats, and home ranges commonly overlap (Carney 2000a personal communication). Both species prefer closed timber habitats, including aspen stands. Black bears and grizzly bears move back into the park in the fall to forage in the avalanche chutes when the huckleberries (*Vaccinium membranaceum*) are in fruit.

Mountain lions are present in the project vicinity. Mountain lions often travel along ridges and are closely associated with coniferous habitats, particularly during the daytime. Populations appear to be increasing, and reports of sightings and depredations of livestock attributable to mountain lions east of US 89 are not uncommon. Mountain lions are often reported in the North Fork Cut Bank Creek drainage in the vicinity of reference post 17 on US 89.

Amphibians and Reptiles

Amphibians and reptiles occupy an important niche in the habitats in which they occur. Amphibians and reptiles are significant predators of insects, mollusks, small mammals, and ground-dwelling birds. They also provide an important food source to many species of fish, birds such as great blue herons and red-tailed hawks, and mammals such as mink. Expected occurrence of amphibians and reptiles in the project area is based on Reichel and Flath (1995). Occurrence is shown in Table G-1 in Appendix G and summarized below.

Permanent and ephemeral open water and emergent ponds in the project area likely support egg laying and larvae development of tiger salamanders, western chorus frogs, and spotted frogs. Northern leopard frogs may also be present. The drier habitats of the eastern portion of the project area likely support several species of reptiles, including gopher snakes, rattlesnakes, racers, and short-horned lizards. Rubber boas may be found in various forest habitat types. Western and common garter snakes are likely in all the habitat types in the project area, but are most commonly found at lower elevations near water.

Wildlife Movement Corridors

Current levels of wildlife mortality on US 89 and Duck Lake Road are reportedly low. For the period from 1994 to 1999, 26 collisions with animals were reported along US 89, and four collisions were reported along Duck Lake Road. Of the 26 accidents reported along US 89, 20 of the collisions were with domestic animals. It is presumed that most ungulate and carnivorous wildlife populations readily cross the existing US 89 roadway at various locations because of the overall low traffic levels in the project area and their nocturnal habits. Wildlife crossing habits may differ during the summer months when traffic levels along the US 89 corridor are nearly two times greater than other seasons of the year.

Four locations in the project area have been identified as important crossing areas for bears and ungulates (Morehead 2000 personal communication). Locations and expected use at important movement corridors are summarized in Table 7. An additional crossing was identified in the Duck Lake Road corridor where a deep ravine funnels wildlife toward Saint Mary River.

Table 7. Wildlife movement areas on US 89 and Duck Lake Road.

	Associated Natural Feature	Expected Use
US 89		
Reference post 10 to 11	Dense aspen groveland and scrub-shrub wetland habitat area east of Kiowa	Bears, ungulates, small- to medium-sized mammals
Reference post 12	Lake Creek, near Kiowa	Bears, ungulates, wolves, small- to medium-sized mammals, amphibians
Reference post 17	North Fork Cut Bank Creek	Bears, ungulates, wolves, small- to medium-sized mammals
Reference post 22	South Fork Milk River, middle branch	Bears, ungulates, small- to medium-sized mammals, amphibians
Duck Lake Road		
Reference post DLR-33.5	Deep ravine funnels wildlife to Saint Mary River	Ungulates, small- to medium-sized mammals, amphibians

Wetlands

Study Methods

Wetland determinations for the project area were performed in accordance with the routine determination method outlined in the *U.S. Army Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987). The manual's three-parameter approach for determining wetland presence relies on the occurrence and distribution of field indicators for hydrophytic (wetland) vegetation, hydric soils, and hydrology. Field conditions for wetland determinations were evaluated June 12–15 and October 19, 2000. Each wetland in the project area was classified using the *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979).

Wetlands were also evaluated using the Montana Department of Transportation *Wetlands Assessment Method* (MDT 1999). This method was established primarily to address highway projects and other linear projects and is based on the principles of the hydrogeomorphic assessment method. The hydrogeomorphic system is based on three fundamental factors that influence how wetlands function: position in the landscape, water source, and the flow and fluctuation of water once it is in the wetland. Wetlands in the project area fall into three hydrogeomorphic classes: riverine, depressional, and slope. These classes provide a convenient means for grouping the wetlands in the project area for the purposes of evaluating functions. Each of the 54 wetlands identified for this study was categorized into one of the following four groups:

- Large riverine systems
- Smaller riverine systems
- Depressional wetlands
- Wetlands occurring on slopes.

Wetlands were assigned to one of the four groups based on their position in the landscape, duration of flooding, and vegetative composition. Because of their similar characteristics, wetlands within a particular group are expected to function similarly, provide habitat for similar species, and be affected by project construction in a similar manner. These groupings are the basis for the description of existing conditions, analysis of wetland functions, and discussion of project impacts.

The methodology uses a form that assesses and assigns functions and values a rating of low, moderate, or high, and scores each on a scale of 0.1 (lowest) to 1 (highest) functional points. The functional assessment form was also used to divide wetlands into one of four hierarchical categories based on physical attributes. This classification hierarchy ranges from Category I wetlands, which exhibit outstanding features such as uniqueness, threatened and endangered species habitat, to Category IV wetlands, which exhibit minimal attributes or uniqueness.

Wetland Resources

A total of 54 wetlands were identified along US 89 and Duck Lake Road. The US 89 corridor contains 48 of the 54 wetlands. Locations of wetlands are shown in Figures 4 through 8. Each wetland within the project area is identified by a number (e.g., W1, W2). Subsequent crossings of the same numbered wetland are indicated by a letter (e.g., W24A, W24B).

Table 8 summarizes the characteristics of the 54 wetlands identified within the US 89 and Duck Lake Road corridors, including the identification number, location, classification, associated water body, and size. For wetlands extending beyond the project area limits, total wetland acreage has been estimated using aerial photographs and National Wetlands Inventory maps. The following section describes the wetlands in the project area, classifies them according to two systems, and evaluates their functions and values.

Jurisdictional and Non-Jurisdictional Wetlands

All wetlands in the project corridor are regulated by the Blackfeet Nation through the Aquatic Lands Protection Ordinance 90A. Wetlands in the project area were determined to be jurisdictional or non-jurisdictional as regulated by the Corps of Engineers. MDT would not be responsible for mitigating impacts on non-jurisdictional wetlands for the purposes of securing a Section 404 permit. However, regardless of jurisdiction, Executive Order 11990 requires MDT to account for all wetland losses. Therefore, MDT would ultimately seek to replace all wetlands affected by the project.

Jurisdictional wetlands include those wetlands that meet the definition of a wetland as defined in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and do not fall under any of the criteria for non-jurisdictional wetlands. Non-jurisdictional wetlands in the US 89 and Duck Lake corridors consist of isolated wetlands, which are generally prairie pothole wetlands. The following guidelines were used in this assessment to determine if a wetland was isolated and non-jurisdictional:

- No apparent surface or wetland connection with any water of the U.S. and not directly adjacent to any water of the U.S.;
- No actual link between the water body and interstate or foreign commerce based on the factors mentioned above;
- Individually and/or in the aggregate, the use, degradation or destruction of the isolated water would have no substantial effect on interstate or foreign commerce, i.e. the wetland does not have a “significant nexus” to navigable waters.

Jurisdictional and non-jurisdictional wetlands in the US 89 and Duck Lake corridors are identified in Table 8 (see Attachment A in Appendix E).

Table 8. Characteristics of wetlands identified along US 89 and Duck Lake Road.

Wetland	Wetland Group [a]	Corps of Engineers Jurisdictional / Non-Jurisdictional [b]	Classification USFWS [c]	Classification State [d]	Associated Water Body	Estimated Size (ha/acre)
1	large riverine (upper perennial [e])	Jurisdictional	PSS/R3UBH	I	South Fork Milk River, north branch	8/20
2	Slope	Jurisdictional	PSS	II	South Fork Milk River, north branch	40/100
3	large riverine (upper perennial [e])	Jurisdictional	PSS	I	South Fork Milk River, middle branch	121/300
4	large riverine (upper perennial [e])	Jurisdictional	PSS/R2UBH	I	South Fork Milk River, south branch	405/1000
5	Slope	Jurisdictional	PSS	III	Drains to South Fork Milk River, south branch	0.4/1
6	depressional (closed)	Non-jurisdictional	PEM	III	Isolated	0.2/0.5
7	depressional (ground water)	Jurisdictional	PEM	III	Seep that drains to North Fork Cut Bank Creek	<0.1/<0.1
8	depressional (open)	Jurisdictional	PSS	III	Drainage feature, likely connected to South Fork Cut Bank Creek	0.4/1
9	depressional (closed)	Non-jurisdictional	PEM	III	Isolated	<0.1/<0.1
10	depressional (closed)	Non-jurisdictional	PSS	III	Isolated	<0.1/<0.1
11	depressional (closed)	Non-jurisdictional	PEM	III	Isolated	0.1/0.2
12	depressional (closed)	Non-jurisdictional	PEM	III	Isolated	<0.1/<0.1
13	depressional (closed)	Non-jurisdictional	PEM	III	Isolated	0.2/0.5
14	depressional (closed)	Non-jurisdictional	PEM	III	Isolated	<0.1/<0.1
15	depressional (closed)	Non-jurisdictional	PEM	III	Isolated	<0.1/<0.1
16	depressional (closed)	Non-jurisdictional	PEM	III	Isolated	<0.1/<0.1
17	large riverine (upper perennial [e])	Jurisdictional	PSS/PEM	I	South Fork Cut Bank Creek	>800/2000
18	large riverine (upper perennial [e])	Jurisdictional	PSS	I	Lake Creek	40/100
19	depressional (closed)	Non-jurisdictional	POW	III	Isolated	0.2/0.5
20	Slope	Jurisdictional	PFO	III	Drains to a tributary to South Fork Cut Bank Creek	2/5
21	large riverine (upper perennial [e])	Jurisdictional	PSS	I	Tributary to South Fork Cut Bank Creek	81/200
22	Slope	Non-jurisdictional	PSS	II	Isolated drainage	8/20
23	large riverine (upper perennial [e])	Jurisdictional	PSS	I	Tributary to South Fork Cut Bank Creek	40/100
24A/24B/ 24C/24D	large riverine (lower perennial [f])	Jurisdictional	PSS	I	South Fork Cut Bank Creek	>800/2000
25	small riverine (nonperennial [f])	Jurisdictional	PSS	III	Tributary to South Fork Cut Bank Creek	10/25
26	small riverine (upper perennial [e])	Jurisdictional	PSS/PEM/ POW	III	Flatiron Creek	81/200
27	depressional (open)	Jurisdictional	PEM	III	Drains to Flatiron Creek	0.1/0.2
28	small riverine (upper perennial [e])	Jurisdictional	PSS/PEM/ PAB	III	Flatiron Creek	81/200
29	depressional (closed)	Non-jurisdictional	PEM	III	Isolated	0.2/0.5

Table 8 (continued). Characteristics of wetlands identified along US 89 and Duck Lake Road.

Wetland	Wetland Group [a]	Corps of Engineers Jurisdictional / Non-Jurisdictional [b]	Classification: USFWS [c]	Classification: State [d]	Associated Water Body	Estimated Size (ha/acre)
30	depressional (closed)	Non-jurisdictional	PEM	III	Isolated	<0.1/0.1
31	depressional (closed)	Non-jurisdictional	PEM	III	Isolated	<0.1/0.1
32	depressional (closed)	Non-jurisdictional	PEM	III	Isolated	<0.1/0.1
33	depressional (closed)	Non-jurisdictional	PEM	III	Isolated	<0.1/<0.1
34	depressional (closed)	Non-jurisdictional	PEM	III	Isolated	0.1/0.3
35	depressional (closed)	Non-jurisdictional	PEM	III	Isolated	0.1/0.2
36	depressional (closed)	Non-jurisdictional	PEM	III	Isolated	0.1/0.2
37	depressional (closed)	Non-jurisdictional	PEM	III	Isolated	0.1/0.2
38	depressional (closed)	Non-jurisdictional	PEM	III	Isolated	0.2/0.5
39	depressional (closed)	Non-jurisdictional	PEM	III	Isolated	0.2/0.5
40	depressional (closed)	Non-jurisdictional	PEM	III	Isolated	0.1/0.2
41	depressional (closed)	Non-jurisdictional	PEM	III	Isolated	<0.1/0.1
42	depressional (closed)	Non-jurisdictional	PEM	III	Isolated	0.1/0.2
43	depressional (closed)	Non-jurisdictional	PEM	III	Isolated	0.4/1.0
44	depressional (closed)	Non-jurisdictional	PEM	III	Isolated	0.1/0.2
45	small riverine (upper perennial [e])	Jurisdictional	PSS/PEM	III	Willow Creek	10/25
46A/46B	small riverine (upper perennial [e])	Jurisdictional	PSS/PEM	III	Willow Creek	10/25
47	depressional (open)	Non-jurisdictional	PEM	III	Isolated drainage	0.6/1.5
48A/48B/ 48C	depressional (open)	Non-jurisdictional	PSS/PEM	III	Isolated drainage	<2/<5
49	large riverine (lower perennial [f])	Jurisdictional	PSS/R3USC	I	Cut Bank Creek	>800/2000
50	depressional (closed)	Non-jurisdictional	PSS/PEM	III	Isolated	0.2/0.5
51	depressional (closed)	Non-jurisdictional	PSS/PEM	III	Isolated	0.8/2.0
52A/52B	small riverine (upper perennial [e])	Jurisdictional	PSS/PEM/ POW/R3US C	III	Tributary to Saint Mary River	>50/>120
53	small riverine (upper perennial [e])	Jurisdictional	PAB/R3USC	III	Tributary to Saint Mary River	>50/>120
54	small riverine (nonperennial [g])	Jurisdictional	PSS/R4SB	III	Tributary to Saint Mary River	>50/>120

Note: See Figures 4 through 8 for mapped locations.

[a] The wetland group is based on three hydrogeomorphic categories: riverine, depressional, and slope.

[b] Corps of Engineers jurisdictional status was determined by project biologists and has been confirmed by the Corps of Engineers (see Attachment A in Appendix E). Wetlands on the Blackfeet Indian Reservation are also regulated by the Blackfeet Nation.

[c] USFWS classification of wetland vegetation in the project area is based on the following classes: palustrine open water (POW), palustrine aquatic bed (PAB), palustrine emergent (PEM), palustrine scrub/shrub (PSS), palustrine forested (PFO), riverine lower perennial perennially flooded (R2UBH), riverine upper perennial perennially flooded (R3UBH), riverine upper perennial unconsolidated shore seasonally flooded (R3USC), and riverine intermittent streambed (R4SB) (Cowardin et al. 1979).

[d] The state of Montana divides wetlands into four hierarchical categories based on the physical attributes analyzed in the function assessment form. The state classification hierarchy ranges from Category I wetlands, which exhibit outstanding features (e.g., uniqueness, threatened and endangered species habitat) to Category IV wetlands, which exhibit minimal attributes or uniqueness.

[e] Within an upper perennial system, there is no tidal influence and some water flows throughout the year at a high gradient and fast velocity.

[f] Within a lower perennial system, there is no tidal influence and some water flows throughout the year at a low gradient and slow velocity.

[g] Nonperennial systems are intermittent channels where water flows for only part of the year. Water may remain in isolated pools or surface water may be absent when water is not flowing.

Wetland Descriptions

Wetlands in the project area are divided into four wetland groups: large riverine systems, small riverine systems, depressional systems, and slope systems. The majority of the wetlands identified along the US 89 and Duck Lake Road corridors are prairie potholes (depressional systems); however, riverine systems comprise the majority of the acreage. Large and small riverine systems are wetlands associated with rivers or streams that are the primary hydrologic source for these wetlands. Prairie potholes are depressions in the landscape that hold surface water or are fed by ground water, and were formed by glaciation. Slope wetlands are located on slopes with ground water seeps as the primary source of hydrology. For additional information on wetlands in the US 89 project area, refer to the *Biological Resources Report: US 89 Browning to Hudson Bay Divide* (Herrera 2002).

Large Riverine System Wetlands

All of the nine large riverine wetland systems crossed by the project corridor are complex palustrine scrub-shrub (PSS) systems interspersed with pockets of palustrine aquatic bed (PAB) and palustrine emergent (PEM) habitats (Cowardin et al. 1979). (Palustrine systems include wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens. The palustrine system includes vegetated wetlands traditionally called by names such as marsh, swamp, bog, and fen. It also includes the small shallow permanent or intermittent water bodies often called potholes.) Large riverine systems in the project area are characterized by high levels of beaver activity and wide floodplains that create expansive and diverse systems. The rivers and streams of these systems drain the northeastern slopes of the Rocky Mountains. Snowmelt and ground water supply the hydrology for these wetlands.

Small Riverine System Wetlands

Eight riverine systems in the project area are generally smaller and more disturbed than the large riverine systems described above. These wetlands are disturbed by grazing and human alterations and are highly influenced by beaver activity. Beaver activity ranges from moderate to high, and vegetation associated with these systems consists predominantly of shrub and emergent layers. The wetlands associated with these streams are not contiguous systems; rather, they are interspersed with reaches of stream channel that lack associated wetlands. Grazing activity is intense, and portions of these wetlands have been filled or excavated for driveways, gravel sources, or agricultural activities. Ground water and some snowmelt supply the hydrology in these wetlands.

Depressional Wetlands

Thirty-three depressional systems comprise the largest group of wetlands identified along the US 89 and Duck Lake Road project corridors. Depressional systems consist of prairie potholes and isolated ponds within aspen grovelands. Ground water and precipitation supply the hydrology in these wetlands. Nearly all of these wetlands are isolated systems with no outlet.

Slope Wetlands

Four wetlands form the smallest category of wetlands identified within the US 89 project area. No slope wetlands were identified along the Duck Lake Road corridor. In each of the four slope wetlands, ground water supplies the hydrology.

Wetland Function Assessment

Each wetland group in the project area was evaluated for the purposes of function assessment. Because wetlands with similar system attributes function similarly, it is not necessary to assess each individual wetland. Each function is given a rating of low, moderate, or high, and scored on a scale of 0.1 (lowest) to 1 (highest) functional points. Results of the evaluation for each wetland function are presented in Table 9 and summarized in the following section. The ratings shown in the table represent an average for all of the wetlands in that group.

Table 9. Averaged functional rating for the four wetland groups identified in the US 89 project area.

Function	Large Riverine System Wetlands	Small Riverine System Wetlands	Depressional Wetlands	Slope Wetlands
Listed/proposed threatened and endangered species habitat	1	0.3	0	0.3
Montana Natural Heritage Program species habitat	0	0	0.1	0
General wildlife habitat	0.9	0.4	0.7	0.6
General fish/aquatic habitat	1.0	0.6	NA	NA
Flood attenuation	0.8	0.6	NA	NA
Short- and long-term surface water storage	1	0.7	0.2	0.7.
Sediment/nutrient/toxicant retention	0.9	0.5	1	1
Sediment/shoreline stabilization	1	0.6	NA	NA
Production export/food chain support	1	0.8	0.2	0.7
Ground water discharge/recharge	1	1	1	1
Uniqueness	0.5	0.1	0.3	0.4
Recreation/education potential	0.5	0.1	0.1	0.1
Overall rating [a]	I	III	III	II/III

NA – Not applicable.

[a] The state of Montana divides wetlands into four hierarchical categories based on the physical attributes analyzed in the function assessment form. The state classification hierarchy ranges from Category I wetlands, which exhibit outstanding features (e.g., uniqueness, threatened and endangered species habitat) to Category IV wetlands, which exhibit minimal attributes or uniqueness.

Large Riverine System Wetlands

Large riverine system wetlands extend for miles upstream and downstream of the US 89 and Duck Lake Road corridors (USFWS 1993a, 1993b 1993c, 1993d, and 1993e) and are a dominant feature in the landscape. The Cut Bank Creek riparian corridor is continuous between US 89 and Duck Lake Road. High levels of beaver activity have added structural diversity and have created high levels of interspersion between vegetation classes in these wetlands. Riparian shrub-scrub habitats in the project area are also important foraging sites for grizzly bears in the spring and summer months. These wetlands provide high levels of general fish and wildlife habitat; flood attenuation; short- and long-term surface water storage; sediment, nutrient, and toxicant retention; sediment and shoreline stabilization; production export and food chain support; and ground water discharge based on size, structural diversity, and the volume of surface water stored in these systems. Large riverine system wetlands are rated Category I because they provide a wide range of functions and exhibit outstanding features such as uniqueness, and threatened and endangered species habitat.

Small Riverine System Wetlands

Small, disturbed wetlands occur where there is less forest and aspen groveland and more grazing. These riverine systems consist of small streams that have been channelized in numerous locations. Although the streams and associated riverine wetlands in this group are much smaller than the large riverine system wetlands, these smaller wetlands are still sizeable. Their smaller size causes several functions to be rated as moderate rather than high.

Incidental habitat is provided for grizzly bears. General wildlife habitat, general fish and aquatic habitat, flood attenuation, short- and long-term surface water storage, and sediment and shoreline stabilization are rated moderate. Ground water discharge, production export and food chain support, and sediment, nutrient, and toxicant retention function at high levels. Smaller and more disturbed riverine system wetlands are rated Category III, which are defined as more common, generally less diverse, and often smaller and more isolated than Category I and II wetlands.

Depressional Wetlands

Depressional wetlands of all sizes are abundant in the Milk River and Cut Bank Creek watersheds (USFWS 1993a, 1993b, 1993c, 1993d, 1993e). The majority of depressional wetlands along the US 89 and Duck Lake Road corridors are fairly small. Grazing activity or recreational use, particularly at Kiowa, surrounds all of these wetlands and nearly all of them are directly grazed. Any use by threatened or endangered species, or plants or animals rated as species of concern by the Montana Natural Heritage Program is incidental. One of the more important functions provided by depressional wetlands is seasonal habitat for migratory birds. Seasonal habitat is provided through short-term surface water storage. The most important function of these wetlands is ground water recharge. Depressional wetlands are rated Category III.

Slope Wetlands

Slope wetlands are somewhat rare in the watersheds crossed by the US 89 and Duck Lake Road project corridors. The wetlands in the project area are surrounded by forested buffers and have moderate levels of structural diversity. Incidental or secondary habitat is provided for grizzly bears and gray wolves. Moderate to high levels of wildlife habitat; ground water discharge; and sediment, nutrient, and toxicant retention occur in slope wetlands. Moderate levels of production export and food chain support, along with short- and long-term surface water storage, are also provided. Three of four slope wetlands are connected to riparian corridors, which increases wetland functional value, particularly for general wildlife habitat; sediment, nutrient, and toxicant retention; production export and food chain support; and ground water discharge. Slope wetlands are rated Category II, with the exception of W5 and W20, which are rated Category III because of their small size and highly disturbed nature.

Fisheries Resources

Methods

Existing data specific to the streams in the project area are scarce. Information on stream conditions, fish occurrence, and fish habitat conditions was gathered from scientific literature, maps, and interviews with representatives of U.S. Fish and Wildlife Service; USGS; the Blackfeet Environmental Office; Blackfeet Fish and Wildlife Department; Montana Department of Transportation; and Montana Fish, Wildlife, and Parks. Three site visits were made to assess each stream crossing along the US 89 and Duck Lake Road corridors, as well as areas potentially affected by road realignments. For streams that are lacking data on fish use, fish use is estimated based on habitat suitability and location and species occurrence in the watershed.

The Rosgen (1985) summary of delineative criteria for broad-level stream classification was used to determine the stream type at each crossing. A summary of the criteria for stream classification using this method is provided in Table 10. The Rosgen classification system facilitates the prediction of stream behavior (how a stream reacts when disturbed), provides a frame of reference in describing streams, and gives insight into the relationships among the different aspects of stream morphology.

Existing Conditions

Streams in the US 89 project area drain to three major rivers: Saint Mary River, Milk River, and Cut Bank Creek. Hudson Bay Divide, located 8.7 kilometers (5.4 miles) south of the town of Saint Mary, is the geographical high point of the area (Figure 2); here the land separates drainage flowing north to the Arctic Ocean’s Hudson Bay from drainage flowing south and east to the Missouri River and eventually to the Gulf of Mexico.

All of the streams crossed by US 89 drain to either the Milk River or Cut Bank Creek, both part of the Missouri River drainage basin. Streams on the east-west portion of Duck Lake Road (reference post DLR-24 to 34) flow north to the Saint Mary drainage and north to Hudson Bay. Those streams crossed by the north-south portion of Duck Lake Road (reference post DLR-0 to DLR-24) drain to either the Milk River or Cut Bank Creek.

Standing and flowing water adjacent to the road corridor is common along US 89. Adequately sized culverts are not always present at all locations where the roads cross drainages. Beaver activity is common within the project area, often resulting in standing water and flooded vegetation along portions of the corridor.

Table 10. Summary of delineative criteria for broad-level classification of streams.

Stream Type	General Description	Entrenchment Ratio	Width/ Depth Ratio	Sinuosity	Slope	Landform/Soils/Features
Aa+	Very steep, deeply entrenched debris-transport streams.	<1.4	<12	1.0 to 1.1	>0.10	Very high relief. Erosional, bedrock, or depositional features; debris flow potential. Deeply entrenched streams. Vertical steps with deep scour pools; waterfalls.
A	Steep, entrenched, cascading step-pool streams. High-energy debris transport associated with depositional soils. Very stable if the channel is bedrock or boulder dominated.	<1.4	<12	1.0 to 1.2	0.04 to 0.10	High relief. Erosional or depositional and bedrock forms. Entrenched and confined streams with cascading reaches. Frequently spaced deep pools in associated step-pool bed morphology.
B	Moderately entrenched, moderate-gradient, riffle-dominated channel with infrequently spaced pools. Very stable plan and profile. Stable banks.	1.4 to 2.2	>12	>1.2	0.02 to 0.039	Moderate relief, colluvial deposition or residual soils. Moderate entrenchment and width/depth ratio. Narrow, gently sloping valleys. Rapids predominate, with occasional pools.
C	Low-gradient, meandering, point-bar riffle pool, alluvial channels with broad, well-defined floodplains.	>2.2	>12	<1.4	<0.02	Broad valleys with terraces, in association with floodplains, alluvial soils. Slightly entrenched with well-defined meandering channel. Riffle-pool bed morphology.
D	Braided channel with longitudinal and transverse bars. Very wide channel with eroding banks.	n/a	>40	n/a	<0.04	Broad valleys with alluvial and colluvial fans. Glacial debris and depositional features. Active lateral adjustment, with abundance of sediment supply.
DA	Anastomosing (multiple channels), narrow and deep with expansive, well-vegetated floodplain and associated wetlands. Very gentle relief with highly variable sinuosities, stable stream banks.	>4.0	<40	variable	<0.005	Broad, low-gradient valleys with fine alluvium or lacustrine soils. Anastomosed (multiple channel) geologic control creating fine deposition with well-vegetated bars that are laterally stable with broad wetland floodplains.
E	Low-gradient, meandering riffle-pool stream with low width/depth ratio and little deposition. Very efficient and stable. High meander width ratio.	>2.2	<12	>1.5	<0.02	Broad valley and meadows. Alluvial materials with floodplain. Highly sinuous with stable, well-vegetated banks. Riffle-pool morphology with very low width/depth ratio.
F	Entrenched meandering riffle-pool channel on low gradients with high width/depth ratio.	<1.4	<12	>1.4	<0.02	Entrenched in highly weathered material. Gentle gradients, with a high width/depth ratio. Meandering, laterally unstable with high bank-erosion rates. Riffle-pool morphology.
G	Entrenched gulleystep pool and low width/depth ratio on moderate gradients.	<1.4	<12	>1.2	0.02 to 0.039	Gulley, step-pool morphology with moderate slopes and low width/depth ratio. Narrow valleys, or deeply incised in alluvial or colluvial materials, i.e., fans or deltas. Unstable, with grade control problems and high bank erosion rates.

Source: Reproduced from Rosgen 1985.

In addition to affecting water movement, beaver activity can also alter fish habitat. Slowing of stream water can increase the density of invertebrates present in aquatic systems, thus increasing the food base for fish species such as trout (USDA 2000). However, slowing the flow of water may result in increased siltation in streams, flooding, and changes in vegetation in and along streams. Beaver dams may also make stream habitat less suitable for fish species that prefer faster streamflows. In addition, reduction in streamside vegetation and reduced streamflows typically result in higher water temperatures.

Stream Crossing Conditions

A total of 12 stream crossings were identified on US 89 that appear to be suitable for fish habitat and that potentially would be affected by the proposed road improvement alternatives. There are three additional stream crossings on Duck Lake Road within the improvement areas that may be suitable for fish habitat. Stream crossings are shown on Figures 4 through 8. Table 11 summarizes the location, corresponding wetland number, stream classification, instream habitat, stream bank conditions, culvert condition, and known or expected fish use for each stream identified in the project area. For additional information on streams and fish occurrence in the US 89 project area, refer to the *Biological Resources Report: US 89 Browning to Hudson Bay Divide* (Herrera 2002).

Rare and Sensitive Species

Information on the occurrence of rare and sensitive species within the project area was obtained from Montana Natural Heritage Program, USFWS, and interviews with Tribal, state, and federal biologists. The Blackfeet Nation does not maintain a separate list of sensitive wildlife species on the reservation, but carefully manages all game species. Aside from culturally significant plants, the tribe does not maintain a list of sensitive plant species on the reservation. For additional information on rare and sensitive species in the US 89 project area, refer to the *Biological Resources Report: US 89 Browning to Hudson Bay Divide* (Herrera 2002).

The following discussion of rare and sensitive plant, wildlife, and fish species addresses Montana listed species of concern. Species of concern are defined by the Montana Fish, Wildlife & Parks as follows:

> *The term "Species of Concern" includes taxa that are at-risk or potentially at-risk due to rarity, restricted distribution, habitat loss, and/or other factors. The term also encompasses species that have a special designation by organizations or land management agencies in Montana, including: Bureau of Land Management Special Status and Watch species; U.S. Forest Service Sensitive and Watch species; U.S. Fish and Wildlife Service Threatened, Endangered and Candidate species.*

Table 11. Characteristics of the stream crossings identified along US 89 and Duck Lake Road.

Stream Crossing and Wetland Number	Location	Rosgen[a] Classification	Instream Habitat	Stream bank Conditions	Culvert Condition	Known or Expected Fish Use
Willow Creek (W45, W46A/B)	reference post 3	C channel	Organic sediments with some submerged vegetation and cobbles.	Upstream of US 89, stream banks are eroded. Downstream of US 89, stream banks are stable.	Provides fish passage, but undersized for average and high flows.	Longnose and pearl dace, white and longnose sucker, mottled sculpin, rainbow and brook trout[b]
Flatiron Creek (W26, W28)	reference post 6.5	F channel	Cobbles and gravels with areas of silty, organic sediment.	Well-vegetated and stable. Recent bank stabilization evident upstream of US 89.	No fish passage during low flows.	Longnose and pearl dace, white and longnose sucker, mottled sculpin, rainbow and brook trout[c]
Unnamed tributary to South Fork Cut Bank Creek (W25)	reference post 9	F channel	Upstream of US 89, gravel with some organic sediments. Downstream of US 89, fine sediments.	Upstream of US 89, stream banks are stable and vegetated. Downstream of US 89, stream banks are eroded and incised.	Provides fish passage.	Longnose and pearl dace, white and longnose sucker, mottled sculpin[c]
Unnamed tributary to South Fork Cut Bank Creek (W23)	west of reference post 9	C channel	Poll habitat with high organic sediment.	Stable and well-vegetated.	Provides fish passage, undersized for volume of water.	Longnose and pearl dace, white and longnose sucker, mottled sculpin, rainbow and brook trout[c]
Unnamed tributary to South Fork Cut Bank Creek (W21)	reference post 11	C channel	Upstream of US 89, pool habitat with organic substrate. Downstream of US 89, cobbles and silt.	Mostly stable, some erosion downstream of US 89.	Provides fish passage.	Longnose and pearl dace, white and longnose sucker, mottled sculpin, rainbow and brook trout[c]
Lake Creek (W17)	reference post 12.4	B channel	Upstream of US 89, pool habitat with organic substrate. Downstream of US 89, silty substrate.	Stable, well vegetated.	Do not provide year-round fish passage. Improperly aligned.	Longnose and pearl dace, white and longnose sucker, mottled sculpin, rainbow and brook trout[c]
South Fork Cut Bank Creek (W18)	reference posts 12.9 through 13	B channel	Upstream of US 89, riffle and deep run habitat with some pools. Pool near bridge. Downstream of US 89, cobbles and gravels.	Stable. Eroding upstream of bridge.	Bridge constrains streamflows.	Rainbow trout brook trout[b] Longnose and pearl dace, white and longnose sucker, mottled sculpin[c] West slope cutthroat[d] trout

Table 11 (continued). Characteristics of the stream crossings identified along US 89 and Duck Lake Road.

Stream Crossing and Wetland Number	Location	Rosgen [a] Classification	Instream Habitat	Stream bank Conditions	Culvert Condition	Known or Expected Fish Use
South Fork Milk River, south branch (W4)	south of reference post 21	C channel	Gravels, cobbles, and silt.	Stable and vegetated. Some erosion from livestock downstream of US 89.	Bridge accommodates streamflows.	Longnose and pearl dace, white and longnose sucker, mottled sculpin, rainbow and brook trout [b]
South Fork Milk River, middle branch (W3)	reference post 21.7	C channel	Organic sediments and submerged vegetation.	Stable	Provides fish passage, flooded by beaver activity.	Longnose and pearl dace, white and longnose sucker, mottled sculpin, rainbow and brook trout [c]
South Fork Milk River, north branch (W1)	reference post 23	B channel	Rock and gravels.	Stable and vegetated.	Provides fish passage.	Longnose and pearl dace, white and longnose sucker, mottled sculpin, rainbow and brook trout [c]
Cut Bank Creek (W49)	reference post DLR-4.5	B channel	Gravels, cobbles, and silt.	Mostly stable and well-vegetated. Some erosion from recreational access.	Bridge accommodates streamflows.	Longnose and pearl dace, white and longnose sucker, mottled sculpin, rainbow and brook trout [c]
Unnamed tributaries to Saint Mary River (W53, W54)	reference post DLR-33		Variable, mostly silt and organic sediments.	Mostly stable. Eastern most tributary eroding.	Likely provide fish passage.	Western tributary supports mottled sculpin [b]

[a] Rosgen (1985).
[b] Wagner (2000 personal communication).
[c] Fish occurrence information not available. Expected use based on stream habitat conditions and occurrence of species in the drainage basin.
[d] Weatherwax (2002 personal communication).

Although, under this definition, Federally listed threatened, endangered, and candidate species are also considered species of concern, the Federally listed species are addressed separately in the following Threatened and Endangered Species section in this chapter.

Rare and Sensitive Plant Species

Thirteen records for rare and sensitive plant species were identified through the Montana Natural Heritage Program database search (MNHP 2000, 2002). The Blackfeet Tribal Wetland Program identified one additional rare plant species that may occur in the project area, the slender moonwort (see Threatened and Endangered Species section that follows). None of the locations identified by the Montana Natural Heritage Program occurs within the project area, although the area encompasses wetland systems that are hydrologically connected to some of the identified locations.

The plant species of concern recorded in the project area are ranked by the state of Montana as Category S1, S2, or S3 species (Lesica and Shelly 1991; Heidel 1999).

- Category S1 species are critically imperiled because of extreme rarity or because of some biological factor that makes it especially vulnerable to extinction.
- Category S2 species are imperiled because of rarity or because of other factors that have been demonstrated to make the species very vulnerable to extinction throughout its range.
- Category S3 species are vulnerable because of rarity or found in a restricted range even though they may be abundant in some locations.

The habitat requirements and locations of the 14 plant species of concern are summarized in Table 12. Due to the disturbed nature of the project area, lack of suitable habitat, and outdated records, plant surveys for rare species were not completed. Two species—autumn willow and many-headed sedge—are associated with stream systems hydrologically connected to Willow Creek. However, Willow Creek within the project corridor is severely disturbed and exhibits an unstable vegetated condition.

Rare and Sensitive Wildlife and Fish Species

The Montana Natural Heritage Program database contains three records of rare or sensitive wildlife species in the project area: black tern, Baird's sparrow, and common loon (MNHP 2000, 2002).

Table 12. Habitat requirements and expected occurrence for state and federal rare and sensitive plant species in the US 89 project area.

Common Name	Status	Documented Occurrence in Project Area?		General Habitat Requirements
		US 89	Duck Lake Road	
Autumn willow	S2	1.6 km (1 mile) south of reference post 6.5	No	Fens and swamps in the valley and foothill zones
Blunt-leaved pondweed	S2	No	No	Shallow water of lakes, ponds, and sloughs in the valley, foothill, and montane zones
Bractless hedge hyssop	S1	5 km (3.1 miles) south of reference post 12	No	Drying mud around ponds in the foothills and on the plains
Disjunct eyebright	S1	6.4 km (4 miles) west of reference post 13	No	Open soil in grasslands, meadows, and tundra in the alpine zone
Heart-leaved buttercup	S2	2.4 km (1.5 miles) south of reference post 3	No	Moist meadows and grasslands; often associated with wetlands in the foothill zone
Kidney-leaf white violet	S3	No	No	Swampy or boggy soils in forests in the montane zone
Macoun's gentian	S1	1.6 km (1 mile) south of reference post 6.5	No	Wet, organic soils of calcareous fens in the valley and foothill zones
Many-headed sedge	S1	1.6 km (1 mile) south of reference post 6.5	No	Moist soils of meadows along streams and ponds in the valleys and on the plains
Northern buttercup	S1	No	No	Moist meadows and open grovelands in the montane to alpine zones
One-flowered cinquefoil	S1	3.2 km (2 miles) west of reference post 25	No	Open, gravelly slopes and ridgetops in the alpine zone
Pale sedge	S3	1.6 km (1 mile) south of reference post 6.5	No	Wet, organic soils of fens in the foothill and montane zones
Rock sedge	S1	3.2 km (2 miles) west of reference post 25	No	Dry, calcareous barrens, cliffs, and talus slopes in the alpine or subalpine zones
Small clubrush	S1	1.6 km (1 mile) south of reference post 6.5	No	Calcareous fens in the foothill zone

The animal species of concern recorded in the project area are ranked as Category S1, S2, S3, or S4 species (Roedel 1999).

- Category S1 species are critically imperiled because of extreme rarity, or because of some biological factor that makes it especially vulnerable to extinction.
- Category S2 species are imperiled because of rarity or because of other factors that have been demonstrated to make the species very vulnerable to extinction throughout its range.
- Category S3 species are either very rare and are found locally throughout their ranges, or are found locally in a restricted range (even though it may

be abundant in some locations), or are vulnerable to extinction throughout its range because of other factors.

- Category S4 species are apparently secure, though they may be quite rare in parts of their range.

Sixteen fish species in the state of Montana have been designated as species of special concern; three of these occur in the drainage basins that encompass the vicinity of the project area: pearl dace, westslope cutthroat trout, and bull trout. A species of special concern is defined as a native Montana species with limited habitats and/or limited numbers in the state. The Montana Department of Fish, Wildlife, and Parks and the Montana chapter of the American Fisheries Society jointly designate species to be included on this list. The list is not enforceable by law, but is intended to alert the public and wildlife managers to the status of these fish. The habitat requirements and use of the project area for the pearl dace and westslope cutthroat trout are summarized in Table 13. Bull trout are discussed in the Threatened and Endangered Species section of this chapter.

Table 13. Habitat requirements and expected occurrence for state and federal rare and sensitive wildlife and fish species in the US 89 project area.

Common Name	Status	Documented Occurrence in Project Area?		General Habitat Requirements
		US 89	Duck Lake Rd	
Black tern	S3	5 km (3.1 miles) south of US 89/ US 2 junction	No	Nests in freshwater marshes, sloughs, and wet meadows
Baird's sparrow	S3/S4	No	No	Nests in natural or scratched depressions concealed by vegetation within shortgrass prairies
Common loon	S2	No	No	Nests on large and small lakes on vegetation at the edges of shallow water
Pearl dace	S2	Yes	Expected	Cool, small streams and ponds
Westslope cutthroat	S2	Expected	Expected	Cool, nutrient-poor streams, typically near headwaters

Threatened and Endangered Species

Information on the occurrence of threatened and endangered species within the project area was obtained from the Montana Natural Heritage Program, USFWS, and interviews with Tribal, state, and federal biologists. The Blackfeet Nation does not maintain a separate list of sensitive wildlife species on the reservation, but carefully manages all game species. Aside from culturally significant plants, the tribe does not maintain a list of sensitive plant species on the reservation. For additional information on threatened and endangered species in the US 89 project area, refer to the *Biological Resources Report: US 89 Browning to Hudson Bay Divide* (Herrera 2002).

According to USFWS (2000, 2002a), one candidate plant species and five species listed as threatened under the Endangered Species Act may occur in the US 89 project area. These species are identified in Table 14 with descriptions following.

Table 14. Terrestrial and aquatic threatened and endangered species considered for the US 89 project.

Species Name	Scientific Name	Status
Slender moonwort (plant)	*Botrychium lineare*	Candidate
Bald eagle	*Haliaeetus leucocephalus*	Threatened
Grizzly bear	*Ursus arctos horribilis*	Threatened
Gray wolf	*Canus lupus*	Threatened
Canada lynx	*Felis lynx*	Threatened
Bull trout	*Salvelinus confluentes*	Threatened

Slender Moonwort

Slender moonwort is extremely rare in Montana, with only three known occurrences. All three sites are in Glacier County, outside the US 89 project area. The population closest to the project area occurs in the vicinity of US 89 in Saint Mary; this site is on a wooded slope at an elevation of 1,402 meters (4,600 feet). Because this species is not expected in the project corridor, no further evaluation is provided. For additional information on slender moonwort, refer to the *Biological Resources Report: US 89 Browning to Hudson Bay Divide* (Herrera 2002).

Bald Eagle

Status

The bald eagle is currently listed as a threatened species under the Endangered Species Act. However, recovery of this species continues to progress at an impressive rate. In July 1999, USFWS proposed to remove the bald eagle from the list of endangered and threatened wildlife, because it believes the available data indicate that this species has recovered. The official delisting has not yet occurred (FR July 6, 1999).

Life History and Characteristics

Egg laying by breeding eagles may occur as early as February in Montana, but typically begins in mid-April, with eggs hatching from mid-March through mid-May (MBEWG 1994). Nesting sites in Montana are most often found at the edge of lakes or reservoirs greater than 32.4 hectares (80 acres) or in forested corridors of large rivers. Nest trees are typically large in diameter and are located in the tallest stand of trees greater than 1.2 hectares (3 acres) in area (MBEWG 1994). The nests are usually as close to convenient foraging sites as possible, as long as human activity is minimal. Bald eagle wintering activities typically occur between October 31 and March 31. Wintering habitat for bald eagles in Montana includes unfrozen portions of lakes and rivers, although they also forage for carrion, game birds, and lagomorphs in upland areas (MBEWG 1994).

Species Occurrence in the Project Area

The Montana Natural Heritage Program identified one bald eagle nest site at Two Medicine Lake approximately 5 kilometers (3 miles) south of US 89. This nest is located within the boundary of Glacier National Park. No additional nests are known or expected within several miles of US 89 (Carney 2000b personal communication; Gnaidek 2000 personal communication).

Limited wintering habitat is available for bald eagles within the project area, with the exception of the South Fork Cut Bank Creek crossing at US 89 and the Cut Bank Creek crossing at Duck Lake Road, which are free-flowing all winter and contain suitable perch trees for foraging eagles. Eagles forage at the outlet of Saint Mary Lake, which remains free of ice; however, no high-use areas are known in the project area (Gnaidek 2000 personal communication).

Bald eagles migrate north through the project area in the spring, likely foraging on ground squirrels along the way (Gnaidek 2000 personal communication).

Grizzly Bear

Status

The grizzly bear was listed as a threatened species under the Endangered Species Act on July 28, 1975. The primary challenges to grizzly bear recovery are conserving remaining available habitat and reducing human-caused mortality (USFWS 1993f). In the lower 48 states, remaining populations of the grizzly bear occur in five grizzly bear ecosystems.

Life History and Characteristics

Grizzly bears are solitary wanderers, except when they are caring for young. Grizzlies are not considered territorial animals; their home ranges often overlap, although they typically maintain a minimum distance from one another (USFWS 1993f). The search for food is the primary factor in determining the size of a grizzly’s home range. Grizzly bears mate in late May through mid-July, typically becoming reproductive at the age of 5 years, though reproduction may occur at 3.5 years. Females produce one to four cubs approximately every 3 years. Grizzly bears hibernate during the winter months at high elevations, where snow accumulations are deep. The bears emerge in spring and move to the lowlands to forage on winter-kill carcasses or newly emerging vegetation, which is rich in protein. Cover is a key habitat component for grizzly bears (USFWS 1993f). They are opportunistic feeders, foraging on carrion, squirrels, vegetation, nuts, berries, and insects. In the late summer and early fall, the bears move back up to higher elevations to forage on the abundant berries in the avalanche slides. Den digging begins between early September and the end of November. These animals typically remain in their dens for approximately 5 months (USFWS 1993f).

Species Occurrence in the Project Area

Grizzly bear populations are divided into recovery areas. The project area is located within the North Continental Divide Grizzly Bear Recovery Area, in Glacier National Park's southeast bear management unit. The habitat in the project area provides important grizzly bear foraging habitat in early spring and supports grizzly bears during the months they are not in their dens.

Grizzly bears are present in the US 89 corridor and the western portion of the Duck Lake Road corridor near Babb roughly between April and November. All grizzlies using the project area winter in and along the boundary of Glacier National Park and emerge from their dens between March and May. Female grizzlies with cubs generally return to their dens in October, and males return to their dens between November and December (Carney 2002 personal communication). These bears appear to be active at all times of the day, especially when there are no human disturbances nearby and during the berry season. In the presence of human disturbance, the bears typically are most active in the early morning and late evening (Carney 2002 personal communication).

From April through June, grizzlies move to lower elevations in the US 89 project area seeking suitable foraging habitat. Important early-spring foraging habitats in the project area are aspen grovelands and riparian areas with newly emerging vegetation and the carrion of livestock that did not survive the winter and spring (Carney 2002 personal communication). Research conducted by the Blackfeet Nation from 1987 through the late 1990s found aspen grovelands and riparian areas to be preferred habitat for grizzly bears on the reservation (Carney 2002 personal communication). Radio-collared bears were located on numerous occasions in the riparian areas associated with the South Fork Cut Bank Creek drainages, including Lake Creek, and the South Fork Milk River drainages, particularly in the vicinity of reference posts 11, 12, 13, 21, and 21.7. These bears have also been observed crossing the road at these locations (Carney 2002 personal communication). In recent years, grizzlies have been reported frequently at the ranches between the US 89 intersection with Duck Lake Road, and Duck Lake. The drainage at reference post DLR-33.5 on Duck Lake Road appears to be a significant movement corridor for all wildlife, including bears. Because foraging habitat is limited in early spring, April through June represents the primary period of activity for the bears in the project area, with riparian and aspen groveland habitats receiving the most use of all available habitats. Grizzly bears that inhabit the project corridor are also reported at dumpsters near Kiowa and Saint Mary. Bears that become food conditioned often cause problems later and must be trapped and relocated or put to death.

Gray Wolf

Status

On March 11, 1967, the gray wolf was listed under the Endangered Species Act as a threatened species in Minnesota and as an endangered species elsewhere in the lower 48 states. The gray wolf is not a listed species in Alaska (USFWS 2002b). Recovery plans have been implemented since wolves were placed on the Endangered Species Act list.

Recovery has been so successful that in June 1998, USFWS announced that it would consider delisting or reclassifying specific gray wolf populations where appropriate (USFWS 2002b). The species' comeback has been attributed to a combination of scientific research, conservation and management programs, and education efforts that helped increase public understanding of the species. Successful reintroduction and management programs have greatly accelerated gray wolf recovery in the Rocky Mountains (USFWS 2002b). On April 1, 2003, the USFWS announced a status change for gray wolves from endangered to threatened for populations in the lower 48 states with the exception of the southwest (FR April 1, 2003).

Life History and Characteristics

Wolf packs generally are composed of a set of parents (alpha pair), their offspring, and other nonbreeding adults. Wolves begin mating when they are 2 to 3 years old, sometimes establishing lifelong mates (USFWS 2002b). Pups are usually reared in dens for their first six weeks. Dens are often used year after year, but wolves may also dig new dens or use some other type of shelter, such as a cave. An average of five pups are born in early spring and are cared for by the entire pack. Usually, after 1 or 2 years of age, a young wolf leaves and tries to find a mate and form its own pack (USFWS 2002b). Dispersing wolves have traveled as far as 800 kilometers (500 miles) in search of a new home (USFWS 2002b).

Wolf packs usually live within a specific territory. Territories range in size from 130 to more than 2,600 square kilometers (50 to more than 1,000 square miles) depending on how much prey is available and seasonal prey movements (USFWS 2002b). Packs use a traditional area and defend it from strange wolves. Their ability to travel over large areas to seek vulnerable prey makes these animals good hunters.

Species Occurrence in the Project Area

The Blackfeet Indian Reservation and lands beyond the boundary extending east to Interstate 15 are considered to contain suitable habitat to support gray wolf packs. The Blackfeet Nation does not monitor the presence or inventory the number of wolves on the reservation. Wolf sightings and tracks are reported frequently on the Blackfeet Indian Reservation in the project area. Reported sightings typically involve individual wolves (Carney 2000a personal communication). There have been several reported wolf sightings and depredations in the project area in the last few years. A group of wolves was reported in the South Fork Milk River drainage in the spring of 2002, indicating a pack may be forming. Investigations at that location revealed a coyote den, and no wolf packs are known on the reservation at this time (Carney 2002 personal communication).

Key components of wolf habitat include a sufficient year-round prey base, suitable and secluded denning and rendezvous sites, and sufficient space with minimal exposure to humans (USFWS 1987). While the last of these components is absent throughout most of the US 89 project area, gray wolf packs could be established upstream of the US 89 area within the Lake Creek, Cut Bank Creek, and Milk River drainage basins. However, there are numerous obstacles to successful establishment of a wolf pack on the Blackfeet Indian Reservation, primary among them is conflicts with livestock and the resulting management actions. While portions of the project area could support a wolf pack, there is no documented pack activity at this time (USFWS et al. 2002). Wolf occurrence in the project area is likely limited to dispersing individuals (Bangs 2000 personal communication, Carney 2000a personal communication).

Canada Lynx

Status

Under the Endangered Species Act, the Canada lynx was listed as a threatened species on March 24, 2000 (FR March 24, 2000). In Montana, the resident population of lynx is distributed throughout its historic range. However, there are little data to determine its population trend or to estimate the population size. Currently, it is believed that the Northern Rockies/Cascades region supports the most viable resident lynx populations in the contiguous United States, although it is recognized that lynx in the contiguous United States are naturally rare (FR March 24, 2000).

Life History and Characteristics

Lynx prefer habitat where snowshoe hares are abundant and require a mosaic of conifer-forest age classes, using early-successional forests for hunting and mature forests for denning (Koehler and Brittel 1990). Lynx denning habitat requires mature forest stands a minimum of 1 hectare (2.4 acres) in size with minimal human disturbance and proximity to foraging areas (Koehler and Aubry 1994). Large woody debris, downed logs, and tree stumps are important characteristics for den sites and are used as thermal and escape cover by kittens (Koehler and Brittel 1990).

In Canada and Alaska, lynx populations undergo extreme fluctuations in response to snowshoe hare population cycles. However, this cycle is not exhibited in populations occurring in the contiguous United States; rather, both species occur at relatively stable densities (McKelvey et al. 1999). Snowshoe hare are the primary prey for the Canada lynx throughout its range. In Montana, lynx also forage for red squirrels and to a lesser extent grouse, other small mammals, and carrion (Aubry et al. 1999). When hare populations decline, lynx are capable of dispersing over long distances. Because of this capability, maintaining habitat connectivity between population areas may be critical to the long-term persistence of lynx populations in the United States (USDI 1999).

In Montana, lynx inhabit subalpine fir forest associations of the Northern Rocky Mountains and are strongly associated with densely stocked lodgepole pine stands and Douglas-fir and western larch stands, where snowshoe hare are abundant (Aubry et al. 1999). Most lynx occurrences are in the 1,500- to 2,000-meter (4,920- to 6,560-foot) elevation class (FR March 24, 2000). In the Rocky Mountains, important lynx habitat may also include islands of coniferous forest within shrub-steppe habitat. Lynx may use shrub-steppe habitat to pursue alternative prey, such as jackrabbits or ground squirrels (USDI 1999).

Species Occurrence in the Project Vicinity

There are many historic and current records of lynx in the Rocky Mountain conifer forests, and breeding animals are known to be present. However, the actual number of lynx in northwestern Montana and population trends are unknown (FR March 24, 2000).

Lynx use a wide variety of habitats but are usually found near their primary prey, the snowshoe hare, in mixed coniferous stands. Lynx have been observed and their tracks have been reported in the coniferous forests of Glacier National Park (USDI 1999). Winter tracking surveys conducted by the Blackfeet Nation often identify lynx within the project vicinity, on the west side of US 89 along the mountain ridges bordering Glacier National Park (Carney 2000a personal communication). Lynx are also reported in the South Fork Milk River drainage, including the east side of US 89 (Carney 2002 personal communication). Lynx may also occur in the conifer habitats near the north end of US 89 where they are seeking food sources or attempting to disperse. However, given the limited habitat availability on the east side of US 89 and lynx avoidance of openings and roads (FR March 24, 2000), lynx occurrence in the immediate project corridor between Kiowa and Hudson Bay Divide is likely limited. Habitats in this portion of the project area are highly fragmented by US 89, a network of secondary roads, and a mosaic of open grasslands. In addition, little suitable habitat is available east of US 89. However, it is assumed that lynx do occasionally cross the existing road corridor.

Bull Trout

Status

The bull trout was listed as a threatened species by USFWS in 1998. Factors contributing to population declines include habitat degradation and loss due to land and water management practices; isolation and fragmentation of populations by both structural and natural barriers; introduction of nonnative fishes resulting in competition, predation and hybridization threats; historical eradication efforts; poisoning to remove nongame species; historical overharvest; and ongoing poaching and accidental harvest due to misidentification (AFS 2000).

Today, the bull trout is largely confined to headwater lakes and streams. Its small, isolated populations face increased extirpation risks as a result of direct impacts of habitat change, random demographic and environmental variation, and genetic processes (AFS 2000).

Life History and Characteristics

Bull trout are native to streams, rivers, and lakes in northwestern Montana. Bull trout may have either a resident or migratory life history. Resident fish usually spend their entire lives in smaller tributaries and headwater streams. Migratory fish spawn, and their progeny rear, for one to several years in tributary streams before migrating downstream to larger rivers or lakes where the progeny mature and spend most of their adult lives. Adults migrate back to their natal tributaries to spawn, apparently with a high degree of fidelity (AFS 2000).

The majority of migratory bull trout spawning in Montana occurs in a small percentage of the total stream habitat available. Spawning takes place between late August and early November. Spawning adults use low-gradient areas (less than 2 percent) with gravel-cobble substrate and water depths between 0.1 and 0.6 meters (4 to 24 inches) and velocities from 0.09 to 0.61 meters per second (0.3 to 2.0 feet per second). Proximity of cover for adult fish before and during spawning is an important habitat component. Spawning tends to be concentrated in reaches influenced by ground water, where temperature and flow conditions may be more stable (AFS 2000). Bull trout eggs remain covered up to 15 centimeters (6 inches) deep in spawning gravels until spring, when the fry emerge. Young bull trout remain in the stream for 1 to 4 years, huddled among bottom rocks and other cover. Bull trout grow to lengths of 94 centimeters (37 inches) and weights as much as 9 kilograms (20 pounds) (AFS 2000).

Basic rearing habitat requirements for juvenile bull trout include cold summer water temperatures (less than 15ºC [59ºF]) with sufficient surface and ground water flows. Juvenile bull trout are generally bottom foragers and rarely stray from cover. They prefer complex forms of cover that include deep pools, large woody debris, rocky streambeds, and undercut banks.

Habitat characteristics that are important for juvenile bull trout of migratory populations (low water temperatures, clean cobble-boulder substrates, and abundant cover) are also important for stream-resident subadults and adults. However, stream-resident adults are more strongly associated with deep pool habitats than migratory juveniles are (AFS 2000).

Species Occurrence in the Project Area

Populations of bull trout in Montana are limited to the Columbia and Saskatchewan river basins. The Saint Mary River in the Saskatchewan basin, draining north into Canada, contains the only bull trout population east of the Continental Divide in the United States (AFS 2000).

Historically, bull trout likely occurred in all of the streams and lakes of the Saint Mary River drainage to which they had access. Today, only remnant populations of bull trout occur in the Saint Mary drainage in Montana (Mogen and Kaeding 2000). Sampling efforts in the Saint Mary River and its tributaries, including the Duck Lake vicinity, identified no bull trout (Wagner 2000 personal communication; Mogen and Kaeding 2000). Bull trout have been reported from the main stem of the Saint Mary River in Canada (Mogen and Kaeding 2000).

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Human Environment

Socioeconomic Considerations

The proposed project is located entirely on the Blackfeet Indian Reservation, and the reservation dominates the social and economic context of the area around the project corridor. Therefore, the affected social and economic environment for the proposed project is expected to be the Blackfeet Indian Reservation.

The Blackfeet Indian Reservation occupies approximately 607,000 hectares (1.5 million acres) in the northwestern portion of the state of Montana. Although there are minor geographical differences, the Blackfeet Indian Reservation and Glacier County, Montana, cover much of the same geographical area. Approximately 70 percent of the reservation is located in Glacier County and 30 percent is in Pondera County. The reservation covers approximately 75 percent of Glacier County and 6 percent of Pondera County. The portions of Glacier County that are outside the reservation include portions of Glacier National Park to the west of the reservation and private lands to the east of the reservation boundary. Because of the high degree of overlap between the Blackfeet Indian Reservation and Glacier County, social and economic data used for this analysis may address Glacier County, if information relating to the reservation is not available or current.

Socioeconomic Background

A Blackfeet Nation document titled *Blackfeet Tribe of the Blackfeet Nation, Community Profile* (undated) offers insight into the social and economic background of the tribe. The following information was obtained from this document.

Tribal History

The modern Blackfeet Nation is descended from three northwestern Plains tribes: the North Piegans, the Blackfeet (also known as South Piegans), and the Kainai (also known as Bloods). Historically, all three tribes spoke Blackfeet as a common language and lived in what is now the Province of Saskatchewan. Around 1730, the tribes started moving south, where buffalo and other game were more abundant. All Blackfeet members in the United States are Blackfeet (South Piegans).

The first contact between the Blackfeet and Europeans occurred during the 1700s when the fur trade began in Blackfeet territory. The Blackfeet had only a minor interest in trapping, but were skillful hunters; buffalo hides became an important item of trade and business. However, as a result of overhunting by railroad crews and other Euro-Americans, the buffalo herds were "virtually exterminated" by 1884, resulting in the loss of a critical source of food, shelter, and clothing for the Blackfeet, as well as the basis of the tribe's trading economy. Afterward, the Blackfeet became dependent upon the United States government for food and supplies.

The first treaty between the Blackfeet Nation and the United States government was the 1851 Treaty of Fort Laramie, in which the United States unilaterally set the boundaries of the Blackfeet Nation and locations for roads and military outposts. A series of treaties followed, many of which reduced the size of the Blackfeet Nation's territory. In 1871, Congress determined that Indians were not foreign powers and therefore not capable of making treaties. Between 1871 and 1880, a series of presidential orders reduced the territory of the Blackfeet until it dwindled to a small 607,000-hectare (1.5 million-acre) tract of land in northwestern Montana. The Indian Reorganization Act of 1934 reestablished Tribal sovereignty and allowed tribes to organize Tribal governments. During the years following the Reorganization Act, "the Blackfeet Tribe has progressed in all areas – economic development, education, social services, increasing the Tribal land base, population, improved health services, physical systems, housing, management skills, and other areas" (Blackfeet Nation undated).

Tribal Lands

Sixty percent of the Blackfeet Indian Reservation is controlled by the Blackfeet Nation and held in trust for them by the United States government. The remainder of the reservation is privately owned. Indian trust lands fall into two broad categories: Tribal and allotted lands. Tribal land is subject to federal restrictions against alienation or encumbrance. Allotted land is held in trust by the United States for the benefit of an individual Indian subject to federal restrictions against alienation or encumbrance.

The land on the Blackfeet Indian Reservation is mostly rural, and Browning is the only incorporated city within the boundaries of the reservation. Historically, reservation residents lived predominantly on rural farms, with only a few people living in smaller towns. With the changes in agricultural technology that took place after 1930, there was a reduction in the number of people engaged in farming and an increase in the percentage of people living in small towns and county seats. Recently, the shift has been away from small towns with more people living in rural areas without being engaged in farming activities.

The Role of Glacier National Park

A factor in the economy of the Blackfeet Indian Reservation is Glacier National Park. Created in 1910, Glacier National Park is a recreational destination that draws visitors from the entire United States as well as the rest of the world. Glacier National Park and the adjacent Waterton Lakes National Park in Alberta, Canada, were joined together by the governments of Canada and the United States in 1932 as Waterton-Glacier International Peace Park, the first park of its kind in the world. Glacier National Park and the Waterton Lakes National Park encompass one of the largest and most intact ecosystems in North America.

One of the park's major draws is the spectacular scenery on the Going-to-the-Sun Road over Logan Pass. Traveling over the Going-to-the-Sun Road brings visitors onto the Blackfeet Indian Reservation as people either enter or exit the park at Saint Mary and travel to the south toward East Glacier or to the population centers to the east (Figure 2). The entrances at West Glacier and Saint Mary receive the majority of traffic into the park with 30 percent of visitors entering at Saint Mary (National Park Service 1999).

For perspective, annual visitation to Glacier National Park was 1,686,007 in 1999 (National Park Service undated). By way of comparison, the population of the state of Montana was estimated to be 880,453 in 1999. Visitation over the past 10 years has fluctuated between 1.68 million and 2.19 million, with peak visitation occurring in 1992 (National Park Service undated). Visitation over the years has fluctuated cyclically, and it appears that visitation is currently at a low point in the cycle.

Socioeconomic Conditions

Population

Although Montana's population grew by nearly 13 percent and the population of Glacier County grew by 9.3 percent between 1990 and 2000, the population of Browning declined by 9.0 percent. As shown in Table 15, the population of Glacier County increased from 12,121 to 13,247 between 1990 and 2000, and the population of Browning decreased from 1,170 to 1,065 during the same period. The 2000 Census shows that 10,100 people lived on the Blackfeet Indian Reservation, although the Blackfeet Nation has previously asserted that Census figures drastically undercount the population on the reservation. Of the 10,100 people counted on the Blackfeet Indian Reservation in 2000, 9,209 lived in Glacier County. Thus, of the 13,247 people counted in Glacier County in 2000, about 69.5 percent lived on the Blackfeet Indian Reservation.

Table 15. Montana, Glacier County, and Browning populations, 1990 and 2000.

	1990	2000	Total Growth 1990–2000
Montana	799,065	902,195	12.9%
Glacier County	12,121	13,247	9.3%
Browning	1,170	1,065	-9.0%

Source: U.S. Census Bureau 2000.

Demographics

The 1990 and 2000 U.S. Censuses indicate that the demographics of the Blackfeet Indian Reservation are very different from Glacier County and the state of Montana as a whole. As shown in Table 16, the reservation is younger, poorer, and less educated. The percentage of people who own their own homes is less on the Blackfeet Indian Reservation. Although the value of the homes on the Blackfeet Indian Reservation is about the same as the surrounding area it is less than the state average. Average rents on the reservation are approximately one-half of the rents in Glacier County.

Table 16. Demographics of the Blackfeet Indian Reservation, Glacier County, and the state of Montana.

	Blackfeet Indian Reservation	Glacier County	State of Montana
Population [a]	10,115	13,247	902,195
Per capita income in 2000 [b]	NA	$15,574	$22,518
Per capita income in 1990 [c]	$4,718	$7,458	$11,213
Poverty rate in 1999 [a]	33.8%	27.3%	14.6%
Poverty rate in 1989 [c]	50.1%	35.7%	16.1%
Median age [a]	26.5	30.6	37.5
High school graduate or higher [c]	77.4%	78.6%	87.2%
College graduate or higher [c]	13.5%	16.5%	24.4%
Home ownership [a]	55.5%	62.0%	69.1%
Median home value [c]	$61,200	$60,900	$99,500
Rent [c]	$172	$351	$447

[a] Source: U.S. Census Bureau (2000).
[b] Sources: Bureau of Economic Analysis (2003).
[c] Source: U.S. Census Bureau (1990).
NA: Not available.

As shown in Table 17, the racial composition of the Blackfeet Indian Reservation is also very different from the racial composition of Glacier County and the state of Montana as a whole. The majority of residents on the reservation are American Indians (84.2 percent) while a smaller percentage of the county's population is American Indian (61.8 percent), and only a small percentage (6.2 percent) of the state's population are members of this minority group.

Table 17. Racial composition of the Blackfeet Indian Reservation, Glacier County, and the state of Montana.

Race	Blackfeet Indian Reservation	Glacier County	State of Montana
White	13.5%	35.4%	90.6%
Black	<0.1%	<0.1%	0.3%
American Indian, Eskimo, or Aleut	84.2%	61.8%	6.2%
Asian or Pacific Islander	<0.1%	0.1%	0.6%
Other race alone	0.2%	0.2%	0.6%
Two or more races	2.0%	2.4%	1.7%

Source: U.S. Census (2000).

Employment

Unemployment is significantly higher on the Blackfeet Indian Reservation than in Glacier County or the state of Montana. Average unemployment was 17.1 percent on the reservation in 2001, 11.1 percent in the county, and 4.6 percent for the state (Montana Department of Labor and Industry 2002). The official unemployment rate for the reservation may also understate unutilized labor because there appears to be a large number of reservation inhabitants who are not in the labor force, that is, persons who have been unemployed for a long period of time and have stopped looking for work (U.S. Census 2000) and consequently are not counted as unemployed. Unemployment has dropped over the past few years; in 1997, the unemployment rate on the Blackfeet Indian Reservation fluctuated seasonally between 22 percent and 67 percent (Blackfeet Nation 1997) and in 1999 unemployment averaged 22.1 percent (Montana Department of Labor and Industry 2000a).

Large employers in Glacier County include Tribal, federal, state, and local governments. Employment on the Blackfeet Indian Reservation is concentrated in the public sector; the federal government provides 38 percent of the jobs and the tribe provides 31 percent of the jobs. The private sector provides only 27 percent of employment on the reservation. The 10 largest public and private employers in the county are listed below in alphabetical order:

- Albertsons
- Blackfeet Community College
- Blackfeet Indian Housing Authority
- Blackfeet Nation
- Cut Bank IGA
- Glacier Electric Cooperative
- Glacier National Park
- Harvest States Cooperative
- McDonald's
- Teepees Market.

The list above indicates that the local economy does not engage in primary or secondary production of goods, but is focused rather on the public (including the Blackfeet Nation, Blackfeet Community College, and the Blackfeet Indian Housing Authority) and service sectors (three markets, a fast food restaurant, and Glacier National Park). Harvest States Cooperative appears to be the only large employer in the county that engages in primary or secondary production of goods. The lack of primary or secondary production indicates that little economic wealth is generated on the reservation and that labor is focused on providing services or selling items produced elsewhere. The fact that the service sector is limited to grocery stores and a fast food restaurant indicates that little of the money that comes onto the reservation is destined to remain on the reservation. Tribal estimates are that only 13 percent of the disposable personal income for consumptive, social, or investment purposes stays on the reservation and that 87 percent of disposable personal income is spent outside the local economy. It is estimated that the income multiplier, the turnover of the dollar of investment in the economy in a given period, is 1.12, while the national multiplier is 2.88. The low regional income multiplier for the Blackfeet Indian Reservation indicates that investment in the local economy does not provide a great deal of local employment; local monies are spent elsewhere.

In an effort to advance Tribal employment and combat chronic high unemployment, the Blackfeet Tribal Business Council passed the Tribal Employment Rights Ordinance (TERO)

1977 (Resolution No. 16-77) requiring that all federal and nonfederal contracts include an Indian hiring preference and establish training programs for partially trained Tribal members. The resolution also authorized the Blackfeet Tribal Employments Rights Office to regulate and guide implementation of Tribal employment rights. In recognition of the Blackfeet Nation's desire to establish Indian hiring preferences, the Blackfeet Nation and the Montana Department of Transportation signed the *Memorandum of Understanding between the Blackfeet Nation and the Montana Department of Transportation* (MDT and Blackfeet Nation 2001), herein referred to as the current memorandum of understanding, which states that Indian hiring requirements would be determined through a project specific agreement for all Montana Department of Transportation projects on the Blackfeet Indian Reservation.

Income

As shown in Table 16, income on the Blackfeet Indian Reservation is substantially below that of Glacier County and the state of Montana. Poverty rates are much greater on the reservation than for the county as a whole and are more than two times the state average. More current information indicates that incomes in Glacier County are still far below the state and national average. In 2000, per capita income in Glacier County was $15,574 (Bureau of Economic Analysis 2003). This figure was 69 percent of the per capita income for the state of Montana ($22,518) and 52 percent of the national average of $29,770. Per capita income in Glacier County increased only slightly in the past two years (in 1998 per capita income in Glacier County was $15,374) and has fallen relative to per capita income in the state of Montana and the nation. In 1998, per capita income in Glacier County was 72 percent of the per capita income for the state of Montana and 56 percent of the national average (Bureau of Economic Analysis 2000).

Housing

Information on housing on the Blackfeet Indian Reservation is summarized from *Housing Unit Cost and Need on the Blackfeet Reservation* (Blackfeet Housing Authority 2000). The shortage and quality of housing on the Blackfeet Indian Reservation has recently been described as a crisis. The Blackfeet Indian Housing Authority has stated that "nearly 50 percent of existing homes are substandard, many families suffer overcrowding." The housing authority estimates that there is a shortage of approximately 1,000 housing units on the reservation. Construction of new housing has been limited by a shortage of domestic water in the city of Browning and a limited supply of developable land in the rural areas. The planned expansion of the water supply to Browning is expected to eliminate one serious obstacle to housing construction on the reservation. However, low incomes and high unemployment rates continue to be barriers to the development of private-sector housing. In addition, private builders are less likely to commit resources to areas where housing prices are likely to be low.

Environmental Justice

The 1994 Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, requires each federal agency to make achieving "environmental justice" part of its mission, to the maximum extent practicable. Each agency is required to "identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States." The order emphasizes incorporation of minority and low-income groups into the decision-making process, as is already required under NEPA.

Guidance provided by the *Environmental Justice Guidance Under the National Environmental Policy Act* (Council on Environmental Quality 1998) states that in order to form a minority/low-income community, the minority/low-income populations of the affected area should exceed 50 percent of the total population, or the minority/low-income populations should be "meaningfully greater" than the minority/low-income population in the general population or other appropriate unit of geographic analysis.

As shown in Table 16, more than 30 percent of the population of the Blackfeet Indian Reservation lives below the poverty line. In addition, Table 17 indicates that 84.2 percent of the population is American Indian. The population of the Blackfeet Indian Reservation meets the first set of criteria of a minority/low-income population; therefore, federal actions on the reservation must consider environmental justice. Furthermore, Tables 16 and 17 indicate that the minority/low-income population of the reservation is meaningfully greater than the general population of Glacier County and the state of Montana.

Displacements and Right-of-Way Acquisition

Implementing the proposed improvement project would require the acquisition of both unimproved land and structures along US 89. This section provides a brief summary of the types of properties and landownership along the project corridor that potentially could be acquired. A more detailed description of land use is provided in the next section of this chapter, Land Use and Farmlands. Chapter 4 – Environmental Consequences, Human Environment, Displacements and Rights-of-Way, discusses potential displacements of property and structures.

Unimproved Land

Unimproved land along the project corridor may be owned by an individual, held in trust for an individual by the United States government, held in trust for the Blackfeet Nation by the United States government, or owned by the tribe. If private land were required for the proposed project, the Montana Department of Transportation would purchase private lands from the owners at fair market value. If lands held in trust, either for individuals or the tribe, were required for the proposed project, the Montana Department of Transportation would purchase an easement from the private party or tribe that would allow for the roadway improvement. The easement would stipulate that if the easement is no longer required, the property would revert back to the United States government and the party for whom the land is held in trust. The same would apply for any Tribal lands required for the project.

Structures

Structures along the proposed right-of-way include single-family residences and businesses. There are approximately 40 residences along the US 89 project corridor between Browning and Hudson Bay Divide and 10 residences along the Duck Lake Road project corridor. There are no multifamily units along US 89 in the project corridor.

Businesses along US 89 are limited to the café/general store situated at Kiowa and the Aspenwood Café and campground approximately 12.6 km (7.8 miles) west of the US 2/US 89 intersection in Browning. The business at Kiowa is opened seasonally and includes a café, general store, campground, cabins, and motel (the owners' residence is also located on the property). The café/general store on US 89 is especially important because it is the only commercially viable retail business between Saint Mary and East Glacier and any changes to this business could be significant to the local community. The Aspenwood Café also includes spaces for camping and RV parking along with the owners' residence. This business is also seasonal and very dependant upon tourism. Given the seasonal nature of tourism in the project area and the overall weakness of tourism spending in the project area, commercial activities along the project route do not appear to be robust.

Businesses on Duck Lake Road within the proposed improvement areas are limited to the Leaning Tree café at approximately reference post DLR-38.5 and Wagner's Duck Lake Lodge at approximately reference post DLR-38. The Leaning Tree café is open year-round, although the hours of business vary. Wagner's Duck Lake Lodge is a bed and breakfast that is open year-round. Wagner's also runs a restaurant that is open to the public for dinner.

Land Use and Farmlands

The Blackfeet Indian Reservation contains four types of land designations: government reserve lands, fee lands, Indian allotted trust lands, and Blackfeet Tribal trust lands (Blackfeet Nation 2000). Government reserve land consists of irrigation projects located throughout the reservation. Fee lands are owned by individuals (Tribal or nontribal member) and are subject to state and county taxes and regulations. Indian allotted trust lands are subject to Tribal regulations and are owned by an individual Indian or group of Indians as an undivided estate. Tribal trust lands are owned and regulated by the tribe as a whole.

The Farmland Protection Policy Act of 1981 (Title 7 United States Code, Chapter 73, Sections 4201–4209) has as its purpose "to minimize the extent to which Federal programs contribute to the unnecessary and irreversible conversion of farmland to nonagricultural uses, and to assure that federal programs are administered in a manner that, to the extent practicable, will be compatible with State, unit of local government, and private programs and policies to protect farmland."

Farmland is defined by the act in Section 4201 as including prime farmland, unique farmland, and farmland, other than prime or unique farmland, that is of statewide or local importance. Farmland determinations are made the Natural Resources Conservation Service.

Most residences and businesses in the project area are located in the city of Browning, which is immediately adjacent to the southeast terminus of the proposed project area. Existing land uses in the US 89 project area outside the city of Browning include livestock grazing, crop production, oil and gas exploration, a few campgrounds, residences, restaurants, and recreational access to hunting and fishing opportunities. Ranches in the project area are mainly used for cattle and hay production. A more detailed discussion of recreation access and facilities in the project area can be found in the Recreation section of this chapter.

US Highway 89

The US 89 corridor is sparsely populated by residences, ranches, campgrounds, and one café/general store. The corridor is composed of fee lands, Indian allotted trust lands, and Blackfeet Tribal trust lands, although the majority of lands in the corridor right-of-way are trust lands. Where the US 89 roadway and associated right-of-way traverse fee lands, the Montana Department of Transportation owns the road and right-of-way. Where the US 89 roadway and associated right-of-way traverse Indian allotted trust lands and Tribal lands, the Montana Department of Transportation maintains the road and has secured a right-of-way easement.

Farmlands of statewide or local importance and prime or unique farmlands are protected under the Farmland Protection Policy Act. The purpose of this act is to protect productive farmlands from losses resulting from highway projects and subsequent development. Based on conversations with the Great Falls office of the Natural Resources Conservation Service, farmlands of statewide or local importance and prime or unique farmlands were determined not to exist in the US 89 corridor (Appendix C).

Duck Lake Road

Land use designations within the Duck Lake Road project corridor are similar to those described for US 89, although this corridor also contains government reserve lands associated with the Cut Bank Boarding School Reserve, located northeast of Browning. The majority of landownership in the right-of-way associated with the three improvement areas is fee land. From the city of Browning, the first 5 kilometers (3 miles) of the Duck Lake Road project corridor are administered and maintained by the Bureau of Indian Affairs. The remainder of the roadway is administered and maintained by the Montana Department of Transportation.

There is one café and one bed and breakfast in this corridor near the intersection with US 89 in Babb, several campgrounds/lodging facilities, and one horseback riding facility. Based on conversations with the Great Falls office of the Natural Resources Conservation Service, farmlands of statewide or local importance and prime or unique farmlands were determined not to exist in the Duck Lake Road corridor (Appendix C).

Land Use Plans

There are no established zoning regulations in the project area. The Blackfeet Nation is in the process of developing a draft comprehensive land use plan for the protection and development of land-related resources on reservation lands.

The Blackfeet Tribal Land Department processes applications for use of Tribal lands and presents the applications to the Land Committee of the Blackfeet Tribal Business Council for Tribal action during its bimonthly meetings. The minutes of those meetings are presented to the Blackfeet Tribal Business Council for approval, and upon approval are processed by the Land Department (Blackfeet Nation 2000).

Transportation Systems

The affected environment discussion for transportation systems can be found in Chapter 1 – Purpose of and Need for Action under the heading, Existing Traffic Conditions.

Bicycle and Pedestrian Facilities

Bicycle Facilities

No data exist on bicycle traffic along US 89, but observations by the preparers of the draft and final EIS suggest that bicycle traffic on US 89 from Browning to Kiowa is incidental and from Kiowa to the Hudson Bay Divide is low. Road bicycling is popular in Glacier National Park; however, bicyclists typically enter the park from the west entrance and travel back and forth on Going-to-the-Sun Road without passing through Saint Mary. There are bike rentals available in the project area near Saint Mary, and a few organized bike tours travel along US 89 during the summer months. Individual bicyclists do travel along US 89, but this number is relatively low compared to the bicyclists within the park. In 1999, 640 bicyclists crossed Going-to-the-Sun Road as members of commercial groups, that is, paid tours. The park does not count individual bicyclists coming into the park, but it is likely that this number exceeds the number of individuals in commercial groups. Mountain biking is not allowed in Glacier National Park and generally is not a popular activity in the project area.

Pedestrian Facilities

Pedestrian facilities along US 89 are generally very limited, although the city of Browning has sidewalks for pedestrians. Informal observations conducted by the preparers of this EIS indicate that pedestrian use in the US 89 project area is incidental. Occasionally pedestrians walk along the shoulder of US 89 because of vehicle breakdowns. Other pedestrian use may be attributed to tourists stopping to photograph scenery and wildlife.

Some pedestrians may cross US 89 while using hiking trails in the project corridor, but their time spent along US 89 is minimal compared to time spent on hiking trails. Most of the hiking trails on the east side of Glacier National Park are directly or indirectly accessible from US 89. Most of the trails directly accessible from US 89 cross the boundary between the Blackfeet Indian Reservation and Glacier National Park. Among these trails are Slidelake Trail, Redgap Pass Trail, Red Eagle Lake Trail, and an unnamed trail leading to the lookout tower on Divide Mountain. These trails are generally considered unimproved roads within the Blackfeet Indian Reservation and become designated hiking trails as they cross into Glacier National Park. There are several unimproved roads accessible from improved roads in the project area and many of these may be used as hiking trails. Access to these unimproved roads is concentrated along US 89 and Starr School Road between Cut Bank Creek Road and Browning.

Services and Utilities

Public services in the project area include fire suppression, emergency medical service, police, solid waste collection and removal, snow removal, schools, and senior services. Utilities include electricity, water supply, wastewater, and telecommunications. Each of these is discussed briefly below. Information on services and utilities on the Blackfeet Indian Reservation was provided by staff of the Blackfeet Tribal Planning Department (Parsons 2000 personal communication, Montoya 2000 personal communication, and Miller 2000 personal communication) and the Blackfeet Utilities Commission (Calftail 2000 personal communication).

Public Services

Fire Suppression and Emergency Medical Services

Volunteer fire departments in East Glacier, Babb, Browning, and for the Bureau of Indian Affairs provide fire suppression service in the project area. Another volunteer fire department is located approximately 24.1 kilometers (15 miles) southeast of the project area in the community of Heart Butte. Though this community lies well outside the project area, the department could be called upon in the case of a fire that cannot be contained by fire departments located closer to the project area. Structural fire suppression is provided by all of the volunteer departments, and structural fire and forest fire suppression are provided by the Bureau of Indian Affairs. There are emergency medical services clinics in Babb and Browning. Emergency victims typically go to a hospital in Browning, and are often transferred to the Browning facility via the Babb emergency clinic and ambulance service. There is also a search and rescue team based out of Browning. There is limited human activity or development throughout much of the project area, although emergencies related to such activities as recreation, automobile accidents, and road maintenance can occur.

Historically, only the city of Browning was served by fire suppression services. By the late 1970s, fire service extended to the entire reservation, and some of the more densely populated areas—primarily East Glacier, Saint Mary, Babb, and Browning—established volunteer fire departments.

Law Enforcement

Police service in the project area is provided by the U.S. Customs border patrol, Glacier County Sheriff's Office, Pondera County Sheriff's Office, and the Bureau of Indian Affairs police, which are based out of Browning. There are resident deputies of the Glacier County Sheriff's Office stationed in Babb, Browning, and East Glacier.

Road Maintenance

US 89 is administered and maintained by the Montana Department of Transportation. From the city of Browning, the first 5 kilometers (3 miles) of the Duck Lake Road project corridor is administered and maintained by the Bureau of Indian Affairs. The remainder of the roadway is administered and maintained by the Montana Department of Transportation. Snow removal on US 89 and Duck Lake Road is provided by the state. Snow removal in the winter months is limited by severe winter conditions and limited funds.

Educational Facilities

Several schools are located in the proposed project area and throughout the Browning School District. In Browning, there are two Tribal language schools, two religious schools, and six public education facilities:

- DeLaSalle Blackfeet School
- Cuts Wood School
- Moccasin Flata School
- Little Flower Parish
- Blackfeet Community College
- Browning High School
- Browning Middle School
- Napi Elementary School
- K.W. Bergan Elementary School
- Vina Chattin Elementary School.

The Blackfeet Community College is a fully accredited 2-year college that provides surrounding communities and reservation residents with adult education services; general education development (GED) certification courses; and vocational, apprenticeship, and technical training programs. Browning High School is attended by 500 students in grades 9–12 and is staffed by 32 teachers. Browning Middle School serves 510 students in grades 6–8 and employs 33 teachers. Napi Elementary School houses 348 fourth- and fifth-grade students in 16 classrooms. Twenty-eight teachers and 12 teaching assistants educate 365 second- and third-grade students at the Vina Chattin Elementary School. Three hundred and fifty students attend the K.W. Bergan School for first and second graders, which is staffed by 31 teachers and staff. There are two Head Start programs, one located in Browning, the other is in Babb. Babb also has one small elementary school for kindergarten through fifth grade. Thirty-eight students attend Babb Elementary School, and it is staffed by three teachers and three teacher's aides. In

1972, when the Babb School was incorporated into the Browning School, its sixth, seventh, and eighth graders began busing to Browning Middle School.

Transportation is provided for students attending the public schools throughout the project area via 20 different routes. School bus routes that would be directly affected by the proposed project alternatives are Route 3, Route 7, and Route 11. Route 3, the Babb-Pontracina route, travels northwest from Browning to Babb along Duck Lake Road. Route 7, the Babb-Saint Mary route, travels north-south between Babb and Saint Mary along US 89. Route 11, the Durham route, travels west from Browning along US 89 to the Tribal Route 7 spur. The Durham route services this spur road and then returns to US 89 and continues west through Kiowa to its terminus between Kiowa and the intersection of US 89 with Starr School Road. Each of these school bus routes is scheduled to provide pick-up and delivery service once in the morning and once in the afternoon. No service is provided along the portion of US 89 between its intersection with Starr School Road and the community of Saint Mary.

Public Transportation

Blackfeet Transit System provides on-call public transportation services throughout the reservation and project area. There are no standard routes or schedules for this service; residents of the reservation in need of transportation simply call Blackfeet Transit to be picked up and delivered as needed.

Solid Waste Collection

Solid waste collection in Browning is provided by the city of Browning. Solid waste collection on the reservation and throughout the remainder of the project area is provided by the Blackfeet Utilities Commission. Currently there is a landfill east of Browning on Boarding School Road for disposal of large items and solid waste. The Blackfeet Nation maintains the solid waste system by providing solid waste collection services and operating the landfill. An annual reservation-wide cleanup is usually scheduled for May. During these cleanups, residents, businesses, and government entities clean up problem areas and transport large items that have been discarded in the landfill.

Solid waste collection service is provided by three drivers who operate two trucks 6 to 7 days a week. There are two primary collection routes in the proposed project area. The Kiowa/Starr School Road collection route provides collection along US 89 from Browning to Kiowa, and along Starr School Road. The Duck Lake collection route runs along Duck Lake Road from Browning to Babb, travels south to Saint Mary, and then north on US 89 to the Canadian border to provide collection services.

Solid waste collection services on the Kiowa/Starr School Road route are provided once each week, year around. Along Duck Lake Road, collection services are provided once a week at each residence year-round. The collection route is divided into three segments during the winter and five segments during the summer. During the winter, the trucks run three days per week, one day along each of three segments. During the summer, the trucks run five days per week, one day along each of five segments.

Senior Services

The Blackfeet Nation developed the Eagle Shield Senior Citizen Program to provide assistance to the senior citizens of the Blackfeet Indian Reservation by providing them with meals, social events, and access to services of other related programs such as the Personal Care Attendant Program. The Personal Care Attendant Program offers in-home care services for elders whose health conditions cause them to be functionally limited in performing activities of daily living. In the communities of Browning, Blackfoot, Starr School, Seville, East Glacier Park, and Babb/Saint Mary, and in reservation rural areas outside these communities, the center provides home-delivered meals to native Americans 60 years of age and older who are confined to their homes because of age, disability, or lack of transportation.

Utilities

Water Services

Blackfeet Utilities Commission through the Blackfeet Nation operates five water and wastewater systems in the communities of Seville, Starr School, Glacier Homes, Heart Butte, and Babb on the reservation. Because they lie outside the project area or are not municipalities, Seville, Glacier Homes, and Heart Butte are not depicted on vicinity maps. Seville is approximately 19.3 kilometers (12 miles) east of Browning, outside the project area; Glacier Homes is a housing development north of Starr School Road approximately 4.8 kilometers (3 miles) west of Browning; Heart Butte is south of the Glacier-Pondera county line, outside the project area. Outfall and collection lines do not extend outside the limits of these communities. For the reservation lands that fall outside these municipalities, water is principally supplied by wells. These wells have been installed by individual landowners or in cooperation with the Indian Health Service.

The municipal water system for Browning has as its source three large springs located approximately 6.4 kilometers (4 miles) west of the city. The water main for this system originates at these springs, and water is transferred to Browning in a 25-centimeter (10-inch) water main, with approximately 2.5 meters (8.5 feet) of cover. Service lines ranging in size from 10 to 15 centimeters (4 to 6 inches) branch from this primary main to distribute water throughout Browning. The water main runs south until it intersects and crosses US 89 approximately 350 meters (1,150 feet) west of the pumping and water treatment station located on the south side of US 89 approximately 5.6 kilometers (3.5 miles) west of Browning. The line runs parallel to US 89 under the drainage ditch (with approximately 2.4 meters [8 feet] of cover) running alongside the south side of the roadway. The main crosses to the north side of US 89 approximately 0.8 kilometers (0.5 miles) west of Browning. The line runs parallel to the highway beneath the north ditch, until it crosses US 89 once again at the edge of town near the Plains Indian Museum, where it is directed south, to the 3.7-megaliter (1,000,000-gallon) water tank south of town atop Snow Shed Hill. There are white PVC pipes, approximately 45 centimeters (18 inches) in height, located intermittently along the pipeline. These vertical structures are listening stations, used to detect leaks in the pipeline. This water supply system is maintained and operated by the city of Browning and the Indian Health Service.

Due to continual problems with water shortages in both Browning and East Glacier, the Blackfeet Community Water Project was formed in 1999 to provide water to both communities. This project will pump water from lower Two Medicine Lake to a treatment plant at East Glacier. A 757-kiloliter (200,000-gallon) storage tank will also be constructed in East Glacier, as well as a water main to Browning and a 1.9-megaliter (500,000-gallon) water tank in Browning. The first phase of this project is currently under construction, including the intake structure at Two Medicine Lake, the water treatment plant, the water main to East Glacier, and the storage tank in East Glacier.

Natural Gas Services

Montana Power provides natural gas throughout the project area. Two pipelines, the 20-centimeter (8-inch) Kalispell line and the 30-centimeter (12-inch) Blackfeet loop line, traverse the project area running generally from southwest to northeast. These pipelines cross US 89 approximately 2.3 kilometers (1.4 miles) west of Browning. Approximately 0.8 kilometers (0.5 miles) after the lines cross Flatiron Creek to the northwest of Browning, they diverge slightly. The 30-centimeter (12-inch) line crosses the 20-centimeter (8-inch) line and heads north, while the 20-centimeter (8-inch) line continues along its southwest-northeast axis. The 30-centimeter (12-inch) line crosses Duck Lake Road approximately 3.2 kilometers (2 miles) north of Browning (0.4 kilometers [0.25 miles] south of the substation on the west side of Duck Lake Road). The 20-centimeter (8-inch) line crosses Duck Lake Road approximately 2.4 kilometers (1.5 miles) north of Browning, and runs north, parallel to the road for nearly 0.4 kilometers (0.25 miles) before it resumes its southwest-northeast orientation. The 30-centimeter (12-inch) line has approximately 0.9 to 1.2 meters (3 to 4 feet) of cover at its crossings with US 89 and Duck Lake Road. The 20-centimeter (8-inch) line has 1.8 meters (6 feet) of cover where it crosses under US 89, and 1.7 meters (5.5 feet) cover where it crosses Duck Lake Road.

Sewer Services

Sanitary service is provided throughout Browning and to a lesser degree throughout the reservation. In the late 1970s, the U.S. Public Health Service constructed a 6.9-hectare (17-acre) wastewater lagoon east of Browning and installed approximately 1.4 lineal kilometers (4,600 feet) of sewer lines throughout Browning. The city of Browning operates this lagoon. The federal agency also provided more than 100 houses in Browning with sanitary facilities. Within Browning, most houses are connected directly to the sanitary sewer.

There are two additional wastewater lagoons serving developments on the periphery of Browning (Glacier Homes) that are operated by the Blackfeet Utilities Commission. One lagoon is located southeast of the town off US 89, and a small, single-cell facility is located directly south of Browning. Throughout the reservation lands outside the greater Browning area, most houses are connected to private septic systems. Saint Mary Lodge has constructed its own wastewater treatment lagoon.

Electrical Services

Electrical utility services are provided throughout the reservation and Browning by Glacier Electric Co-op. Electrical lines (transmission and distribution) run along both US 89 and Duck Lake Road. Numerous small distribution lines (4,400-volt lines) intermittently run parallel alongside or cross US 89. Between Browning and Kiowa, distribution lines run parallel to US 89, primarily on the north side of the road. These lines are generally within 9 to 12 meters (30 to 40 feet) of the roadway and may need to be moved where proposed construction activities extend beyond this distance from the existing roadway. Near reference post 10 where US 89 is constrained by dwarf aspen stands on both sides of the road, distribution lines run very close to the road. From Kiowa to Hudson Bay Divide, distribution lines are seen more intermittently. A few lines cross US 89 along this section of the roadway, near reference posts 13.7, 14, 17.4, and 24.4, but are more frequently not visible from the road or are seen a distance from the roadway. Duck Lake Road is paralleled by 115-kilovolt transmission lines, which are only energized to 34.5 kilovolts, as well as 4,400-volt distribution lines, which depart from these main electrical lines to provide service to home sites. The transmission lines run roughly west to east from Babb to the curve in improvement area 2 on Duck Lake Road. In the vicinity of this curve, the transmission lines turn south, and run alongside Duck Lake Road, alternating between the west and east sides of the road.

Telephone Services

Two companies provide telephone service throughout the project area: Qwest and the Three Rivers telecommunication companies. Service in the project area is provided via a network of aerial and buried cables. Buried phone cables run alongside US 89 and Duck Lake Road, and service lines extend from these central lines to specific home sites en route. Buried cables are common along both sides of US 89 and Duck Lake Road, but generally lie within 9 to 15 meters (30 to 50 feet) from the road, outside the clear zone or embankments of both roadways. The telephone cable running alongside US 89 has approximately 2.4 meters (8 feet) of cover. An AT&T fiber optic cable crosses US 89, running north to south, slightly west of a natural gas pipeline located approximately 2.4 kilometers (1.5 miles) west of Browning. This cable has approximately 2.4 meters (8 feet) of cover where it crosses US 89. The AT&T fiber optic cable running alongside Duck Lake Road has approximately 1.5 meters (5 feet) of cover, whereas the telephone cable has approximately 1.8 meters (6 feet) of cover. Along US 89, the cable boxes indicate “Independent” as the primary provider. A few cable boxes or buried cable notices were observed within the clear zone approximately at reference posts 8.1 and 9.8. “Independent” cable boxes and “AT&T” fiber optic signage are visible alongside Duck Lake Road.

Hazardous Materials

Facilities or properties that have released hazardous materials or waste to the environment, or that manage hazardous materials or waste in significant quantities, are required to report these activities to both federal and state regulatory agencies. The first step in evaluating a potential for hazardous materials impacts involves reviewing current databases maintained by these agencies. Identified sites have been evaluated and classified according to whether 1) chemical releases to the environment had been identified, or 2) hazardous materials have been managed, with no release identified. Regulatory files were then reviewed and compiled for each site having a reported environmental release to determine the magnitude of impact on the environment, the potential to affect project construction, and potential to affect public health and safety.

Historical information was reviewed for the project area to identify activities that may have impacts on soil and ground water. Sources reviewed included records of previous environmental site investigations.

Historical documentation for the project area was found from the following standard sources:

- Sanborn Fire Insurance maps
- Historical aerial photographs
- City directories.

A site reconnaissance provided verification of property configurations, interviews with individuals knowledgeable about the area, and firsthand knowledge of site settings, including the surrounding environs.

Hazardous Materials Regulation

Hazardous materials may be classified in different categories based on the laws and regulations that define their characteristics and use. These classifications include the following:

- Hazardous waste
- Dangerous waste
- Hazardous substances
- Toxic substances.

The U.S. EPA and the Montana Department of Environmental Quality maintain databases to track sites with potential and confirmed releases of chemicals to the environment. These agencies also monitor facilities that manage hazardous materials as part of their operations. The Blackfeet Environmental Office Hazardous Waste Program also requires federal, state, and Tribal agencies, businesses, and individuals to report hazardous waste generating activities. A brief summary of regulations enforced by the agencies is provided below.

The federal Resource Conservation and Recovery Act defines what is meant by hazardous waste. In Montana, the Department of Environmental Quality has been authorized by the U.S. EPA to implement most of the Resource Conservation and Recovery Act program. Authorization was based on state hazardous waste regulations that are consistent with and at least as stringent as the federal requirements. The U.S. EPA tracks hazardous waste management at individual facilities throughout the state based on notification requirements and records. These requirements and records define the magnitude of waste generated (e.g., small or large quantity); define the type of handling performed (e.g., treatment, storage, or disposal); or they identify whether a release to the environment has occurred. The Montana Department of Environmental Quality tracks facilities based on required registration of underground storage tanks; it also maintains an inventory of solid waste facilities and landfill sites.

Nationally, the Comprehensive Environmental Response Compensation and Liability Act, also known as Superfund, defines hazardous substances. The Department of Environmental Quality operates a parallel program in Montana under the Comprehensive Environmental Cleanup and Responsibility Act. Both programs are designed and administered to provide appropriate responses to the release of hazardous substances to the environment. The Comprehensive Environmental Cleanup and Responsibility Act also addresses releases of petroleum products not covered under federal statutes. The U.S. EPA tracks sites based on reported potential or actual releases to the environment, emergency response notifications, and cleanup progress at major release sites. The Montana Department of Environmental Quality tracks the same types of sites and also tracks petroleum releases from underground storage tanks.

Toxic substances are a subset of hazardous substances also regulated by the federal Toxic Substances Control Act. The Toxic Substances Control Act was adopted so that all new chemical substances and existing chemicals put to new uses, other than as pesticides, could be evaluated for health and environmental effects. Additional controls governing disposal, beyond the Comprehensive Environmental Cleanup and Responsibility Act and the Resource Conservation and Recovery Act, have been specifically applied to polychlorinated biphenyls (PCBs). Toxic Substances Control Act sites are tracked by the U.S. EPA.

Site Categories

Hazardous materials sites in the project area would fall into two categories based on whether a release to the environment has been documented or is considered a potential threat.

Documented Release Sites

Documented releases of hazardous materials to the environment, identified in regulatory agency site files, directly affect soil and ground water. Releases to soil generally are limited in lateral extent and consequently can have impacts when found on the proposed alternative property. Releases to ground water tend to extend farther from the area of origin and can potentially result in impacts on alternative property even when the source is located beyond alternative property boundaries.

Potential Release Sites

A potential for release is based on the site activity registered with regulatory agencies, the development of site activities evident from historical documentation (e.g., a foundry site that became a service station and then was developed for an office building), or the current activity evident from visual observation (e.g., junk yard). Potential release sites have had no reported release of hazardous substances.

Known and Potential Hazardous Material Sites

Review of regulatory files for sites with reported releases identified the extent of contamination determined through past characterization efforts. Releases to soil on designated sites also may have had an impact on ground water, though this may not have been investigated.

Potential release sites typically are identified based on the following categories:

- Reported current activities, such as the generation of hazardous waste
- Reported current features, such as registered underground storage tanks
- Recorded historical activities, such as the operation of gas and oil facilities
- Recorded historical features, such as a mapped tank farm
- Visually identified activity or feature.

Sites of potential releases have not been characterized and may or may not have soil or ground water contamination.

No documented release sites have been identified on the US 89 or Duck Lake Road rights-of-way or on adjacent properties. Two gasoline underground storage tanks reported located 4.3 to 7.6 meters (14 to 25 feet) north of the café/general store at Kiowa were removed in 1995. Four soil samples collected from 3 meters (10 feet) deep in the tank excavation indicated no gasoline detected. Both tanks and fuel dispenser reportedly were located in the existing right-of-way. The residence that could be displaced (see Displacements and Right-of-Way Acquisition section in Chapter 4) may contain asbestos and/or lead-based paint.

Historic and Cultural Resources

The US 89 project area lies entirely within the Blackfeet Indian Reservation in northern Montana. The project area contains many historic and culturally important sites. Historic properties eligible for or included on the National Register of Historic Places are protected under Section 106 of the Historic Preservation Act and Section 4(f) of the 1966 Department of Transportation Act. Tribal cultural resources are protected through the Native American Graves Protection and Repatriation Act and the Archaeological Resources Protection Act.

Historic resource is a property or cultural resource listed in or eligible for listing in the National Register of Historic Places and may include buildings, structures, objects, sites, archaeological resources (greater than 50 years old) or traditional cultural properties. *Cultural resource* is an all-inclusive term referring to objects, sites, places, institutions, values, beliefs, customs, traditions, symbols, and social structures that have cultural value to some sociocultural group (Aaberg 2001). The project area is generally considered part of the Northwest Plains subarea of the Plains Culture Area.

Study Methods

A file search for the project area was conducted at the Rocky Mountain Regional Office of the Bureau of Indian Affairs in Billings, Montana, which maintains records of previously recorded archaeological and historic sites. Subsequent to the file search, a field archaeological survey was conducted in the project area in fall and winter 2000 and spring 2001 that located and described archaeological and cultural sites, and made recommendations of significance for the sites found. An intensive surface survey was conducted within a corridor extending approximately 60 meters (200 feet) on each side of the proposed US 89 realignment route (Aaberg 2001). In addition, the proposed improvement areas on Duck Lake Road were surveyed. Erosional exposures, such as cutbanks, trails, roads, ditches, and wallows, were investigated. Shovel testing was used to make baseline subsurface evaluations and to determine the presence or absence of buried cultural deposits at sites occurring in depositional settings. Artifacts were not collected from the surface or from test sites. The Montana State Historic Preservation office and the Blackfeet Cultural Department were consulted on the findings and conclusions of this study. The results of the file search and field survey are presented in *US 89 Browning-Hudson Bay Divide and Duck Lake Road Archaeological and Cultural Investigations, Blackfeet Indian Reservation, Glacier County, Montana* (Aaberg 2001). Information from that report is summarized below.

Study Results

A total of 58 cultural and historic properties were identified along the US 89 and Duck Lake Road corridors. Of the 58 properties, 50 were found along US 89, seven were found along the Duck Lake Road survey segments, and one, the Old North Trail, is reported along both Duck Lake Road and US 89.

Of the 58 sites, 34 sites are documented exclusively as Blackfeet cultural localities, consisting of recent cloth-offering sites. The remaining 24 sites are historic properties, six of which were documented previous to the studies conducted for this project. An additional site (Old North Trail) has been reported in the project area, but no evidence of that site was found in the project area during studies conducted for this project. None of the 24 sites is listed on the National Register of Historic Places, although six of them are eligible for listing. The 24 sites consisted of the following:

- Teepee rings
- Cairns
- Foundations
- Heat-altered rocks
- Lithic scatter
- Old roadbeds and trails
- Historic bridges
- Buried/stratified campsites.

The locations and character of previously undocumented sites are not disclosed in this final EIS for the purposes of protection and cultural sensitivity. Previously documented sites within the project corridor are described below.

Previously Documented Sites

All previously documented sites are eligible for listing on the National Register of Historic Places, or are protected by a programmatic agreement between the Montana Department of Transportation and the Montana State Historic Preservation Office. Because these resources are eligible for listing on the National Register of Historic Places, they are considered to be Section 4(f) resources and are also described in Appendix D. Additional information on these resources is provided in Appendix D.

Historic Roads

Four historic roads occur in the US 89 project area.

- Blackfeet Highway (Site 24GL846)
- Browning to Babb to Saint Mary Stage Road (Site 24GL208)
- Old Duck Lake Road (Site 24GL209)
- Browning to Peskan Road (Site 24GL210).

US 89 between Kiowa and the Hudson Bay Divide follows the route of the original Blackfeet Highway (Site 24GL846). The Blackfeet Highway, which ran from East Glacier to Canada, was paved around 1928. Long, intact stretches of an old road grade between North Fork Cut Bank Creek and South Fork Cut Bank Creek are evident in the project corridor. The stretches of road exhibit a raised, constructed bed or grade. Some of the segments between Kiowa and Hudson Bay Divide show badly weathered and fragmented pieces of asphalt; others exhibit no asphalt at all.

Based on General Land Office maps from 1907, the Browning to Babb to Saint Mary Stage Road (Site 24GL208) angled in a northwest direction from Dry Fork Milk River to the curve in improvement area 2 on Duck Lake Road. Evidence of the Browning to Babb to Saint Mary Stage Road is visible in improvement areas 2 and 3 on Duck Lake Road.

Evidence of the Old Duck Lake Road (Site 24GL209), constructed from 1925 to 1931, is clearly visible on the ground and in aerial photos generally paralleling the present alignment of Duck Lake Road. It departs in some instances from the modern Duck Lake Road by approximately 1.6 kilometers (1 mile) to the south but eventually rejoins the modern alignment just north of the Middle Fork Milk River, in improvement area 2.

Evidence of the Babb to Peskan Road was observed in improvement area 2 on Duck Lake Road and consisted of a remnant roadbed.

These historic roads are protected under a programmatic agreement between the Montana Department of Transportation and the Montana State Historic Preservation Office. Under that programmatic agreement, a determination of significance or National Register eligibility is not necessary. Additional information on these resources is provided in Appendix D.

Historic Bridges

Two historic bridges occur on US 89:

- South Fork Cut Bank Creek/Kiowa Bridge (Site 24GL212)
- South Fork Milk River Bridge (Site 24GL213).

The South Fork Cut Bank Creek /Kiowa Bridge (Site 24GL212) is located at reference post 13 on US 89. The South Fork Milk River Bridge (Site 24GL213) is located at reference post 21 on US 89. Both bridges are in use and convey traffic over their respective streams. Both structures are rock-faced concrete arch bridges with hand-placed flagstone railing and detail work. Both bridges were constructed in 1928 during construction of the Blackfeet Highway.

Both bridges are eligible for nomination to the National Register of Historic Places and are considered Section 4(f) resources. Additional information on these resources is provided in Appendix D.

Old North Trail

The Old North Trail (no site number assigned) was an important travel corridor used in precontact and historic times by Plains and Mountain tribes. This trail has been suggested by some as being the most important aboriginal trail in western North America. It extended along the east front of the Rocky Mountains from what is now Canada to what is now Mexico. As determined from recent archival, oral history, and ground-truthing research, the Old North Trail was a system of interwoven, roughly parallel linear features.

Quadrangle maps depicting segments of the trail were obtained from the Montana State Historic Preservation Office and used to estimate locations of the Old North Trail within the project area. However, subsequent field investigations conducted for this project did not identify evidence of the trail within the project area, therefore, there is no site that could be impacted and an effect determination was not conducted.

Recreation

US 89 connects communities and recreational areas in western Wyoming, western Montana, and Alberta, Canada. This highway extends between major recreational areas, including Yellowstone National Park and Glacier National Park. The highway continues north into Alberta, Canada, where it becomes Alberta PR 2, and provides vehicular access from Glacier National Park to Waterton Lakes National Park, Banff National Park, and Jasper National Park.

The US 89 project area is located directly east of Glacier National Park and the roads within it serve as conduits for travel to and from the park. Within the project area, US 89 is part of an important scenic loop, which also includes US 2, Going-to-the-Sun Road, and Looking Glass Hill Road, that is frequently traveled by tourists visiting the project area.

Glacier National Park is the closest designated recreational area in the project vicinity. Glacier National Park is a destination park, meaning that tourists typically travel a substantial distance to visit the park and spend several days in the area. For many tourists traveling through the area, the park is only one of several destinations along the Rocky Mountain range, and tourists are not limited to local or Montana state residents. Traffic flows in and out of the park tend to be relatively consistent throughout the week during peak season and are not dramatically higher during weekends.

Although public recreation opportunities within the boundaries of the project area are limited, many tourists travel through the project area to pursue a wide range of regional recreational activities in northwestern Montana and southern Alberta, such as the following:

- Hiking and camping
- Backcountry backpacking and horse packing
- Road biking
- Alpine skiing/snowboarding, backcountry skiing, and cross-country skiing
- Snowshoeing
- Fishing, boating, water skiing, and rafting
- Horseback riding
- Bird watching and wildlife viewing
- Hunting
- Boating, canoeing, kayaking, white-water rafting
- Dog sledding
- Golfing
- Rock climbing and mountaineering
- Caving
- Off-road vehicle tours
- Heli-hiking and heli-skiing
- Flight sightseeing tours.

There are no Land and Water Conservation Fund - assisted outdoor recreation sites in the project corridor.

US Highway 89

US 89 provides access to the eastern end of Going-to-the-Sun Road, which is one of Glacier National Park's premier attractions. Going-to-the-Sun Road, the only road that traverses the entire width of Glacier Park, connects Lake McDonald on the west side of the park with Saint Mary Lake on the east. It provides the only access to many of the park's other main attractions.

The road is open to motorists from early June to mid-October. During winter months, segments of Going-to-the-Sun Road are accessible for cross-country skiing and snowshoeing.

US 89, within the improvement project corridor, is a two-lane highway that meanders through the rolling hills and open grasslands of the Blackfeet Indian Reservation, offering unobstructed panoramic views of the eastern front of the Rocky Mountains. Recreation that is directly accessible from US 89 includes sightseeing, bird watching, wildlife viewing, camping, hiking, biking, cross-country skiing, snowshoeing, fishing, and hunting. There are several stream crossings within the US 89 project corridor that are popular areas for both fishing and bird watching, including the North Fork Cut Bank Creek, the South Fork Cut Bank Creek, and the South Fork Milk River.

US 89 connects the small communities of Browning and Saint Mary, and provides access to Looking Glass Hill Road, Duck Lake Road, and the Cut Bank Creek entrance to Glacier National Park (Figure 13). All Glacier National Park entrances that are accessible from US 89 are listed in Table 18. It should be noted that the numbers in Table 18 do not account for vehicles leaving the park, and that the number of vehicles leaving the park (and entering US 89) at Saint Mary may be greater than those entering the park due to eastbound traffic across Going-to-the-Sun Road. Locations of the park entrances are indicated on Figure 13.

Table 18. Average monthly number of visitors entering Glacier National Park from US 89.

Entrance	Location	Average Monthly Number of Visitors Entering Glacier National Park May–September in the Years 1990–1999				
		May	June	July	August	September
Many Glacier Road	North of the US 89 improvement project segment at Babb	4,713	2,1263	47,843	48,446	20,597
Saint Mary	North of the US 89 improvement project at Saint Mary	15,075	61,649	127,956	120,471	67,904
Cut Bank Creek [a]	In US 89 improvement project corridor near reference post 17	44	283	1,705	1,598	501
Two Medicine Road	South of US 89 improvement project, off Looking Glass Hill Road	5,590	14,285	26,138	26,766	11,693

[a] Numbers for the Cut Bank Creek entrance reflect visitors in 1990–1991 only. (This entrance was not monitored 1992–1999.)

Duck Lake Road

Duck Lake Road is a two-lane highway offering an alternate route between Browning and Babb, Montana. This road provides access to Duck Lake, located northeast of Saint Mary within improvement area 3, which is a very popular fishing destination offering world-class trout fishing. Duck Lake Road also crosses several streams, including Cut Bank Creek (improvement area 1) and the Milk River, which are also popular fishing destinations. Recreational opportunities along Duck Lake Road include sightseeing, bird watching, wildlife viewing, camping, hiking, biking, horseback riding, cross-country skiing, snowshoeing, fishing, and hunting.

10-09-03/rtb/HEC-O/rb/00-01457-001/DEIS

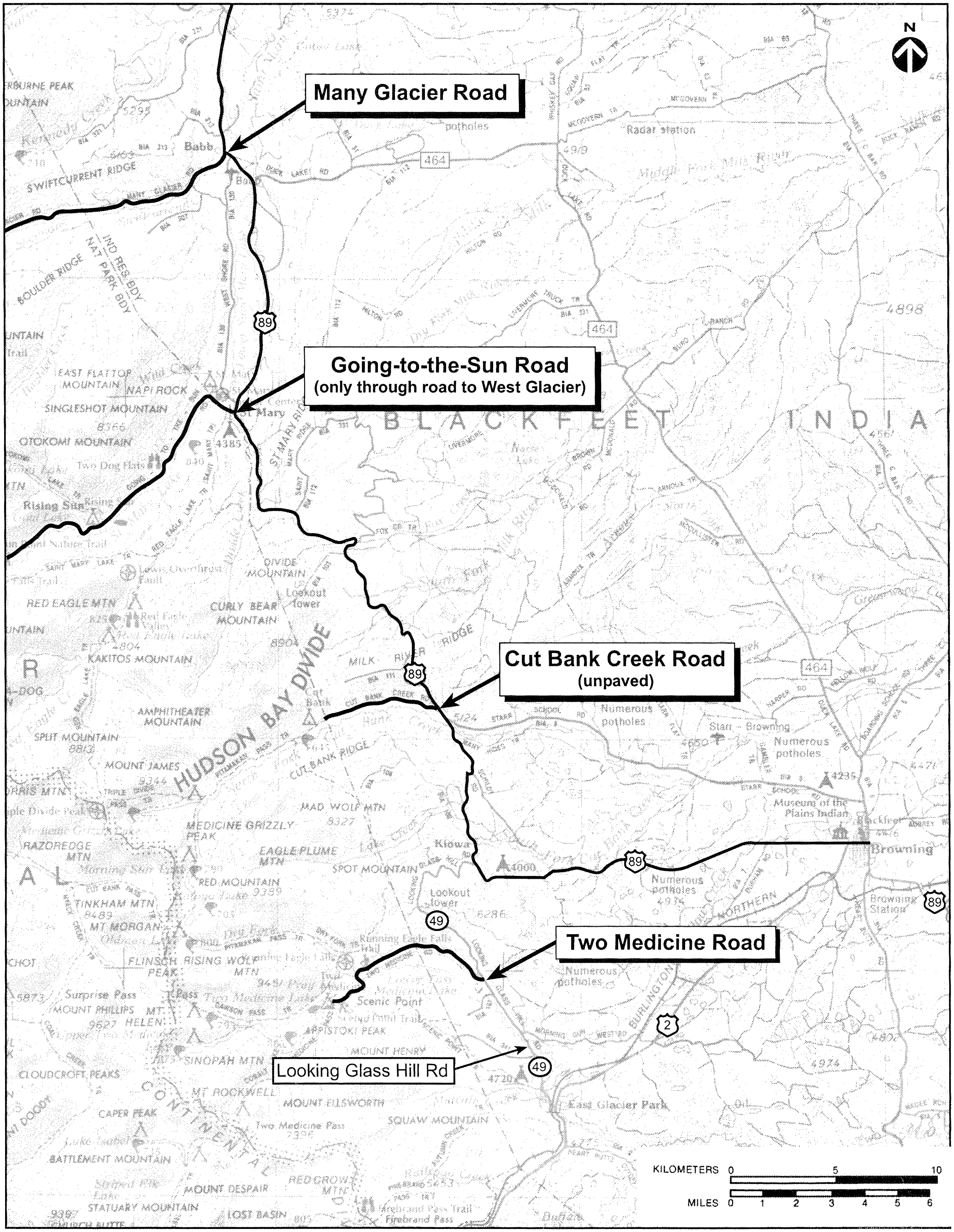

Figure 13. Eastern entrances to Glacier National Park within the US 89 project area.

Recreational Opportunities in the Project Area

Camping

Within the project corridor, US 89 provides access to several privately owned campgrounds. There are also a few campgrounds accessible from Duck Lake Road. There is no unmet demand for campsites in Glacier National Park, and the total available campsites in the eastern portion of the park have never filled to capacity at any one time. However, certain campgrounds in the eastern portion of the park are especially popular and do fill to capacity almost daily during peak season. The Many Glacier campground fills to capacity nearly every day from the last week in June through August. Rising Sun is another popular campground that fills to capacity almost daily from mid-July through the end of August. The Two Medicine campground fills to capacity approximately five nights per year, and the Saint Mary and Cut Bank Creek campgrounds rarely fill to capacity.

Hiking

Most of the hiking trails on the east side of Glacier National Park are directly or indirectly accessible from US 89. Most of the trails directly accessible from US 89 cross the boundary between the Blackfeet Indian Reservation and Glacier Park. Among these trails are Slidelake Trail, Redgap Pass Trail, Red Eagle Lake Trail, and an unnamed trail leading to the lookout tower on Divide Mountain. These trails are generally considered unimproved roads within the Blackfeet Indian Reservation and become designated hiking trails as they cross into Glacier National Park. There are several unimproved roads accessible from improved roads in the project area and many of these may be used as hiking trails. Access to these unimproved roads is concentrated along US 89 and Starr School Road between Cut Bank Road and Browning.

Bicycling

Road bicycling is popular in Glacier National Park; however, bicyclists typically enter the park from the west entrance and travel back and forth on Going-to-the-Sun Road without passing through Saint Mary. There are bike rentals available north of the project area near Saint Mary, and a few organized bike tours travel along US 89 during the summer months. Individual bicyclists do travel along US 89, but this number is relatively low when compared to the bicyclists within the park. In 1999, 640 bicyclists crossed Going-to-the-Sun Road as members of commercial groups, that is, paid tours. The park does not count individual bicyclists coming into the park, but it is likely that this number exceeds the individuals in commercial groups. Mountain biking is not allowed in Glacier National Park and is generally not a popular activity in the project area.

Fishing

Sport fishing in the project area is a popular activity among tourists as well as residents. There are several fishing streams and lakes in the project vicinity that are accessible from US 89. These include Saint Mary Lake, Fox Creek, Divide Creek, Milk River, Cut Bank Creek, and Lake Creek. Two Medicine Lake, south of the project area off Looking Glass Hill Road, is also a popular fishing destination. Fishing is popular in Glacier National Park, and all streams and lakes located on the east side of the park are indirectly accessible from US 89. Destinations along the US 89 project corridor include the South Fork Milk River, the north and south forks of Cut Bank Creek, Lake Creek, and Willow Creek.

Boating

Boating in the project area is very popular with tourists as well as residents and includes sailing, windsurfing, kayaking, canoeing, and motor boating. The only lakes that are directly accessible from US 89 and Duck Lake Road are Saint Mary Lake, located adjacent to US 89, north of the project area, and Duck Lake, accessible from improvement area 1 on Duck Lake Road. However, there are several lakes in the project vicinity that are indirectly accessible from US 89, including Pike Lake and Goose Lake to the north, and Two Medicine Lake to the south. Boating is very popular in Glacier National Park, and the lakes located on the east side of the park are indirectly accessible from US 89.

Cross-Country Skiing

Although cross-country skiing is a popular winter activity in the project vicinity, the area is not a major destination for cross-country skiing tourists. There are no formal Nordic centers, guided cross-country ski tours, or equipment rental shops in the project area or in Glacier National Park. There are several formal cross-country skiing trails in the park, including a series of groomed trails near the Saint Mary entrance to the park. The main skiing trailhead for the Saint Mary ski trails is a parking area near the Hudson Bay park office. This parking area is accessed from US 89 at the park entrance just south of the town of Saint Mary. There are also many areas within the Blackfeet Indian Reservation that are accessible for cross-country skiing, but these areas do not provide groomed trails.

Other Winter Activities

Backcountry telemark skiing, snowshoeing, snowmobiling, and ice fishing are also popular activities in the project vicinity. However, snowmobiles are not allowed in Glacier National Park. The Blackfeet Nation has plans to expand and improve cross-country skiing and snowmobiling opportunities within the project area.

Visual Quality

US 89 and Duck Lake Road are the primary routes through the project area. These roadways traverse an open and rolling rural landscape and offer unobstructed vistas of the eastern front of the Rocky Mountain range. Both of these roads have two lanes. Although US 89 and Duck Lake Road have not been designated as Scenic Byways by a federal or state agency, the area contains a unique combination of scenery, geology, plants, wildlife, and multicultural history.

US Highway 89

US 89 is a two-lane highway that serves the east side of Glacier National Park and connects the communities of Browning and Saint Mary. Within the project corridor, US 89 meanders through the gentle hills of the western portion of the Blackfeet Indian Reservation and offers unobstructed panoramic views of the mountains to the west. The roadway is narrow and without clearly marked centerlines or shoulder lines in areas, resulting in a relatively undeveloped, back-road appearance. The corridor travels through terrain characteristic of Glacier National Park's eastern fringe: grassy hills mixed with aspen grovelands, bands of conifer stands, and riparian wetlands thick with willows and other shrubs.

There are at least 10 unimproved vehicle pullouts along US 89 offering a wide range of views. Many pullouts along US 89 are located at hill peaks and offer unobstructed panoramic views of the Rocky Mountains; others offer closer natural scenes such as steep slopes, heavily vegetated riparian areas, and aspen grovelands. Notable overlooks along the US 89 project corridor include the top of the Hudson Bay Divide, which offers a view overlooking the Milk River valley and upper Saint Mary Lake; and Milk River Ridge, which offers a view of the Cut Bank Creek valley. From both of these vantage points, there are mostly unobstructed and panoramic views of the eastern front of the Rocky Mountains.

Duck Lake Road

Duck Lake Road is a two-lane road offering an alternate route between Browning and Babb, Montana. This road provides access to Duck Lake, a popular fishing destination located northeast of Saint Mary. In general, the alignment of this road is flat, straight, and wide open; it lacks the meanders, hills, and sharp curves experienced on US 89. The centerline and shoulder lines are clearly marked along the entire roadway, giving it the appearance of a typical modern two-lane highway. The shoulder along Duck Lake Road is uniform and wider than the shoulder along US 89.

Duck Lake Road traverses the gently rolling grasslands and ranches of the Blackfeet Indian Reservation and offers distant panoramic views of the Rocky Mountains from nearly all points along the road corridor. Because of its flat topography, lack of trees, and a more uniform and open landscape, Duck Lake Road does not offer the scenic variety that is encountered on US 89. Vegetation along the Duck Lake Road project corridor is sparse and mostly limited to riparian wetlands associated with streams. There are several stream crossings along Duck Lake Road, and these small and discrete areas are dense with tall grasses, shrubs, and small willow trees. However, the view from Duck Lake Road is mostly dominated by a gently rolling and open landscape. Several ephemeral ponds and water-filled potholes are visible from the road and support a wide range of waterfowl. Bird viewing opportunities are best in the early summer, before the ponds and potholes have evaporated.

There are no established vehicle pullouts along Duck Lake Road, but the uniform shoulder allows vehicles opportunities to pull over safely along most sections of the roadway. The most notable unimproved pullout along Duck Lake Road is located on both sides of the road in improvement area 1 at the Cut Bank Creek crossing. This pullout area is unimproved and is not especially scenic, but is useful as a parking area for visitors and local residents accessing fishing areas.

Road Perspectives

The scenic quality of views from the road is very important to most tourists, often playing a key role in determining the route selected to reach a destination. A majority of tourists visit the project area during the summer months and are either approaching or leaving Glacier National Park. These visitors tend to travel at a more leisurely pace than local residents, often slowing down to take a look at wildlife, or gaze at scenic overlooks and other points of interest along US 89 and Duck Lake Road.

Conversely, it is the view *of* the road that matters most to local residents, business owners, and travelers. Residential viewers may be most sensitive to nearby roadwork and its effects, such as higher traffic volume, road widening that brings traffic closer to their homes, and construction activities that reduce existing landform or vegetative buffers between their homes and the roadway.

The project area is sparsely populated, and residential development along the project corridors is scattered. Along US 89 between Hudson Bay Divide and Kiowa there are very few residences within viewing distance of the existing roadway. Between Kiowa and Browning, however, there are several private residences that have clear and unobstructed views of the existing and proposed roadway. The most developed segment of US 89 within the project area is at Kiowa, near the intersection of Looking Glass Hill Road and US 89. At this intersection, a café/general store, small motel, cabins, picnic areas, and primitive camping sites are concentrated in a relatively small area. The café/general store, which includes a motel and picnic area, is within 25 meters (80 feet) of the existing US 89 alignment and is used by tourists during operational months for relaxing, eating, and shopping. The surrounding view is part of the tourist experience while visiting this area.

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CHAPTER 4

Environmental Consequences

Introduction

This chapter documents the analysis of the environmental consequences of each of the alternatives being considered. It includes the direct, indirect, and cumulative effects. In this chapter, the terms "effect" and "impact" are synonymous. Direct effects are those that are caused by the action and occur at the same time and place. Indirect effects, also called secondary impacts, "are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density, or growth rate, and related effects on air and water and other natural systems, including ecosystems." (40 CFR 1508.8)

To more clearly represent the time period when anticipated impacts will occur, two sub-headings, *construction* and *post-construction*, have been added where applicable to the direct and indirect impacts discussions that follow. Construction impacts occur during the construction period and cease once construction is complete. Post-construction impacts persist or occur after construction is complete.

Dust generated during road-building ceases once the road is completed and is therefore an example of a construction impact. Stormwater runoff from the completed road may impact the quality of receiving waters and is therefore an example of a post-construction impact. Noise generated by road-building equipment is an example of a direct construction impact. Noise generated by traffic on the completed roadway is an example of a direct post-construction impact. If roadway improvements cause new commercial development to occur, the impacts associated with the new development would be indirect impacts of the proposed roadway project.

The impacts are discussed by the categories contained in Chapter 3 – Affected Environment. These are organized within the following broad categories:

- Physical environment
- Biological environment
- Human environment.

A cumulative effect is "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR 1508.7). Actions that have resulted in cumulative effects upon specific resources in the vicinity of US 89 are addressed at the end of Chapter 4, Environmental Consequences.

Information also is provided on mitigation measures that may reduce or eliminate the impacts identified for each element of the environment, and a mitigation summary is provided at the end of Chapter 4. These recommended measures have been successfully used for similar projects and are technically accepted means for reducing adverse impacts.

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Physical Environment

Geology and Soils

Direct Effects

The no-build alternative would require no earthwork. Therefore, no construction-related or post-construction impacts to geology and soils would be expected.

Construction

Clearing, grading, filling, and roadbed preparation would be required for this project under all of the proposed action alternatives. Alternative B would have an estimated amount of earthwork of 1,150,000 cubic meters of excavation (1,504,000 cubic yards) and 1,000,000 cubic meters (1,308,000 cubic yards) of fill. The footprint for Alternative C is approximately 10 percent greater than the Alternative B footprint and would have an estimated amount of earthwork of approximately 1,300,000 cubic meters (1,700,000 cubic yards) of excavation and 1,100,000 cubic meters (1,439,000 cubic yards) of fill. The Duck Lake Road Option would have an estimated amount of earthwork of 500,000 cubic meters (654,000 cubic yards) of excavation and 390,000 cubic meters (510,000 cubic yards) of fill.

Some of the excavation material would be usable on the site, and additional fill material would be imported to the site. Based on the soil engineering characteristics, there is substantial variability in the quality of soil that would be encountered during excavation. Excavation and fill activities would expose soils susceptible to erosion, landslides, and seismic hazards, such as liquefaction.

Impacts related to seismic activity are unlikely because no faults with Quaternary-age movement have been identified in the project vicinity and historic earthquake activity in the area has been limited (Stickney et al. 2000).

Post-construction

With appropriate design features for excavation and fill slopes, and application of erosion and sediment controls, there would be no post-construction adverse impacts on geology and soil resources under Alternatives B and C and the Duck Lake Road Option.

Indirect Effects

Indirect impacts associated with the US 89 improvement project action alternatives include development of material source sites for material extraction. The preliminary roadway design has attempted to balance the amount of cut and fill; however, materials would be needed for the structural surfacing of the road including coarse crushed gravel, fine crushed gravel, and plant mix surfacing (asphalt). While the material source sites for the proposed project have not been identified, these materials are normally extracted as near the project site as available. The source sites that are developed would impact geology and soils. Due to the slightly larger footprint of Alternative C, the quantity of materials to be extracted would be slightly greater than is required for Alternative B. The quantity of materials to be extracted for the Duck Lake Road Option would be substantially less than either Alternative B or Alternative C.

Mitigation Measures

No mitigation measures are proposed for the no-build alternative.

All excavation and grading for roadways and slope stabilization for the action alternatives will be designed and executed in accordance with recommendations of a geotechnical engineer based on site-specific soil exploration. Standard erosion control measures will be implemented during the earthwork stages of the project. These measures involve the use of water trucks to reduce dust, as appropriate, the use of vegetative cover, and other best management practices (BMPs) to temporarily control surface water drainage and reduce erosion of exposed soils.

Appropriate seismic parameters will be used in final design of the roadway and for slope stabilization, although no faults with Quaternary-age movement have been identified in the project vicinity and historic earthquake activity in the area has been limited (Stickney et al. 2000). If liquefaction-prone areas are encountered, soil improvement techniques will be considered in the final design to enhance the engineering properties of the soil.

Floodplains

Direct Effects

Under the no-build alternative, existing undersized culverts and bridges would continue to contribute to localized flooding at Willow Creek (reference post 3) and South Fork Cut Bank Creek (reference post 13) as described in Chapter 3 – Affected Environment.

Construction

Under Alternatives B and C, temporary clearing of vegetation in floodplains would result in impacts on surface waters as described in the Water Resources section below. Construction activities would require temporary work in floodplains for the placement of bridge abutments and culverts. However, this work is not expected to contribute to flooding during the construction season.

Post-construction

A reduction in stream channel capacity at US 89 crossings in the project corridor is not expected under any of the action alternatives. Stream capacity would likely be increased at Lake Creek (reference post 12) by replacing the existing culverts with a bridge, and at South Fork Cut Bank Creek (reference post 13) by increasing the hydraulic capacity of the bridge opening.

Additional impervious roadway areas draining to streams would result in impacts associated with increased stormwater flow rates. Although the increased stormwater flows from the project corridor represent a minor amount of the total flow in these streams, the affected streams could experience minor adverse flooding impacts or increased channel scour.

Fill in floodplains at South Fork Cut Bank Creek, Lake Creek, and South Fork Milk River may be required to accommodate the widened roadway. The impacts to floodplains are not known at this time because there is no FEMA mapping on the Blackfeet Reservation. Floodplain impacts will be accurately evaluated and mitigation measures quantified during the final design phase of the project, when field survey and design level mapping is developed for this project. The following summarizes the impacts of the encroachments to the floodplain at each location per Federal-Aid Policy 23 CFR 650A, section 650.111. None of the identified floodplain encroachments are expected to result in significant impacts.

South Fork Cut Bank Creek

There are longitudinal (parallel) and latitudinal (transverse crossing) encroachments of the proposed highway on South Fork Cut Bank Creek. Located in a wide valley, the stream channel meanders through the floodplain measuring approximately 200 meters (660 feet) in width. The existing roadway is constructed on fill, which is continuous across the floodplain except at the channel, where there is a bridge. The proposed improvements would widen this fill symmetrically about centerline. This would place a narrow strip of fill within the floodplain, on both sides of the road. The existing fill would be widened by an average of two meters (6 feet) on each side, for a length of 200 meters (660 feet). The latitudinal encroachment could therefore affect as much as 800 square meters (8,600 square feet) near reference post 13. The longitudinal encroachment would be upstream of the bridge and could affect as much as 300 linear meters (1,000 feet) of the adjacent floodplain. These encroachments to the floodplain would be very minor when compared to the overall floodplain in this area and there would be no risks associated with the encroachments. The effects on the flood carrying capacity of the channel would be negligible.

Lake Creek

The proposed roadway crosses Lake Creek 100 meters (330 feet) downstream (east) of the existing crossing. This new alignment would require fill to be placed in the floodplain. Depending upon the extent of the floodplain, the fill within it could be as much as 200 meters (660 feet) in length and 30 meters (100 feet) in width for a total area of 6,000 square meters (64,600 square feet). This encroachment would be latitudinal (transverse) in nature. The proposed project would also remove the existing roadway embankment from the abandoned alignment. The encroachments to be removed include a latitudinal fill 140 meters (460 feet) long and 26 meters (85 feet) wide and a longitudinal encroachment 160 meters (525 feet) long and 15 meters (50 feet) wide. The total area of existing encroachment to be removed from the Lake Creek floodplain is estimated to be as much as 6,000 square meters (64,600 square feet). The new structure would increase the flood carrying capacity and the net encroachment to the floodplain would be minor.

South Fork Milk River

There are no longitudinal (parallel) encroachments of floodplain associated with South Fork Milk River from the proposed highway. In this location (reference post 21) the existing historic bridge will be left in place and widened. The proposed roadway widening would increase the latitudinal encroachment, or transverse crossing, of the floodplain area directly adjacent to the bridge by approximately 20 square meters (220 square feet). The widened roadway would include increasing the size of the adjacent relief culverts. This would increase the flood carrying capacity and the encroachment to the floodplain would be minor. Risks to the floodplain would be minor.

Cut Bank Creek

Under the Duck Lake Road Option, the parking area in improvement area 1 is located in the 100-year floodplain of Cut Bank Creek. The Glacier County maximum allowable rise in flood elevation would be complied with during final design and floodplain impacts would be minimal. No impacts on stream channel capacity would occur at any of the other Duck Lake Road crossings. Additional impervious roadway areas draining to streams would result in impacts associated with increased stormwater flow rates. Although the increased stormwater flows from the project corridor represent a minor amount of the total flow in these streams, the affected streams could experience minor adverse flooding impacts or increased channel scour.

Indirect Effects

Under Alternatives B and C and the Duck Lake Road Option, vegetation communities in floodplains may experience impacts from encroachment by noxious weeds into the floodplain if exposed soils are colonized by noxious weeds. Vegetation communities may also be affected by subsequent maintenance to eradicate noxious weeds.

If material source sites are located within a floodplain area, it would present additional indirect impacts on floodplains. Gravel removal in floodplains not only can alter the quantity of gravel within a river system, but can also affect gravel transport and deposition processes, alter flow conditions and habitat (surface and subsurface), and introduce petroleum based contaminants and fine sediments into a river system as a result of machinery working within the floodplain or sediment laden run-off. Floodplain material source sites have the potential to become good wildlife habitat upon reclamation, provided that margins are appropriately contoured and water table fluctuations are not excessive (Kondolf 2002).

Mitigation Measures

No mitigation measures are proposed for the no-build alternative.

Under Alternatives B and C and the Duck Lake Road Option, all culverts and bridges to be replaced or constructed in the US 89 corridor will be designed in accordance with current Montana Department of Transportation guidelines and would be designed to pass the 50-year flood. All bridges to be replaced or constructed in the US 89 corridor will be designed to pass the 50-year flood and provide the minimum required 0.3-meter (1-foot) clearance above the 100-year flood elevation to the low beam elevation. (The current preliminary design has yielded only preliminary determinations of 50-year flood elevations, since no floodplain mapping is available). During later stages of project design, channels will be surveyed to more accurately determine channel capacity and water surface profiles during the 100-year event. Culvert and bridge designs then will be modified as necessary. Placement of roadside pullouts will be located in areas that do not encroach upon the floodplain.

New stormwater outfalls associated with new or reconfigured surface drainage systems will be designed to prevent erosion over the long term, accounting for increased flow rates from the roadway.

Only Practicable Alternative Finding

All projects with Federal sponsorship must comply with *Executive Order 11988 – Floodplain Management (E.O.11988)*. E.O. 11988 directs federal agencies to avoid to the extent possible adverse impacts associated with floodplains and to avoid direct or indirect support of floodplain development. Current FHWA policy, regulations, and nonregulatory procedural guidance for floodplains are provided in 23 CFR Part 650, Subpart A (23 CFR 650A), titled *Location and Hydraulic Design of Encroachment on Floodplains*.

There is no floodplain mapping or designated floodplain within the project area. However, floodplains are evident at the South Fork Cut Bank Creek, Lake Creek, South Fork Milk River and Cut Bank Creek. The impacts under all of the project alternatives at Lake Creek and South Fork Milk River would be transverse encroachments and are unavoidable. The purpose of the proposed project is to improve traffic flow, safety, and maintenance requirements within a corridor serving the Blackfeet Nation and Glacier National Park. Therefore, none of the proposed floodplain impacts are anticipated to support incompatible floodplain development. Not only are these areas within the floodplain and therefore require permits for further development, but also these areas all support wetlands, which are protected under Section 404 of the federal Clean Water Act and on the reservation by the Blackfeet Aquatic Lands Ordinance 90A. These regulations further restrict development to minimize impacts on wetlands. Additionally, these sites, with the exception of Cut Bank Creek on Duck Lake Road, are recognized as important wildlife movement corridors and various measures are proposed at these locations to facilitate wildlife movement through the corridor, which should further restrict human encroachment and the potential for development of the floodplain.

The impacts at South Fork Cut Bank Creek are both transverse and longitudinal (parallel) floodplain encroachments. The transverse impact is required at the creek crossing for the new bridge and is unavoidable. Road widening would result in longitudinal encroachments on the floodplain.

The Duck Lake Road option would require a longitudinal floodplain encroachment at Cut Bank Creek to accommodate a proposed parking area. The location of the parking area was considered in coordination with local Tribal representatives. The site was selected based on site constraints and to maximize safety by limiting pedestrian traffic along the roadway. The parking area is proposed to provide recreational access to the stream and is not considered to be an incompatible development; nor is it expected to support additional development in the floodplain.

None of the transverse encroachments would adversely impact the floodplains where bridges and culverts are required, provided that the structures are sized during final design such that the structures provide the minimum required 0.3-meter (1.0-foot) clearance above the 100-year flood elevation to the low beam elevation.

At South Fork Cut Bank Creek, additional opportunities to avoid the longitudinal encroachment will be sought during final design. However, the road is constricted by the creek and a steep, cut slope at the location of the longitudinal encroachment and the impacts on the floodplain may be unavoidable.

Under the Duck Lake Road option, the longitudinal floodplain encroachment at Cut Bank Creek would comply with Glacier County requirements for maximum allowable rise in floodplain elevation and the impacts would be minimal.

Water Resources

Direct Effects

Erosion of soil on bridge approaches and road shoulders would continue under the no-build alternative. Existing undersized culverts and bridges would continue to contribute to localized flooding. The overall impervious roadway surface area would not be increased under the no-build alternative; therefore, no increases in runoff rates and volumes would be expected under this alternative.

Bridges would be inspected periodically as an element of the Montana Department of Transportation bridge inspection program and bridge maintenance and improvement projects would also be completed in the future as necessary. Construction activities related to these bridge structural projects include continued maintenance and localized rebuilding of the existing roadbed, in addition to spot safety-improvements, would likely result in the temporary introduction of eroded sediment into surface waters when these activities are conducted near surface waters.

The no-build alternative would not cause post-construction change to water quality. Vehicles traveling on US 89 would continue to deposit substances such as grease, oil, and other toxic fluids on the road and the roadway shoulders. These substances would be transported to surrounding drainages in stormwater runoff, and eventually into nearby streams and wetland areas. Roadside ditches would not be expanded or otherwise modified under this alternative, and therefore no improvement in surface water quality would be expected.

No adverse impacts on ground water would be expected under the no-build alternative because no new sources of pollutants flowing to ground water would be introduced. Construction for spot safety improvements or maintenance activities would predominantly occur on the existing roadway surface so potential ground water impacts would be minimized and would probably not result in alteration of ground water flow. Eroded sediment and toxic chemicals from road machinery could potentially be introduced into surrounding surface waters. However, any toxic chemicals or other pollutants introduced at sites where routine roadway maintenance and operations occurred, would likely attach to particulates that would be filtered by underlying soil prior to reaching ground water.

Ongoing noxious weed maintenance activities could result in soil erosion or chemical herbicide inputs into surrounding surface water.

Construction

Direct impacts due to construction, which would be similar under all of the action alternatives, would primarily affect surface waters rather than ground water.

Improvement of US 89 under Alternatives B and C would likely result in short-term impacts on surface water quality due to erosion associated with excavation and grading activities. Soil erosion could result in transport of sediment into nearby streams, resulting in increased stream turbidities and deposition of sediments in stream channels. Demolition of existing roadway sections would result in short-term surface water impacts due to the generation of dust and debris, which could also result in increased sediment loading where streams are adjacent to the roadway. Increased turbidity in surface waters would reduce light penetration in the water column and potentially reduce the productivity of streams. Sediment deposition could eliminate fish spawning areas and smother fish eggs.

Improvement of US 89 under Alternatives B and C would also likely require the replacement or extension of culverts in unnamed drainages and canal crossings.

Under Alternatives B and C, widening of the roadway and bridge replacement and rehabilitation could result in sloughing of stream bank soils if adequate slope protection measures and drainage controls are not implemented during construction.

Most of the proposed alignment shifts under Alternative B are minor and would have little or no direct impact on surface waters. However, at Lake Creek (reference post 12), the existing roadway centerline would be shifted approximately 30 meters (100 feet) northward. The extent of earthwork required at this location would be substantially greater than that required under the no-build alternative. Alternative C would likely result in a slightly greater total volume of disturbed soil susceptible to erosion and potentially transported to surrounding surface waters compared to Alternative B.

Selection of the Duck Lake Road Option would require five road improvements to make the road a suitable alternative route for commercial truck traffic. All five improvements would result in temporary construction-related impacts, similar to those discussed above for the two proposed action alternatives. The impacts that would result from the five improvements are described below.

1. Realignment of Duck Lake Road at its intersection with US 89 in improvement area 3 would require earthwork (Figure 8). As discussed previously, earthwork would disturb soil at the construction site, facilitating the erosion process. Wind and water may carry the disturbed material off site, which could add to sediment loading of nearby surface waters. Harmful substances could be leaked by construction equipment and attach to the particulates that may be introduced into surface waters, but the likelihood is minor.

2. Construction of a chain-up area on Duck Lake Road in improvement area 3 would result in the same short-term construction-related impacts described above. In the long-term, the chain-up area, if paved, would increase the impervious surface and would increase the volume of surface water runoff at the site. An increase in runoff could result in increased erosion downstream of the roadway. Incorporation of proper drainage measures would be required as part of the site design to accommodate the increased runoff.

3. Reconstructing approximately 10 kilometers (6 miles) of Duck Lake Road in improvement area 3 would also require demolition and earthwork. Erosion and sediment loading impacts may occur, as discussed in item 1 above.

4. Increasing the radius and slope of the curve in improvement area 2 on Duck Lake Road (Figure 7) would result in additional earthwork and greater total pavement area, with similar localized impacts as described in items 1 and 2 above.

5. Adding an off-road parking area near the Cut Bank Creek bridge in improvement area 1 (Figure 4) would result in impacts similar to those described in item 1 above. In addition, the parking area could result in long-term adverse impacts on Cut Bank Creek related to stormwater runoff. However, the parking area would be sloped away from the stream so that runoff would flow southeast through an area of dense vegetation, reducing runoff to the stream.

Operation and maintenance of heavy equipment under all of the action alternatives could result in accidental spills or leaks of toxic construction products and heavy equipment fluids, such as grease, oil, and solvents. These spills or leaks of toxic chemicals could contaminate soils that when disturbed, could carry contaminants to streams or other offsite locations if effective control measures are not implemented. Introduction of contaminants to streams and wetlands could cause toxicity problems for fish and other aquatic organisms inhabiting those waters.

Construction activities under any of the action alternatives are not expected to adversely impact ground water, since most of the excavation that would be required would be of short duration and would not substantially alter ground water flows. The possibility of contaminants from heavy machinery leaching into the soil at the construction site exists but is minor. Unless a major pollutant spill were to occur, the soil beneath the construction site would filter out most pollutants of concern before they would reach ground water. Contaminated soil materials discovered during construction would require appropriate handling and disposal measures.

Mitigation measures to control construction-related erosion and to reduce the risk of soil contamination by toxic substances from heavy equipment and from accidental spills would likely minimize adverse, short-term pollution impacts on receiving waters. Those measures are discussed later in this section.

Post-construction

Under Alternatives B and C, the proposed realignment at one location (reference post 12) would result in a change in the location where US 89 crosses a stream, the Lake Creek crossing. New stormwater outfalls (i.e., drainpipe or ditch discharge points) at this location would have localized effects on streamflow rates and water quality, and could result in long-term erosion of channel bank areas if not designed and maintained appropriately.

The most prevalent type of surface water impact that would result under the action alternatives would be from increases in the overall road width along the project corridor. The greater road width would result in greater amounts of surface runoff conveyed to streams and wetlands, and would provide a larger paved surface for collection of pollutants that are available for transport in stormwater runoff. Increased rates and volumes of stormwater runoff could cause increased erosion in ditches and small streams, and could induce localized flooding in drainage conveyance systems if design measures are not implemented adequately to offset those flows.

The road footprint proposed under Alternative C is approximately 10 percent greater than that proposed under Alternative B. Thus, the total impervious (paved) surface would be slightly greater under this alternative, and slightly greater volumes of runoff from the roadway would enter surrounding surface water. The potential for adverse surface water impacts would be the greatest under this alternative due to the larger amounts of runoff generated. Under the Duck Lake Road Option, post-construction impacts on water quality would primarily be associated with increased stormwater runoff to wetlands and streams from more extensive impervious surface areas. These adverse impacts on receiving waters are expected to be minor, however.

Flat-bottomed ditches measuring 3 meters (10 feet) wide would be used along the roadway under the action alternatives, although V-shaped ditches would be used where necessary. Flat-bottomed ditches are designed to act as snow storage areas during winter months, and they are expected to be easy to maintain.

During the warmer months of the year, improved ditches would increase conveyance efficiency of runoff to desired locations, potentially inducing high flow damage at the discharge points. Most importantly, however, new ditches would be designed for ease of maintenance and to prevent erosion, and that would likely result in less debris, pollutants, and sediment entering sensitive areas.

No impacts on ground water are expected under any of the action alternatives. As discussed under the no-build alternative, toxic substances in roadway runoff would either be discharged to surface waters or would likely attach to particulates and be filtered by underlying soil before reaching ground water.

Indirect Effects

If material source sites were located within an active channel or floodplain area, it would present additional indirect impacts for water resources (both water quality and quantity). Gravel removal in floodplains not only can alter the quantity of gravel within a river system, but can also affect gravel transport and deposition processes, alter flow conditions and habitat (surface and subsurface), and introduce petroleum based contaminants and fine sediments into a river system as a result of machinery working within or in close proximity to water resources or sediment laden run-off. Material extraction may cause lowering of alluvial water tables, channel destabilization and widening, and loss of aquatic and riparian habitat (Kondolf 2002).

Long-term road maintenance activities necessary to maintain the newly reconstructed US 89 have the potential to indirectly affect water quality through herbicide spraying for weed control, mowing, snow-removal and sanding, and use of chemicals to remove or prevent ice formation.

Herbicide spraying for weed control may result in the introduction of chemicals or herbicides to surface waters. The impact of the herbicide on water quality would depend on the type of herbicide and the amount reaching the channel. Once in the aquatic environment, pesticides may undergo transformation through photochemical and chemical reactions (i.e., hydrolysis, oxidation, and reduction) thus becoming more or less toxic (Rand and Petrocelli 1985). Herbicide application would be conducted in accordance with EPA safety sheets and manufacturers' recommendations. If used at the recommended rates and in the appropriate areas, herbicides are expected to have minimal effects on water quality.

Water quality may be affected if stormwater runoff contains contaminants found in de-icers, such as magnesium chloride. The potential impact would depend on the rate of application, the amount of increase in impervious surface under each alternative, effectiveness of infiltration, and filtration in roadside ditches. A widened roadway would also require slightly more sanding in the winter months to maintain safe, drivable roads. Increased sanding could result in increased sedimentation to streams in the project corridor.

The proposed new ditches would reduce the potential effects of increased sanding and pollution from stormwater runoff because runoff would be directed to ditches where sediments and pollutants would settle out before entering nearby streams and wetlands. Further, the ditches are designed for ease of maintenance and to prevent erosion, and that would likely result in less debris, pollutants, and sediment entering sensitive areas.

Mitigation

No mitigation measures are proposed for the no-build alternative.

In order to comply with the requirements of the Clean Water Act, the Montana Department of Transportation and the contractor will obtain authorization from the U.S. EPA for a National Pollutant Discharge Elimination System (NPDES) permit for the action alternatives. This permit is required to prevent a violation of water quality standards and requires the completion of a stormwater pollution prevention plan. The stormwater pollution prevention plan requires a description of BMPs and stormwater management controls appropriate for the construction site including measures to reduce soil erosion, reduce site sediment loss, and manage some of the more common construction-generated wastes and construction-related toxic materials. Appropriate BMPs for the project site will be selected from the current version of *Erosion and Sediment Control Best Management Practices: Field Manual*, prepared for Montana Department of Transportation.

In accordance with MDT's standard specifications, the contractor would be required to secure the necessary permits associated with material source sites, including those permits required to prevent a violation of water quality standards.

New stormwater outfalls associated with new or reconfigured surface drainage systems will be designed to prevent erosion over the long term, accounting for increased flow rates from the roadway.

In addition, under the Duck Lake Road Option, as appropriate, the off-road parking area at Cut Bank Creek will be sloped so that runoff flows southeast, away from the stream. As a result, runoff will move to an area of heavier vegetation and higher filtering capacity, thereby reducing runoff to the stream.

Air Quality

Direct Effects

Background traffic volumes on US 89 and Duck Lake Road are projected to increase under the no-build alternative, as discussed in the Transportation section of this chapter. Future levels of criteria pollutants from highway traffic and maintenance would not be expected to exceed any of the national ambient air quality standards (NAAQS) due to the low background concentrations of criteria pollutants in the project area's rural location. No long-term air quality impacts would be expected under the no-build alternative.

Particulate emissions are of potential concern due to the close proximity of the Class I airshed in Glacier National Park. Particulate emissions from paved roads are the result of exhaust from vehicles and resuspension of loose materials on the road surface (U.S. EPA 1995). The average PM_{10} emissions from the entire section of US 89 between Browning and Hudson Bay Divide under normal conditions at existing traffic volumes would be conservatively estimated[1] at 67 kilograms (147 pounds) of PM_{10} per day. At traffic volumes projected for 2025, average PM_{10} emissions[1] would increase to approximately 114 kilograms (251 pounds) of PM_{10} per day.

Future levels of criteria pollutants from highway traffic and maintenance would not be expected to exceed any NAAQS due to the low background concentrations of criteria pollutants in the project area's rural location and low traffic volumes expected.

Ongoing maintenance activities and roadway improvements (bridge and road surface or prism improvements and maintenance, weed control and clear zone maintenance) may require the use of heavy machinery during construction, which will generate fugitive dust and emissions-related impacts to air quality.

In general, air quality impacts under the no-build alternative would be less than the impacts under the remaining alternatives due to the absence of the construction activities associated with the remaining alternatives. No substantial air quality impacts would be expected under the no-build alternative.

Construction

Widening US 89 to 9.8 meters (32 feet) or to 11 meters (36 feet) and constructing the associated improvements on Duck Lake Road would have an impact on air quality in several ways, including fugitive dust emissions from project construction and emissions from the internal combustion engines of construction equipment. Roadway construction has the potential to generate fugitive dust emissions during land clearing, drilling and blasting, ground excavation, earth moving, and other construction processes. A large fraction of fugitive dust emissions at construction sites is generated by equipment traffic over temporary roads (U.S. EPA 1995). Equipment used for roadway construction also produces pollutants that could have an impact on air quality. Pollutants from equipment consist primarily of byproducts from fuel combustion and include carbon monoxide, hydrocarbons, nitrogen and sulfur oxides, and particulate matter. Roadway construction would also cause temporary traffic congestion, resulting in increased concentrations of carbon monoxide, hydrocarbons, nitrogen oxides, and sulfur oxide, and particulate matter.

[1] PM_{10} emission calculations are based on the assumption of an average vehicle weight of 6,000 pounds and factors provided in AP-42 (U.S. EPA 1995).

Fugitive dust emissions that would be generated under Alternatives B and C and the Duck Lake Road Option were estimated using the AP-42 emission factor established by the U.S. EPA for heavy-duty construction operations. The emission factor is based on field measurements of total suspended particulate (TSP) concentrations during construction activities and is equivalent to 2.7 metric tons (2.9 tons) of TSP per hectare per month of construction activity. (Actual TSP emissions vary depending on specific site conditions.) The derivation of this factor assumes a 30-day work month; thus the estimate for TSP is conservatively high. In addition, by considering all TSP emissions to be PM_{10} emissions, the estimate is again conservatively high (U.S. EPA 1995).

Using this conservative emission factor and assuming all particulate matter is generated during an 8-hour workday, each acre of construction activity has the potential to produce an estimated 4.5 kilograms (10 pounds) of particulate matter per hour. Approximately 5 to 10 percent more particulate matter would be generated during construction for Alternative C because of the larger footprint of this alternative (10 percent). Emissions of criteria pollutants would be substantially less for the Duck Lake Road Option than for either Alternative B or C due to the smaller scale of the project. Exceeding the 24-hour average particulate matter NAAQS is not expected, nor would any short-term adverse impacts on air quality be expected during construction activities under Alternative B and C and the Duck Lake Road Option, especially if a standard dust monitoring and suppression program is implemented. In addition, dust generated by construction activities would not be expected to have an impact on the Glacier National Park Class I airshed, because prevailing winds during the summer construction season would tend to disperse the particulate matter to the north and east, away from the park.

Emissions from equipment typically used during road construction could be estimated using emission factors established by the U.S. EPA; however, emissions of this nature are typically not excessive and would not be expected to exceed any NAAQS. Any impacts from emissions of criteria pollutants from heavy machinery operation during roadway construction would be short term and would not interfere with attainment or maintenance of long-term air quality standards.

Under Alternatives B and C and the Duck Lake Road Option, highway traffic would experience some congestion and is expected to have potential wait times of up to 30 minutes, during which time many vehicles would be idling and producing emissions. Due to the relatively short delays, it is anticipated that no NAAQS would be exceeded. Any increases in pollutant levels would be temporary in nature and would not be expected to have any short-term or long-term impacts on air quality.

Some phases of construction would cause odors that could be detectable to people located at or near the construction site, particularly during any required paving operations using asphalt. Odors could also result from diesel-powered equipment. These odors are typically insubstantial in nature; no adverse construction-related air quality impacts would be expected to result from construction.

Adverse short-term air quality impacts under Alternatives B and C would be short-lived and would not exceed standards. Under the Duck Lake Road Option, particulate matter emissions from construction work, emissions from construction equipment, or emissions from congested highway traffic would not be expected to create any short-term impacts on air quality in the project area.

Post-construction

Long-term impacts on air quality under Alternatives B and C and the Duck Lake Road Option would not be expected, as particulate matter would be expected to return to background levels upon completion of construction activities.

Future levels of criteria pollutants due to highway traffic and maintenance would not be expected to exceed any NAAQS due to the low background concentrations of criteria pollutants in the project area's rural location.

The Duck Lake Road Option would result in increased traffic on Duck Lake Road by rerouting commercial truck traffic from US 89. The net long-term vehicle emissions in the project area would closely parallel the emissions projected for the background traffic increase discussed under the no-build alternative. Thus, no long-term adverse air quality impacts would be expected under this option.

No adverse post-construction air quality impacts would be expected under Alternatives B or C or the Duck Lake Road Option.

Indirect Effects

Under Alternatives B and C and the Duck Lake Road Option, development of material source sites for gravel extraction could result in indirect impacts on air quality. Traffic to and from material sources sites, in addition to the heavy machinery required to extract materials, will have fugitive dust and emissions impacts similar to those described for direct construction-related impacts.

Mitigation

No mitigation measures are proposed under the no-build alternative.

Because no adverse effects are expected under the action alternatives, no mitigation is required. Controlling and minimizing offsite tracking of sediments as required for the stormwater pollution prevention plan will help control dust produced by construction. Implementation of a traffic control plan as submitted by the contractor and approved by the Montana Department of Transportation will minimize prolonged periods of vehicle idling from traffic delays and will reduce emissions during construction.

No operational mitigation measures are required. Project-generated carbon monoxide concentrations near the areas with the highest potential for air quality problems will comply with established standards.

Noise

A preliminary noise screening for traffic noise for the US 89 improvement project was completed in accordance with the *Traffic Noise Analysis and Abatement: Policy and Procedure Manual* (MDT 2001b), and is presented in Appendix B. This screening concluded that a detailed noise analysis for the US 89 project was not required because noise levels from the proposed project would not differ materially from noise levels that would occur under the no-build alternative.

Direct Effects

Under the no-build alternative, noise levels along US 89 and Duck Lake Road will increase in the future as a result of the predicted increase in background traffic volumes.

On-going maintenance activities and roadway improvements (bridge and road surface or prism improvements and maintenance, weed control and clear zone maintenance) may require the use of heavy machinery, which will generate some noise-related impacts. In general, these noise impacts will be similar to those associated with construction activities and machinery, which are described in detail for the action alternatives below.

Construction

Construction noise sources for Alternatives B and C and the Duck Lake Road Option include earth-moving equipment, generators and compressors, trucks, and impact equipment. Construction noise would be temporary and limited to the duration of the project. The severity of noise impacts from construction would depend on the type, amount, and location of construction activities and the presence of noise-sensitive receptors. The U.S. EPA (1971) estimates that maximum noise levels from construction activities at 15 meters (50 feet) range from 69 to 106 decibels, and at 61.0 meters (200 feet) range from 57 to 94 decibels. Most residences along the corridor are greater than 15 meters (50 feet) from the roadway. The duration of construction is expected to be three or more construction seasons. Construction activity and resulting noise impacts at any particular location in the US 89 or Duck Lake Road corridors would be expected to occur for a period of several weeks to more than one month.

Post-construction

As described in the introduction to this section, the preliminary screening procedure determined that noise levels under Alternatives B and C and the Duck Lake Road Option would not differ materially from noise levels that would occur under the no-build alternative. Therefore, no adverse post-construction effects from increased noise levels would occur under the action alternatives.

Indirect Effects

On-going maintenance activities (bridge and road surface maintenance, weed control and clear zone maintenance) may require the use of heavy machinery, which will generate some noise-related impacts. In general, these noise impacts will be similar to those associated with construction activities and machinery, which are described in detail above. Operation of material source sites for gravel extraction could result in noise-related indirect impacts. While the material source sites for the proposed project have not been identified, these materials are normally extracted as near the project site as available. Traffic to and from material source sites, in addition to the heavy machinery required to extract materials, will have noise-related impacts similar to those described for direct construction-related impacts. If blasting is required for material extraction, noise-related impacts would be substantially greater (i.e. extending to a one-mile radius from the blasting site).

Mitigation Measures

Mitigation would not be applied under the no-build alternative. No mitigation measures for noise abatement are required for Alternative B, C, or the Duck Lake Road Option.

Biological Environment

Vegetation and Wildlife Habitat

Direct Effects

Under the no-build alternative, no construction-related direct impacts on vegetation and wildlife habitat are expected along the existing US 89 corridor or Duck Lake Road.

In its current condition, the existing US 89 roadway displaces some wildlife from habitats near the road corridor. Under the no-build alternative, this impact would remain, but no new areas of wildlife habitat would be disturbed or reduced in value. The existing US 89 road corridor does not provide alternatives for wildlife other than crossing over the road. In its current condition and at existing traffic volumes, it is presumed that most ungulate and medium- to large-sized mammal populations readily cross the road corridor although the existing corridor may impede wildlife movement or present a potential barrier for some smaller wildlife species in the project area.

Culverts are undersized or lacking at several locations along the existing US 89 roadway, limiting the natural hydrologic regime of streams and wetlands within the road corridor. Over time, these conditions could reduce the functions and values of these wetlands systems, which would affect their ability to provide wildlife habitat.

Under the no-build alternative, no long-term impacts on vegetation and wildlife habitat along Duck Lake Road are expected.

Construction

Direct impacts on wildlife and vegetation resulting from construction of Alternatives B and C would include:

- Disturbance of wetlands and wildlife habitat
- Temporary displacement of wildlife from the project corridor due to increased human activity
- Mortality of wildlife with limited mobility.

Noise, disturbance, and vegetation removal during construction would result in the displacement of wildlife within the project corridor and adjacent habitats. Vegetation clearing and grading may result in the mortality of wildlife with limited mobility, such as nestlings, snakes, or small mammals. Under Alternative B, an estimated 75 hectares (185 acres) would be temporarily disturbed by roadway construction, compared to an estimated 86 hectares (213 acres) under Alternative C. Revegetating these areas after construction would increase their value to wildlife, particularly insects, birds, and small mammals. Wildlife sensitive to human activity would temporarily avoid habitats near construction, but is expected to return once construction is complete as the rate of human presence and disturbance subsides. Over time, roadside areas would provide relatively dense low-growing vegetation due to increased runoff from paved surfaces. This vegetation growth attracts insects and nesting and insectivorous birds as well as hawks and owls that prey on small mammals. Roadside areas are of greatest value when they support native vegetation (Bennett 1991).

Direct impacts on vegetation and wildlife habitat resulting from construction along Duck Lake Road would be similar to those described for Alternatives B and C. However, the extent and duration of the effects on wildlife would be less because a shorter segment of roadway would be improved, requiring a shorter construction period. This option would result in the direct loss of approximately 18 hectares (45 acres) of wildlife habitat. This option would temporarily disturb an additional estimated 16 hectares (39 acres). Most of the temporary disturbance would affect grassland habitats that were disturbed by construction of the existing roadway and ongoing agricultural land use practices.

Project construction along the US 89 corridor would likely be conducted in several phases, with each phase completed before the next segment is started. Implementing construction in phases would minimize impacts on wildlife by allowing wildlife to continue to access habitats near the roadway that are not in the immediate construction area. Because beavers would be removed from systems adjacent to the corridor during construction, riparian wetlands that are currently formed by beaver activity may be temporarily drained.

Post-construction

Direct post-construction impacts on wildlife and vegetation resulting from Alternatives B and C would include the following adverse effects:

- Permanent loss of upland and wetland habitat as a result of roadway widening
- Loss of wetland functions and values
- Increased fragmentation of habitats along the roadway
- Reduced value of upland habitat and conversion of forested areas into disturbed grasslands.

Beneficial effects would include the following:

- Increased food availability along roadside areas where paved roadways result in increased moisture and lush vegetation growth
- Improved hydrologic connections in wetland systems where culverts are currently lacking or undersized.

Alternative B would result in an estimated loss of 55 hectares (135 acres) of wildlife habitat in the project corridor, and Alternative C would result in slightly more area lost, approximately 59 hectares (146 acres). In the long term, loss of this habitat would result in the permanent displacement of some wildlife from these areas. Some wildlife species are more tolerant of human activity and would return to the habitats adjacent to the road corridor within the right-of-way after construction is complete, including small mammals, snakes, and birds.

Most of the habitat lost due to roadway widening consists of grasslands. Most grassland habitats in the project area are agricultural lands or disturbed areas adjacent to the roadway. While these areas provide important wildlife habitat, they support a lower diversity of wildlife than native, undisturbed grassland communities. Conifer and mixed forests represent a smaller percentage of the project area than grasslands or aspen grovelands, and therefore, only a small portion of the habitat loss would affect these habitat types. Mixed forest habitats are important as a transition zone between the lowland grasslands and the mountain conifer forests, allowing wildlife to access both habitat areas under the protection of cover. Grassland, shrubland, mixed forest, and conifer forest habitat types are neither unique nor limited within the project area and no substantial adverse impacts on wildlife are expected as a result of the loss of these habitats.

Because of the overall limited distribution of aspen groveland communities and the importance of this habitat to grizzly bears, loss of this habitat type has greater importance than loss of other habitat types in the project area. Alternatives B and C would not bisect large contiguous patches of groveland habitat, and most impacts would occur at the fringes of patches already affected by the existing roadway. Areas disturbed by construction but not covered by fill would likely recover once construction is complete. Segments of the existing roadway that currently bisect large patches of aspen grovelands and that would be abandoned will be reclaimed.

Loss of wetland habitat in the project area would affect numerous wildlife species. The majority of wetland impacts would affect riparian systems. Many of the culverts and bridges along the existing roadway corridor are undersized and restrict the natural meandering of the stream channels in the project corridor. At other sites, culverts are lacking, limiting hydrologic flow in wetlands and affecting wetland functions and values. While wetland habitat would be lost because of road widening, culverts and bridges would be added or replaced to improve hydrology, which ultimately would improve wetland functions and values at these sites. During the final design stage, culverts would be sized to accommodate natural streamflow fluctuations and enhance fish passage. Culverts immediately north of Kiowa on Lake Creek (reference post 12) would be replaced with a bridge. Because hydrologic conditions would be improved and mitigation would be implemented to compensate for wetland acreage lost, no substantial adverse impacts on wildlife using wetland habitats are expected.

The widened roadway would contribute to the fragmentation of habitat within the project area. While this condition already exists along the road corridor, the magnitude of this impact would be slightly greater with a wider road because a larger amount of habitat would be affected. Alternative C would result in a slightly greater magnitude of impact on habitat fragmentation and wildlife crossing difficulty compared to Alternative B, because the wider road surface and adjacent vegetation clearing would disturb approximately 10 percent more area than Alternative B.

In addition, road widening and roadside vegetation removal would incrementally increase the difficulty for wildlife crossing the roadway. Currently, the portion of US 89 between Browning (reference post 0) and the vicinity of Kiowa (reference post 12) traverses open grasslands, and the roadside corridor contains drainage ditches and clear zones. (A clear zone is the area beyond the edge of the lane where out-of-control vehicles can recover and return to the road or travel to the bottom of the road embankment.) Because of the habitat types present, this portion of the US 89 project area supports fewer ungulate and medium- to large-sized mammal populations, with the exception of the portion of roadway between reference posts 10 and 11, which is a known moose and grizzly bear crossing area. The open nature of the road corridor in this portion of US 89 is likely a barrier to some small mammals. The widened roadway may deter additional wildlife species or individuals from crossing the corridor. For this portion of the roadway, this impact is probably greatest for small mammals in upland habitats and wildlife in wetland systems that are divided by a road surface (Bennett 1991).

The portion of US 89 between Kiowa (reference post 12) and Hudson Bay Divide (reference post 25.5) traverses numerous riparian systems, aspen grovelands, and mixed and conifer forests. The roadside corridor is narrow, has few ditches, and supports dense vegetation growth immediately adjacent to the roadway. This condition facilitates crossing by wildlife, particularly large carnivores, because they can securely move between habitat types. Under Alternatives B and C, the entire roadway length would have a clear zone and drainage ditches on the cut slope side of the road, resulting in a wider and more open road corridor. (Cut slopes are located on the uphill side of the roadway and fill slopes are located on the downhill side.) The width of the cleared area would vary depending on the ditch configuration selected for a particular portion of the roadway. The road corridor between reference posts 12 and 25.5 currently averages about 10 meters (35 feet) in width. After construction, the corridor would average a minimum of 20 to 24 meters (65 to 80 feet) in width, including shoulders and clear zones.

While the portion of US 89 between reference posts 12 and 25.5 in its existing condition may be a barrier to smaller mammals, the widened roadway may deter additional wildlife species or individuals from crossing the corridor because of the greater distance wildlife must travel without the benefit of cover. Fencing installed along the right-of-way boundary may also deter wildlife from crossing the roadway if it is constructed of woven wire. Barbed wire fence would not deter wildlife. Clearance between habitats on either side of road may be a key factor inhibiting movement by wildlife (Oxley et al. 1974). The widened roadway and the reduction of roadside vegetation would incrementally increase the difficulty for all wildlife populations crossing the roadway.

Wildlife mortality rates associated with vehicle collisions were not identified as an issue of concern during the public scoping process for this proposed project. This is likely due to the relatively low collision rates reported in the project area. Wildlife/vehicle collisions are influenced by a number of factors, including road design, travel speeds, population size, time of day, time of year, and habitat characteristics adjacent to the highway (Gunther et al. 1998).

Roads designed to maintain sinuosity and keep vehicle speeds at 70 kilometers per hour (45 miles per hour) or slower may aid in reducing the frequency of wildlife killed by collisions with vehicles (Gunther et al. 1998). While widening the US 89 project corridor between reference posts 12 and 25.5 would smooth some curves, the 70-kilometer-per-hour (45-miles-per-hour) travel speed and some sinuosity would be maintained. These design factors and improved sight distances may help to maintain the low levels of wildlife-vehicular collisions reported for the project corridor. One area of concern is the vicinity of reference post 21. The elimination of a series of sharp curves between reference post 20 and 21 is likely to result in increased travel speeds in this localized portion of the corridor. This area is also highly used by a variety of wildlife. Based on the results of research in other locations where road improvements have been completed (Gunther 2003 personal communication), increased travel speeds at this location may lead to an increase in wildlife/vehicle collisions.

The character of post-construction impacts on vegetation and wildlife habitat resulting from construction along Duck Lake Road would be similar to that described for Alternatives B and C. However, the extent and duration of the effects on wildlife would be less because fewer realignments are proposed, a shorter segment of roadway would be improved, and the habitat is of lesser value (pertaining to biological complexity and diversity) than the habitat found in the US 89 project corridor. This option would result in the direct loss of approximately 18 hectares (45 acres) of wildlife habitat. Most of the habitat loss would affect grassland habitats that were disturbed by construction of the existing roadway and ongoing agricultural land use practices. Some aspen grovelands would be affected, but disturbance would occur at the fringes of patches already affected by the existing roadway. Improvements to Duck Lake Road would have a lesser magnitude of impact on habitat fragmentation and wildlife crossing difficulty than the US 89 alternatives. This is attributed to several factors, including the lesser value of the habitat within this corridor, the lack of cover along the existing road corridor, and the nature of the improvements, which include only a minor widening of the road surface.

Indirect Effects

Exposed soils, particularly in road corridors, are susceptible to colonization by noxious weeds. Noxious weeds are nonnative species whose introduction causes economic or environmental harm. Noxious weeds of particular concern in the project area are Canada thistle (*Cirsium arevense*), houndstongue (*Cynoglossum* sp.), foxtail (*Alopecurus* sp.), and spotted knapweed (*Centaurea maculosa*) (Cooper 2000 personal communication; Johnson 2000 personal communication; Weatherwax 2002 personal communication).

Noxious weeds spread from road corridors onto adjacent lands and can result in land devaluation and loss of productivity, added operational costs, and additional loss of native habitats. In the presence of flowing water, weed seeds can be transported over great distances, resulting in additional risk to landowners downstream. Of additional concern relative to aspen grovelands that would be disturbed during construction or abandoned and reclaimed is the potential for invasion by noxious weeds that displace native, beneficial forage species for grizzly bears. The proposed revegetation plan, described in the mitigation section that follows, would minimize the risk of invasion of these habitats by noxious weeds.

Development of material source sites would result in additional impacts on wildlife habitat and vegetation communities in the project area.

Mitigation Measures

No mitigation measures are proposed for the no-build alternative.

Construction

Best management practices aimed at minimizing impacts on wildlife and vegetation during construction of Alternatives B and C and the Duck Lake Road Option consist of the following:

- Clearly mark the limits of clearing to minimize intrusion into surrounding habitats.
- Minimize the size of staging areas.
- Locate staging areas in grassland habitats or previously disturbed areas.
- Stabilize exposed soils in accordance with the Montana Department of Transportation Standard Specifications using a temporary seed or erosion seed mix, as appropriate (the Montana Department of Transportation botanist, in consultation with the Blackfeet Nation, will approve the seed mixes).

Control of noxious weeds will occur during construction. During construction, proper grading, topsoil treatment, seed mix selection, and seeding operations will be employed to establish a vigorous, competitive, desirable plant species composition. A Montana Department of Transportation staff botanist will conduct a site visit and prepare a site-specific revegetation plan. This plan will include provisions for a temporary or erosion control seed mix used during construction as well as provisions for post-construction revegetation of the disturbed road corridor.

Four locations in the US 89 project corridor have been identified as important crossing areas for bears and ungulates. These sites occur in riparian areas containing dense vegetation on both sides of the roadway along US 89 at reference post 10 to 11, reference post 12, reference post 17, and reference post 21. Riparian areas that are bridged can provide an effective opportunity to modify proposed vehicle bridges as crossing structures to facilitate wildlife use. Each wildlife crossing area in the corridor was examined in the field and discussed at an Interdisciplinary Team meeting on December 7, 2000 with representatives of the Blackfeet Fish and Wildlife Department, Montana Department of Transportation biologists, USFWS biologists, the Corps of Engineers, and consulting highway design engineers.

Ideally, at identified wildlife crossing locations, existing or proposed road structures will be replaced and modified to facilitate wildlife crossing underneath. Typically this involves constructing a structure with a minimum height of 3 to 4 meters (9 to 13 feet), an average length of 30 meters (100 feet), and the narrowest width feasible. These measurements are required to allow dry land passage underneath the structure. Cover, visibility, and light are other important considerations (Jackson and Griffin 1998).

A new highway bridge would be constructed at reference post 13 at main stem South Fork Cut Bank Creek (Figure 5). This structure will be enlarged from a 9-meter (30-foot) opening to a wider opening, to provide a narrow area of dry land passage underneath the bridge during most months of the year. Wildlife fencing may be incorporated to funnel wildlife toward the crossing area.

The realignment proposed at reference post 12, Lake Creek (Figure 5), provides the best opportunity in the project corridor to facilitate wildlife crossing by installing a modified highway bridge for passage underneath. The project design engineers will continue to involve staff biologists in the design and configuration of the highway bridge at this location to enhance its attractiveness as a crossing location for wildlife. Along with structure design, a revegetation plan will be implemented at this site to provide additional crossing cover, and wildlife fencing may be incorporated to funnel wildlife through the crossing.

At reference post 17, the North Fork Cut Bank Creek crossing (Figure 5), the existing structure was constructed within the last 10 years in conjunction with improvements to the US 89 intersection with Starr School Road and therefore does not require replacement at this time. In order to improve this structure for wildlife crossing purposes, shrubs and trees will be planted along the banks of the river at the location of the bridge to enhance the vegetative cover at this site.

An extended bridge length to facilitate wildlife passage underneath the roadway was considered at reference post 21, the South Fork Milk River, south branch (Figure 5); however, this historic bridge would likely be retained and widened. A new, extended bridge was also considered at the tributary to South Fork Cut Bank Creek (reference post 11.3); however, a bridge was determined to be unwarranted at this location (Figure 5).

For the tributary to South Fork Cut Bank Creek (reference post 11.3), South Fork Cut Bank Creek (reference post 13), and South Fork Milk River, south branch (reference post 21), the following measures will be implemented to retain the natural conditions that currently facilitate wildlife crossing:

- Construction plans will specify that clearing and grubbing are limited to the minimum area necessary beyond the construction limits (not the right-of-way limits), and that any temporary clearing necessary for culvert or utility line installation or similar activities outside the construction limits but within the right-of-way will be kept to the smallest area possible, to be reclaimed following construction. At a minimum, this measure will be applied at the following approximate locations along the proposed corridor: reference posts 10 to 11.5, reference posts 12.5 to 13, and reference posts 19.5 to 22.

- As appropriate, construction plans will specify that contractor stockpiles of topsoil must be contained within the construction limits and may not be stored at environmentally sensitive areas. Locations where this measure will be implemented will be specified in the special provisions for this project and will include cultural sites and high quality wetlands. (Special provisions are modifications to the Standard and Supplemental Specifications applicable to an individual project.)

- V-shaped ditches will be included in areas where there is a lack of right-of-way or there is a need to avoid sensitive areas or more extensive earthwork. Additionally, this measure will be applied at the following approximate locations along the proposed corridor in order to minimize vegetation disturbance: reference posts 10 to 11.5, reference posts 12.5 to 13, and reference posts 19.5 to 22.

- Onsite visits will be conducted by Montana Department of Transportation botanists and biologists, in consultation with the Blackfeet Nation, to develop appropriate post-construction revegetation plans to enhance the vegetative cover at these crossing sites after construction is complete. At a minimum, this measure will be applied at the following approximate locations along the proposed corridor: reference posts 10 to 11.5, reference posts 12.5 to 13, and reference posts 19.5 to 22.

In addition to the sites agreed upon at the December 7, 2000 meeting, wildlife crossing structures and associated fencing would be considered at the following locations during the final design process:

- The deep ravine at reference post 18.6 could be converted to a wildlife crossing through the installation of a large concrete culvert. While there is little evidence this site is currently used, it connects forest habitat types and extensive riparian areas (Figure 5).

- In the upland area adjacent to the stream crossing at reference post 21.7, the South Fork Milk River, middle branch, an enlarged concrete culvert could be installed (Figure 6). (This additional dry culvert would be needed because the culvert at the stream crossing is likely to be flooded during most times of the year).

The following are additional mitigation measures proposed to minimize vegetation disturbance and impacts on wildlife:

- Avoid locating scenic pullouts, turnouts, and access roads in wetland and aspen groveland habitat.
- Modify the recommended fill slope beyond clear zones in Category I wetlands from a 6:1 slope to a steeper slope where practicable and feasible. During final design the proposed locations for steepened slopes will be further investigated to determine if the proposed preliminary design is practicable and feasible. If, during final design there are areas that slopes can be safely steepened, they would be incorporated into the proposed project plans.
- Revegetate clearing limits, material source sites, and storage and staging sites with species that benefit wildlife.
- Implement the V-shaped ditch in areas where there is a lack of right-of-way or there is a need to avoid sensitive areas within the portion of roadway between Kiowa and Hudson Bay Divide as a means of minimizing vegetation disturbance.

Post-construction

The following mitigation measures are proposed to minimize post-construction direct, indirect, and cumulative impacts on wildlife and vegetation in the project area under Alternatives B and C.

Control of noxious weeds will continue after construction is completed. See a more detailed description of these activities in the Mitigation Measures, Construction section above.

Segments of the existing roadway that currently bisect large patches of aspen grovelands and that would be abandoned will be reclaimed. These areas occur at approximately reference posts 14 and 15 and require detailed restoration plans including soil treatment, planting specifications, if needed, and fencing provisions. Aspen grovelands disturbed by construction but not covered by fill also would likely recover once construction is complete. Threats to species composition in aspen grovelands from invasion by noxious weeds will be mitigated in a manner similar to that described in the preceding paragraph. Grovelands have natural tension zones of expansion and retraction affected by climatic conditions, soil moisture content, and grazing. Fencing domestic livestock out of the right-of-way through the project corridor may result in the natural expansion of some of these stands.

No post-construction mitigation measures are proposed for the Duck Lake Road corridor. Wildlife movement areas were not discussed in this corridor because only a minor increase in roadway width is proposed, wildlife crossings are less frequent in this corridor compared to US 89, and traffic volumes are not expected to increase any more than the anticipated natural growth of traffic. While no mitigation measures were agreed upon for this corridor, the following recommendation should be considered: In the deep ravine at reference post DLR-33.5, an enlarged culvert could be installed. There are numerous wildlife tracks at this site indicating that animals regularly cross at this location. This corridor connects extensive forest and riparian habitat types with the Saint Mary River.

Wetlands

Direct Effects

No direct impacts on wetlands are expected under the no-build alternative.

In its current condition, the existing US 89 roadway bisects numerous wetlands throughout the project area. Culverts are undersized or lacking at several locations along the existing US 89 roadway, limiting the natural hydrologic regime of streams and wetlands within the road corridor. Over time, these conditions can reduce the functions and values of these wetlands systems, which would affect their ability to provide wildlife habitat, groundwater recharge functions, flood storage area, and sediment filtration functions. Under the no-build alternative, this impact would remain, but no new areas of wetlands habitat would be disturbed.

Under the no-build alternative, inadequate hydrologic connections at Wetland 52A would remain but no new areas of wetland habitat would be disturbed along Duck Lake Road.

Construction

Direct impacts on wetlands resulting from construction of Alternatives B and C and the Duck Lake Road Option would be similar, but impacts under Alternative C would be more extensive due to the larger area of construction. Direct impacts on wetlands resulting from construction would include placement of temporary fill for construction access, temporary vegetation clearing, displacement of wildlife, and temporary increases in sedimentation to wetlands. The magnitude of these impacts varies with the type of wetlands affected, the amount of clearing and disturbance, the type of vegetation affected, and the length of the construction period. Therefore, impacts are difficult to quantify for each wetland in the project corridor. For example, cleared herbaceous plant species would recover shortly after construction is complete. Shrub or tree species removed during construction would take longer to return. The greater the area of a clearing, the longer it may require to recover. A long construction period results in greater disturbance to wildlife and a greater risk of increased sedimentation to the wetland than a shorter one. However, the magnitude of these impacts can be greatly reduced through the implementation of BMPs.

Post-construction

Wetlands in the project area that would experience post-construction impacts from Alternatives B and C and the Duck Lake Road Option are identified in Table 19. Table 19 also identifies the wetland group, state classification, and affected area. Table 20 identifies the estimated wetland impact area for Alternatives B and C and the Duck Lake Road Option by wetland group and state rating category.

Table 19. Estimated areas in hectare (acres) of post-construction wetland impacts in the US 89 project area.

US 89 Project Area				
			Affected Area hectares (acres)	
Wetland	Wetland Group	State Classification	Alternative B	Alternative C
1	Large riverine (upper perennial)	I	0.1 (0.3)	0.2 (0.4)
2	Slope	II	0.1 (0.3)	0.1 (0.3)
3	Large riverine (upper perennial)	I	0.5 (1.2)	0.5 (1.2)
4	Large riverine (upper perennial)	I	1.2 (2.9)	1.2 (3.0)
5	Slope	III	0.2 (0.6)	0.2 (0.6)
6	Depressional (closed) [b]	III	<0.1 (<0.1)	<0.1 (<0.1)
7	Depressional (ground water)	III	0.0	0.0
8	Depressional (open)	III	<0.1 (0.1)	<0.1 (0.1)
9	Depressional (closed) [b]	III	0.0	0.0
10	Depressional (closed) [b]	III	0.0	<0.1 (<0.1)
11	Depressional (closed) [b]	III	<0.1 (0.1)	<0.1 (0.1)
12	Depressional (closed) [b]	III	0.0	0.0
13	Depressional (closed) [b]	III	0.1 (0.2)	0.1 (0.2)
14	Depressional (closed) [b]	III	0.0	0.0
15	Depressional (closed) [b]	III	0.0	0.0
16	Depressional (closed) [b]	III	<0.1 (0.1)	<0.1 (0.1)
17	Large riverine (upper perennial)	I	1.0 (2.6)	1.4 (3.6)
18	Large riverine (upper perennial)	I	0.4 (0.9)	0.5 (1.2)
19	Depressional (closed) [b]	III	0.0	0.0
20	Slope	III	0.3 (0.8)	0.4 (0.9)
21	Large riverine (upper perennial)	I	0.1 (0.3)	0.2 (0.4)
22	Slope	II	<0.1 (0.1)	<0.1 (0.1)
23	Large riverine (upper perennial)	I	0.1 (0.2)	0.1 (0.2)
24A/B/C/D	Large riverine (lower perennial)	I	0.4 (1.0)	0.4 (1.0)
25	Small riverine (nonperennial)	III	0.2 (0.4)	0.2 (0.4)
26	Small riverine (upper perennial)	III	0.3 (0.8)	0.3 (0.8)
27	Depressional (open)	III	<0.1 (0.1)	<0.1 (0.1)
28	Small riverine (upper perennial)	III	0. 0	0.0
29	Depressional (closed) [b]	III	<0.1 (<0.1)	<0.1 (<0.1)
30	Depressional (closed) [b]	III	0.0	0.0
31	Depressional (closed) [b]	III	0.0	0.0
32	Depressional (closed) [b]	III	<0.1 (0.1)	<0.1 (0.1)
33	Depressional (closed) [b]	III	0.0	0.0
34	Depressional (closed) [b]	III	0.0	0.0
35	Depressional (closed) [b]	III	<0.1 (<0.1)	<0.1 (<0.1)
36	Depressional (closed) [b]	III	<0.1 (0.1)	<0.1 (0.1)
37	Depressional (closed) [b]	III	0.0	0.0
38	Depressional (closed) [b]	III	0.0	0.0
39	Depressional (closed) [b]	III	0.0	0.0
40	Depressional (closed) [b]	III	0.0	0.0
41	Depressional (closed) [b]	III	0.0	0.0

Table 19 (continued). Estimated areas in hectares (acres) of post-construction wetland impacts in the US 89 project area.

US 89 Project Area				
			Affected Area hectares (acres)	
Wetland	Wetland Group	State Classification	Alternative B	Alternative C
42	Depressional (closed) [b]	III	0.0	0.0
43	Depressional (closed) [b]	III	0.0	0.0
44	Depressional (closed) [b]	III	0.0	0.0
45	Small riverine (upper perennial)	III	0.1 (0.2)	0.1 (0.2)
46A/B	Small riverine (upper perennial)	III	<0.1 (0.1)	<0.1 (0.1)
47	Depressional (open)	III	0.3 (0.8)	0.3 (0.8)
48A/B/C	Depressional (open)	III	0.7 (1.8)	0.8 (1.9)
		Total [a]	6.4 (16.1)	7.2 (17.9)

Duck Lake Road Project Area			
Wetland	Wetland Group	State Classification	Affected Area hectares (acres)
49	Large riverine (lower perennial)	I	0.2 (0.4)
50	Depressional (closed) [b]	III	0.0
51	Depressional (closed) [b]	III	0.0
52	Small riverine (upper perennial)	III	0.1 (0.2)
53	Small riverine (upper perennial)	III	0.4 (1.1)
54	Small riverine (nonperennial)	III	0.1 (0.2)
		Total [a]	0.8 (1.9)

[a] Differences in sums are due to rounding.
[b] This wetland group is regulated by the Blackfeet Nation but is subject to Corps of Engineers determination that these wetlands do not fall within their jurisdiction under Clean Water Act section 404. All other wetland groups are within the jurisdiction of the Corps under section 404.

Table 20. Estimated wetland impact area in hectares (acres) for each alternative by wetland group and state rating category.

	Alternative B hectares (acres)	Alternative C hectares (acres)	Duck Lake Road Option hectares (acres)
Wetland Group			
Large Riverine	3.8 (9.4)	4.5 (11.0)	0.2 (0.4)
Small Riverine	0.6 (1.5)	0.6 (1.5)	0.6 (1.5)
Slope	0.7 (1.8)	0.7 (1.9)	0.0
Depressional	1.3 (3.4)	1.4 (3.5)	0.0
Total [a]	6.4 (16.1)	7.2 (17.9)	0.8 (1.9)
State Rating			
Category I	3.8 (9.4)	4.5 (11.0)	0.2 (0.4)
Category II	0.1(0.4)	0.1(0.4)	0.0
Category III	2.5(6.3)	2.6(6.5)	0.6 (1.5)
Total [a]	6.4 (16.1)	7.2 (17.9)	0.8 (1.9)

[a] Differences in sums are due to rounding.

Alternative B would result in the loss of approximately 6.4 hectares (16.1 acres) of wetland habitat in the project corridor, Alternative C would result in the loss of approximately 7.2 hectares (17.9 acres) and the Duck Lake Road Option would result in the loss of approximately 0.8 hectares (1.9 acres). Placement of fill in wetlands causes a reduction in some functions and values such as wildlife habitat, flood storage capacity, and groundwater recharge capacity. The magnitude of this impact varies with the type of wetland affected, the amount of fill placed, the size of the overall wetland system, and the condition of the wetland system (disturbed or pristine). The following sections provide a brief qualitative and quantitative description of the effect of the widened roadway on each wetland group identified in the project area.

Large Riverine Systems

Large riverine system wetlands, also known as large riparian systems, provide numerous important functions in the US 89 project area. These systems constitute the greatest amount of wetland acreage in the project area and therefore would incur the greatest impacts of the wetland groups. Under Alternative B, approximately 3.8 hectares (9.4 acres) of large riverine wetlands would be affected. Under Alternative C, approximately 4.5 hectares (11.0 acres) would be affected. Under the Duck Lake Road Option, installation of a parking area would result in the loss of approximately 0.2 hectares (0.4 acres) of riparian wetlands associated with W49 and Cut Bank Creek (see Figure 4). Loss of these wetland habitats would result in a slight decrease in the function of these systems, primarily at the location of the impact. These systems are already affected by the existing road corridor, and for the most part, construction would maintain the existing alignments at these sites.

Roadway realignments are proposed at wetlands W17, W18, W21, and W23 (Figure 5). A slight realignment at W17 (South Fork Cut Bank Creek, reference post 13) is required to replace the existing bridge, which currently restricts the natural width of the stream. The realignment and proposed widening would require relocation of a portion of the stream channel. The natural meandering of the channel at this location is restricted by the proximity of the existing roadway and has been affected by fill placed to provide parking. At W18 (Lake Creek, reference post 12), the natural meandering of the stream is restricted by the alignment of the existing culverts. The proposed realignment at this location would include a bridged crossing and would result in an improvement over existing conditions. Realignments at W21 and W23 would relocate the roadway away from the wetlands and adjacent stream channel, resulting in improved conditions at these sites.

Small Riverine Systems

Primary functions of small riverine systems include general fish and aquatic habitat, sediment/nutrient/toxicant retention, ground water discharge and recharge, and production export and food chain support. Implementation of Alternatives B and C would result in the loss of approximately 0.6 hectares (1.5 acres) of wetland habitat in this group. Construction of the Duck Lake Road improvements would also result in the loss of approximately 0.6 hectares (1.5 acres) of wetland habitat in this group. Impacts on the functions of these systems under Alternatives B and C and the Duck Lake Road Option are expected to be localized at existing culverted crossings and would be minor when compared to the overall size of these riparian wetland systems.

Depressional Wetlands

Of the 31 depressional wetlands in the US 89 project corridor, 12 would be affected by Alternative B (W6, W8, W11, W13, W16, W27, W29, W32, W35, W36, W47, and W48). Alternative C would affect the same wetlands and would also have an impact on W10. Primary functions of depressional wetlands in the project area include migratory bird habitat and ground water discharge and recharge. The functions of these wetlands would be substantially decreased if one-third or more of the individual wetland is filled or excavated for the widened roadway. Under Alternative B the widened roadway would have an adverse impact on five of the 12 depressional wetlands and would have minor effects on the remaining seven depressional wetlands. Alternative B would result in the loss of approximately 1.3 hectares (3.4 acres) of wetland habitat in this group. Under Alternative C, five of the 13 depressional wetlands would be negatively affected by decreasing their size by more than one-third due to the proposed road widening. Alternative C would result in the loss of approximately 1.4 hectares (3.5 acres) of wetland habitat in this group. Two depressional wetlands (W50 and W51) were identified in the Duck Lake Road project area. Potential impacts on these systems would be avoided.

Slope Wetlands

Four of the project wetlands are included in this group. Alternative B would result in the loss of approximately 0.7 hectares (1.8 acres) of wetland habitat in this group. Alternative C would result in the loss of approximately 0.7 hectares (1.9 acres) of wetland habitat in this group. The primary functions lost due to impacts on these systems include loss of secondary habitat for threatened and endangered species and loss of general wildlife habitat. Fill associated with roadway widening in W2 and W22 would have minor effects on these systems due to their large size and the location of the impact near the fringes of the existing roadway. Nearly half of W5 would be lost under Alternative B. Road widening would fill the edges of W20. Impacts on slope wetlands under Alternative C would result in a slightly greater amount of disturbance to these systems than for Alternative B. No impacts on slope wetlands would occur under the Duck Lake Road Option.

Indirect Effects

Indirect effects on wetlands under Alternatives B and C and the Duck Lake Road Option may occur if material source sites or access roads to the sites are located in wetlands. Wetlands temporarily disturbed by construction may also be susceptible to colonization by noxious weeds or ongoing noxious weed control efforts. Wetlands may also sustain impacts from other ongoing maintenance activities such as snowplowing, localized rebuilding of the roadbed, spot-safety improvements, and bridge repairs. Impacts associated with these activities could result from direct disturbance, soil erosion, introduction of toxic chemicals, debris, or gravels to surface waters.

Mitigation Measures

No mitigation measures are proposed for the no-build alternative.

Construction

Recommended mitigation for wetland impacts is based on a hierarchy of avoiding, minimizing, and compensating for unavoidable impacts, as described below. Minimization and avoidance during construction consists of implementing BMPs.

Implementation of the following BMPs will minimize construction-related impacts on wetlands:

- Prepare a stormwater pollution prevention plan prior to construction site disturbance, and update the plan as necessary as the project proceeds.
- Clearly mark the limits of clearing to minimize intrusion into wetland habitats.
- Staging areas for construction equipment and materials will be located within upland areas or otherwise permitted.
- Stabilize exposed soils in accordance with the Montana Department of Transportation standard specifications using a temporary seed or erosion seed mix as appropriate. Seed mixes will be approved by the Montana Department of Transportation botanist in consultation with the Blackfeet Nation.

Post-construction

A detailed evaluation of the potential impacts on aquatic ecosystems and mitigation measures proposed to offset adverse impacts are presented in Appendix E. Minimization and avoidance of long-term impacts on wetlands begins with preliminary project designs and continues though final design and ultimately with compensation for unavoidable impacts.

Avoidance and Minimization

Impact avoidance is achieved throughout the development of project alternatives and the preliminary and final design process. Once the preliminary US 89 alignment was established, several field visits were conducted to refine the alignment. On May 16, 2000, Tribal biologists, project biologists, and the design engineer met to review proposed roadway realignments to determine whether sensitive areas would be affected and to suggest modifications to avoid or minimize new impacts. In addition, Montana Department of Transportation biologists, the Corps of Engineers, and the design engineer met on August 10, 2000, to review proposed stream crossings to suggest modifications to avoid or minimize new wetland and stream impacts. Several minor alignment adjustments were suggested by project biologists to further reduce wetland impacts. Reference post locations where these measures were incorporated into the proposed preliminary design are listed in Table 21. As a result of these efforts, approximately 2.2 hectares (5.4 acres) of wetland impact would be avoided.

Table 21. Wetland impact avoidance and minimization measures incorporated into the preliminary project design for US 89.

Wetland	Reference Post Location	Problem Statement	Implemented Solution[a]	Approximate Wetland Impact Area Avoided
W6	21	Construction limits would fill a portion of wetland.	Modify construction limits to avoid wetland.	<0.1 hectares (<0.1 acres)
W 8	15	Proposed alignment crossing is located at a bend in the riparian system, increasing the amount of acreage affected.	Realign the roadway to the north approximately 25 meters (80 feet).	0.1 hectares (0.3 acres)
W 18	12	Existing alignment contains a sharp curve.	Shift alignment to the north and use a bridged crossing rather than culverts.	0.7 hectares (1.7 acres)
W 21	11	Roadway is confined by moderate slope to the north and a riparian system to the south.	Widen along the north side of the roadway and avoid stream channel impacts.	0.2 hectares (0.5 acres)
W28	5	Roadway confined by wetland to the north and irrigation ditch to the south.	Widen or shift roadway to the south 30 meters (100 feet).	0.3 hectares (0.7 acres)
W45 and W46	3	Willow Creek closely parallels the roadway.	Shift construction to the north side of the roadway and modify construction limits to avoid stream channel.	0.1 hectares (0.2 acres)
All Category I wetlands		Road designers typically prefer to scale the road fill embankment at a 6:1 slope to eliminate steep embankments and minimize the need for guardrail.	Modify the recommended fill slope beyond clear zones from a 6:1 slope to a steeper slope where practicable and feasible.	0.8 hectares (2.0 acres)

[a] These measures have been incorporated into the proposed preliminary design. During final design, these areas will be further investigated to determine if the proposed preliminary design is practicable and feasible.

In addition to alignment modifications, locations were identified where exceptions to roadway design criteria would facilitate wetland impact minimization. These recommendations were incorporated into the preliminary project design or rejected based on constructability and safety issues, as determined by the design engineer and the project Steering Committee.

The following additional measures will be implemented during final design and construction to minimize impacts on wetlands:

- Widen the roadway to the north at South Fork Milk River, south branch (W4) to avoid higher-quality forested wetlands on the south side of the road.
- Replace culverts with properly sized culverts, where necessary, and through the final design process determine the need for any equalizer culverts

- Perform work in and around wetlands from an existing roadway or upland site, where possible.

Compensation

Permits for unavoidable placement of fill in wetlands are required from the Blackfeet Nation (Aquatic Lands Protection Ordinance No. 90A) and from the Corps of Engineers, under Section 404 of the federal Clean Water Act. As part of the permitting process, compensatory mitigation is required when avoidance or minimization is infeasible through project design. Where impacts are unavoidable, mitigation will be provided by creating, enhancing, or restoring wetland habitat of a similar type and function. Mitigation may occur during construction of the proposed alternative or as a separate project. Compensation for wetland impacts will be provided in accordance with current replacement ratios required by the Corps of Engineers. The Corps of Engineers does not regulate impacts on isolated wetlands (that is, those wetlands that are hydrologically isolated from other surface waters, such as prairie potholes). The Blackfeet Environmental Office regulates all wetland types and recommends full compensation for all wetland impacts. The Blackfeet Environmental Office has recently proposed changes to its mitigation policy. These changes have not yet been adopted by the Tribal council. If the new policy is approved by the Tribal council, the project will compensate for unavoidable wetland impacts in accordance with the new guidelines.

To date, the following onsite mitigation opportunities for impacts resulting from Alternatives B or C have been identified and will be further investigated for feasibility during the final project design stage:

- Obliterate the existing road and restore wetlands where the roadway is realigned (such as W8, W18, W21, and W23).
- Establish additional wetland area at W18 (Lake Creek, reference post 12) in conjunction with the proposed realignment.
- Establish additional wetland area at W17 (South Fork Cut Bank Creek, reference post 13) in conjunction with the proposed stream relocation.
- Replace existing impassable culverts in streams where fish are present with those that allow fish passage in order to increase habitat availability in the project area.

Mitigation measures for impacts on wetlands resulting from the Duck Lake Road improvements are similar to those described for Alternative B and C. To date, the following onsite mitigation opportunities have been identified:

- Create additional wetland area in improvement area 1 at Cut Bank Creek in conjunction with construction of the proposed parking area.

- Add culverts to the road corridor at W52A in improvement area 3 to reestablish a hydrologic connection between the wetlands on either side of the roadway. Wetland creation opportunities may also be feasible on the north side of the roadway at this location.

As the roadway designs are advanced, additional opportunities to reduce impacts on wetlands will be explored, and additional mitigation opportunities in the project area will be identified. Based on the wetland impacts identified to date and the resulting effects on wetland functions, the following priorities will direct the selection of mitigation for the proposed project:

- Continue to identify opportunities to avoid or minimize impacts on wetlands through project design.
- Attempt to provide feasible onsite mitigation for all wetland impacts in the project area.
- Attempt to mitigate at the location of the impact or in the same localized drainage basin.
- Where feasible, give priority to replacing functions of affected wetlands.
- Identify sites that offer wetland creation, restoration, or enhancement opportunities.
- Identify additional offsite or out-of-kind mitigation opportunities if onsite and in-kind mitigation cannot be achieved or is not practicable.
- When the aforementioned options are not practicable, consider a Montana Department of Transportation reserve, which allows the department to develop wetlands in the general area, then as wetland losses occur, to subtract the acreage from the developed wetland reserve.

Wetland mitigation may occur at the same location as the impact or in the same localized drainage basin as the affected wetland or resource, as indicated in the last two bullets above. Sites in the immediate vicinity are preferred over sites upstream or downstream or within other drainage systems. These criteria may be difficult to meet in the US 89 and Duck Lake Road project areas, because wetland mitigation is often incompatible with land uses in the area, such as crop production and livestock grazing. Mitigation for unavoidable wetland impacts may therefore include offsite improvements, providing funding for other mitigation projects, or mitigation reserves. Because of the wider road surface under Alternative C compared to Alternative B, a greater amount of wetland acreage would be affected, requiring additional compensatory mitigation that may need to occur off site due to existing land uses. To date, offsite mitigation opportunities identified include implementing one of the mitigation projects contained on the list of priorities maintained by the Blackfeet Nation.

Only Practicable Finding Alternative

Protection of Wetlands, Executive Order 11990 of 1977 (E.O. 11990) requires federal agencies to minimize the loss or degradation of wetlands and enhance their natural value.

Impact avoidance is achieved throughout the development of project alternatives and the preliminary and final design process. Once the preliminary US 89 alignment was established, several field visits were conducted to refine the alignment. As a result of these efforts, the proposed preliminary design avoids approximately 2.2 hectares (5.4 acres) of wetland impact. In addition to alignment modifications, locations were identified where exceptions to roadway design criteria would further facilitate wetland impact minimization. These recommendations were incorporated into the preliminary project design or rejected based on constructability and safety issues, as determined by the design engineer and the project Steering Committee and include steepening fill slopes and reducing the construction limits.

With these avoidance and minimization efforts in place, the Preferred Alternative is anticipated to impact approximately 7.2 hectares (17.9 acres) of wetlands throughout the corridor.

Avoidance of all identified wetland areas in the project corridor was deemed not practicable based on several factors, including the need to design the proposed project to current state and federal standards. Opportunities to avoid and minimize impacts within the proposed project corridor were investigated in detail during the preliminary road design analysis for the proposed project as described above. Additional opportunities to avoid and minimize wetland impacts will be sought during final design.

The Preferred Alternative has more wetland impacts than Alternative B. However, the Preferred Alternative does a better job of meeting the overall transportation needs along the corridor, particularly the needs of pedestrians and bicyclists. The marginal increase in wetland fill area of the Preferred Alternative over Alternative B (approximately 0.8 hectares [1.8 acres]) was deemed reasonable considering the benefits of the Preferred Alternative.

Based upon the above considerations, it is determined that there is no practicable alternative to the proposed construction in wetlands and that the proposed action includes all practicable measures to minimize harm to wetlands which may result from such use.

Fisheries Resources

Roads can have numerous effects on stream systems through the following means (Furniss et al. 1991):

- Stream channel alteration
- Sources of soil erosion

- Increased sediment deposition in streams
- Increased stormwater and pollutant runoff
- Human access to streams
- Potential contamination from gasoline or diesel spills as a result of vehicle accidents
- Problems with fish passage through culverts at road crossings.

These effects may result from construction-related activities or from the post-construction impacts of the presence of a road.

Direct Effects

Under the no-build alternative, no construction-related impacts on fish resources are expected.

In its current condition, there are several culverts within the existing US 89 corridor that are undersized or poorly placed and affecting fish passage (Willow Creek, Flatiron Creek, Lake Creek, and an unnamed tributary to South Fork Cut Bank Creek). The poorly placed culverts and undersized culverts limit the natural hydrologic regime of streams and wetlands within the road corridor. Over time, these conditions can reduce the functions and values of these streams, which would affect their ability to provide fish habitat. Some culverts may become impassable for fish, thereby limiting the availability of fish habitat in the corridor. Under the no-build alternative, these conditions would remain.

With the implementation of the no-build alternative, no stream channels would be relocated and no streamside vegetation would be altered.

Under the no-build alternative, no changes in fish habitat conditions along Duck Lake Road would occur.

Construction

As part of Alternatives B and C, all of the culverts in the US 89 project corridor would be replaced, and culverts would be added to improve hydrologic connections and reduce the potential for flooding. The existing bridge at reference post 13, South Fork Cut Bank Creek, would be replaced, and the bridge at reference post 21, South Fork Milk River, south branch, would be widened (Figure 5). (Based on preliminary investigations, the bridge at South Fork Milk River would be retained and widened. However, if the bridge cannot be brought to current standards through modification of the existing structure, this bridge may be removed and replaced.) The twin culverts at reference post 12, Lake Creek, would be replaced by a bridge (Figure 5). Culvert and bridge removal and replacement at stream crossings, and other construction activities may directly affect fish and aquatic organisms in the following ways:

- There would be a temporary diversion of streamflow within systems where culverts and bridges are replaced. Such a diversion could generate sediments downstream of the construction site and may create a temporary barrier to fish movement.

- Necessary in-water work, construction noise, and human disturbance at culvert and bridge sites would temporarily displace fish upstream and downstream of the construction site and may temporarily create a barrier to fish movement. (Culvert replacement would likely require 2 to 4 weeks for construction and bridge construction would extend over a period of 4 to 6 months.)

- Dust and particles from asphalt removal and paving may settle into nearby streams and wetlands.

- Dewatering and excavation of the construction site may result in increased sediment entering nearby streams and wetlands.

- Runoff from recently cleared and graded areas and soil stockpiles may result in increased sediment entering nearby streams and wetlands.

- Erosion of embankments and streambeds may occur during construction activities.

- Accidental spills of fuels, oils, concrete leachate, and chemicals used during construction could enter nearby streams and wetlands.

Under all of the action alternatives, increased turbidity and sediment movement in streams would displace adult fish to other unaffected portions of the stream until construction has been completed. This impact would be of short duration and would occur in a small geographic area; therefore, the direct adverse impacts on fish would not be substantial. If fish are spawning in the area at the time of construction, the loss of that year's class of fish may occur in the immediate vicinity. Loss of fish could result from eggs being smothered or from adult fish spawning in substandard habitat. This impact would be avoided by restricting culvert replacement and bridge construction to the time period outside the spawning and rearing period for fish.

Under all of the action alternatives, increases in sediment beyond the transport capacity of the stream would result in sediment deposition and turbidity, which would degrade existing feeding and spawning habitat for fish. Those streams that are characterized as B channels have the greatest capability to move excess sediment through the system (Lake Creek-reference post 12, South Fork Cut Bank Creek-reference post 13, and the north branch of the South Fork Milk River-reference post 23). The remaining streams in the corridor are C or F channels, and are more sensitive to disturbance and have a slower recovery period.

The direct construction-related impacts on the aquatic environment and fisheries resources occurring from sedimentation and erosion as a result of Alternative C would be slightly greater in magnitude due to the greater cleared area required than for Alternative B.

Under the Duck Lake Road Option, culvert replacement or lengthening would be required at all stream crossings (W52B, W53, and W54) in improvement area 3. Additional short-term impacts would occur with the construction of a parking area at Cut Bank Creek in improvement area 1. A paved off-road parking area would be constructed adjacent to the stream channel on the east side of the roadway to provide safe recreational access to the stream. Construction in close proximity to the stream channel could result in the potential for increased erosion and sedimentation to the stream channel. Impacts would be reduced through the implementation of construction-related mitigation measures as described below.

Post-construction

The potential post-construction impacts on aquatic resources and fish habitat resulting from Alternatives B and C include increases in stormwater runoff, changes in water quality, loss of wetland and riparian habitat, loss of fish habitat, and changes in stream channel dynamics.

Operation of a widened roadway would result in greater amounts of stormwater runoff conveyed to streams and wetlands, and would provide a larger paved surface for collection of pollutants that could be transported in stormwater runoff. Increased rates and volumes of stormwater runoff could cause increased erosion in ditches and small streams, and could potentially induce localized flooding in drainage conveyance systems. However, design measures would be implemented to adequately offset such flows, and no adverse impacts on receiving waters are expected.

Widening of the roadway would result in the loss of approximately 6.4 hectares (16.3 acres) of wetlands in the project area under Alternative B and approximately 7.2 hectares (17.9 acres) under Alternative C. Loss of wetland habitat can directly and indirectly affect fish habitat depending on the proximity of the wetland to fish-bearing streams, the presence of a hydrologic connection, and the wetland type. The larger area of wetlands lost under Alternative C would result in greater impacts on fisheries habitat. Loss of wetland habitat may result in a loss of infiltration through the soil and in flood storage capacity. Under these conditions, stormwater enters area streams and rivers episodically, resulting in increased peak flows and reduced base flows. Loss of flood storage capacity also can lead to the occurrence of more frequent flood events. Wetlands also serve to filter sediments, nutrients, and pollutants from stormwater runoff before it enters streams.

The addition of drainage ditches throughout the US 89 project corridor would have both beneficial and adverse impacts. During the warmer months of the year, these improved ditches would increase the conveyance of runoff to ditch outlets to nearby streams or wetlands, potentially inducing high flow damage at the discharge points. More importantly, new ditches would be designed to prevent erosion and to manage high flow damage at discharge points on drainage ditches.

Numerous culverts in the US 89 project corridor are undersized, improperly aligned, or improperly installed. As a result, culvert and bridge replacements in the US 89 project corridor generally would improve hydrologic connections in streams and wetlands and improve fish passage. To ensure fish passage, replacement culverts and bridges in fish-bearing streams would be designed in compliance with Montana Department of Transportation standards.

Road widening would result in direct impacts on stream channel habitat at South Fork Cut Bank Creek (reference posts 9 and 13) and Willow Creek (reference post 3). Road widening in the vicinity of reference post 9 would require the relocation of two short segments of South Fork Cut Bank Creek stream channel located on the north side of the project corridor. At the US 89 crossing of South Fork Cut Bank Creek, the existing bridge would be replaced, and the widened road would require the relocation of approximately 396 meters (1,300 feet) of stream channel on the west side of the roadway. Road widening in the vicinity of Willow Creek would require the relocation of two short segments of stream channel on the north side of the project corridor. Under Alternative C, a greater amount of stream channel relocation would be required than for Alternative B, thereby affecting a greater amount of fish habitat.

Direct impacts on stream channels would result in the loss of habitat, alterations to channel morphology (channel shape, size, slope, and configuration), and function.

The post-construction impacts on fisheries resources resulting from improvements in the Duck Lake Road project corridor are limited to the proposed parking area off Duck Lake Road, adjacent to Cut Bank Creek. The enhanced parking area is not expected to result in an increase in human use of the stream, since users are currently able to park along the road to access the site. With a paved parking area, water infiltration would decrease and the amount of surface runoff could increase during precipitation and snow melt. The surface runoff could pick up fine sediments and the increase in sediment potentially could increase turbidity in the stream during storm events and snowmelt. The increase in impermeable surface area specifically used for parking vehicles could potentially increase the vehicle pollutants that enter the stream.

Beneficial Effects

The following beneficial effects would result from Alternatives B and C:

- Fish passage and conveyance capacity would be improved by replacing culverts at Willow Creek (reference post 3), the unnamed tributary to South Fork Cut Bank Creek (west of reference post 9), and the South Fork Milk River, middle branch (reference post 21.7).

- Fish passage would be improved by the replacement of the culvert at Flatiron Creek (reference post 8).

- The proposed roadway realignment at Lake Creek (reference post 12) would provide a bridged crossing approximately 100 meters (328 feet) to the east of the existing culvert crossing. The existing culverts at this site are undersized and are improperly aligned resulting in the erosion of the downstream stream bank. The proposed realignment and bridge construction are expected to result in beneficial effects on this system, including improved hydrologic connections, elimination of stream bank erosion, removal of road fill from adjacent wetlands, and restoration of the instream habitat.

- The South Fork Cut Bank Creek bridge (reference post 13), which in its current configuration constricts flood flows, would be removed and replaced with a longer and wider structure.

Indirect Effects

Development of material source sites could result in additional impacts on streams and fisheries resources. The extent of these impacts would depend on the location and suitability of access points to the site relative to the locations of streams. Development of a material source site or construction of access roads to material source sites near a stream would result in similar impacts on streams as those described above.

Fisheries resources could also be affected by ongoing noxious weed control efforts that could result in sedimentation or the introduction of toxic chemicals or herbicides to surface waters. Surface waters and aquatic habitat may also sustain impacts from other ongoing maintenance activities such as snowplowing, localized rebuilding of the roadbed, spot-safety improvements, and bridge repairs. Impacts associated with these activities could result from direct disturbance, soil erosion, or introduction of toxic chemicals, debris, or gravels to adjacent or nearby water resources.

Mitigation Measures

No mitigation measures are proposed for the no-build alternative.

Construction

Sedimentation to streams during construction can be minimized if erosion controls, BMPs, and spill control measures are properly implemented, monitored, and maintained during construction. BMPs will be implemented during construction activities, and an NPDES permit will be secured through the U.S. EPA in accordance with Section 402 of the Clean Water Act. This permit requires the completion of a stormwater pollution prevention plan. The stormwater pollution prevention plan requires a description of BMPs and stormwater management controls appropriate for the construction site including measures to reduce soil erosion, reduce site sediment loss, and manage some of the more common construction generated wastes and construction related toxic materials. Appropriate BMPs for the project site will be selected from the current version of *Erosion and Sediment Control Best Management Practices: Field Manual*, prepared for Montana Department of Transportation. Implementation of these measures will minimize sedimentation to streams in the project area. In addition, the contractor will be expected to store and handle petroleum products, chemicals, cement and other deleterious materials to prevent their entering streams and associated wetlands. MDT will also work with resource agencies during the permitting process to avoid and minimize impacts to fish spawning.

Project biologists suggested several minor alignment adjustments to avoid and reduce stream impacts in the US 89 project area. Impacts on stream channels will be mitigated onsite by creating a new channel with dimensions, pattern, profile, and length the same as that of the existing channel. To recreate the channel that would be lost, the affected stream reach will be mapped and photographed prior to construction, noting habitat type (riffle, pool, run), substrate size, width, depth, and dimensions of the thalweg (i.e., the longitudinal profile of the stream; a line connecting the deepest points along the streambed). In addition to mapping the affected stream channel, streamflow data will be collected in order to adequately size, locate, and reconstruct the new stream channel. Stream channel relocation at South Fork Cut Bank Creek (reference post 9) and Willow Creek (reference post 3) will not be difficult to accomplish, because these stream reaches are relatively stable. Relocation at South Fork Cut Bank Creek at reference post 13 will be more difficult because this system is extremely dynamic.

Sites identified for wetland avoidance are discussed in the Wetlands section of this chapter. In most instances, avoidance or reduction of impacts on riparian wetlands also will benefit the associated stream system. Locations where these measures were incorporated into the preliminary design to avoid impacts on streams are identified in Table 22.

Table 22. Impact avoidance and minimization measures at stream crossings incorporated into the preliminary roadway design for the US 89 project.

Stream	Reference Post Location	Problem Statement	Implemented Solution[a]	Impact Avoided (Approximate)	
				Alternative B	Alternative C
Tributary to South Fork Cut Bank Creek	11	Infringement on stream channel and fish habitat	Widen along the north side of the roadway and avoid stream channel impacts	100 meters (328 feet) of stream relocation	100 meters (328 feet) of stream relocation
Willow Creek	3	Infringement on stream channel and fish habitat	Shift construction to the north side of the roadway and modify construction limits to avoid stream channel	140 meters (460 feet) of stream relocation	325 meters (1,066 feet) of stream relocation

[a] These measures have been incorporated into the proposed preliminary design. During final design, these areas will be further investigated to determine if the proposed preliminary design is practicable and feasible.

Post-construction

Where roadway impacts on streams are unavoidable, permits will be required from the Blackfeet Nation and the Corps of Engineers. During final design, further evaluation of the following measures is proposed to minimize post-construction impacts on fisheries resources in the project area. If during the design, the proposed measures are practicable and feasible they will be incorporated into the project.

- Revegetate stream banks with appropriate species at bridges and culvert installations.

- Consider the use of bottomless culverts or countersunk culverts to provide a natural streambed for the length of the culvert.

- For fish-bearing streams, design and install culverts to accommodate fish passage.

- Install and maintain culverts to avoid inlet scouring and to prevent erosion of stream banks downstream of the project site.

Under the Duck Lake Road Option, the proposed parking area adjacent to Cut Bank Creek will be designed and constructed to minimize the adverse impacts related to runoff. As appropriate, drainage of the proposed parking area could be routed to the east of the parking area. The parking area will be sloped to the southeast so that runoff flows away from the stream. As a result, runoff will move to an area of heavier vegetation and higher filtering capacity, reducing direct runoff to the stream.

Rare and Sensitive Species

Direct Effects

The no-build alternative is not expected to result in effects on rare or sensitive plants, animals, or fish species.

Construction

Rare and Sensitive Plants

None of the rare plant records identified by Montana Natural Heritage Program occurs within the limits of ground disturbance for the proposed action alternatives. Sedimentation to wetland systems during project construction under Alternatives B and C could affect rare plant populations that are hydrologically connected to streams or wetlands in the US 89 project area. However, all of the occurrences are located upstream of the proposed alignment and therefore would not be affected by construction.

Rare and Sensitive Animals

As described in Chapter 3 – Affected Environment, Rare and Sensitive Species, none of the rare and sensitive animal species is expected in the project corridor; therefore, these species are not evaluated in this section. For additional information on these species, refer to the *Biological Resources Report: US 89 Browning to Hudson Bay Divide Study Corridor* (Herrera 2002).

Rare and Sensitive Fish

Potential construction effects on pearl dace and westslope cutthroat trout would be the same as those described previously in the subsection Fisheries Resources, Direct Effects and Indirect Effects.

Post-construction

Rare and Sensitive Plants

No rare or sensitive plants were identified in the US 89 or Duck Lake Road project corridors.

Rare and Sensitive Animals

No rare or sensitive animals were identified in the US 89 or Duck Lake Road project corridors.

Rare and Sensitive Fish

Potential post-construction effects on pearl dace and westslope cutthroat trout would be the same as those described under Fisheries Resources, Direct Effects and Indirect Effects above.

Indirect Effects

Indirect effects that may affect rare and sensitive species include the development of material source sites. Development of these sites may affect habitat, which supports these species or other rare species in the project area.

Mitigation Measures

Because no effects are expected under the no-build alternative, no mitigation measures are proposed.

Construction and Post-construction

Because no rare and sensitive species would be affected by the project, no mitigation measures are required. If rare and sensitive species are identified at the proposed material source sites, mitigation measures would be implemented to avoid or minimize impacts to those species.

Conservation measures for potential effects on pearl dace and westslope cutthroat trout would be the same as those described previously in the subsection Fisheries Resources, Mitigation Measures.

Threatened and Endangered Species

The following sections discuss potential project effects for Alternatives B and C and the Duck Lake Road Option on threatened and endangered species. Effects from Alternative B and Alternative C are similar, although impacts from Alternative C would be slightly greater because of a greater roadway width and because a greater area would be disturbed by construction.

The discussion of effects below is based upon 50 CFR 402.02. This implementing regulation for the Endangered Species Act defines "effects of the action" as "the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline. The environmental baseline includes the past and present impacts of all federal, state, or private actions and other human activities in the action area, the anticipated impact of all proposed federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of state or private actions which are contemporaneous with the consultation in process."

Indirect effects are defined as, "those [effects] that are caused by the proposed action and are later in time, but are still reasonably certain to occur" (50 CFR 402.02). Interrelated actions are "those [actions] that are part of a larger action and depend on the larger action for their justification" (50 CFR 402.02). Interdependent actions are defined as, "those [actions] that have no independent utility apart from the action under consideration" (50 CFR 402.02). Direct effects are not defined in the Definitions section of this regulation, but are assumed to be those effects that occur as a direct result of the action, at or very close to the time of the action itself. Cumulative effects are those effects of future state or private activities that are reasonably certain to occur within the action area (50 CFR 402.02). The geographic area considered for the analysis of cumulative effects on threatened and endangered species includes a 1.6-kilometer (1-mile) radius extending from the limits of construction in the US 89 and Duck Lake Road corridors, including staging and storage areas, and the same radius extending from material source sites and access roads to those sites. Due to the specific requirements to address cumulative effects under the Endangered Species Act, cumulative effects on threatened and endangered species are addressed in this section and again, for additional clarity, in the overall cumulative effects discussion later in this chapter.

As previously described, slender moonwort is not expected in the project corridor; therefore, this species is not evaluated in this section. For additional information on this species and for a more complete discussion of potential project effects on all listed species, refer to the *Biological Resources Report: US 89 Browning to Hudson Bay Divide Study Corridor* (Herrera 2002). Table 23 presents the determination of effects on threatened species in the project area.

The Federal Highway Administration and MDT have completed formal consultation with the USFWS for the project. A biological assessment (BA) was submitted to the USFWS on July 14, 2004. In a letter dated January 28, 2005, the USFWS concurred with the preliminary determination of not likely to adversely affect for bald eagle, gray wolf, Canada lynx and bull trout as described in the biological assessment and in this document. The USFWS issued a biological opinion on January 28, 2005 for the effects to the threatened grizzly bear due to this project. The biological assessment and biological opinion are contained in Appendix I.

Table 23. Determinations of effect for threatened species expected in the US 89 project area.

Species Name	Scientific Name	Status	Determination of Effect
Bald eagle	*Haliaeetus leucocephalus*	Threatened	May affect, not likely to adversely affect
Grizzly bear	*Ursus arctos horribilis*	Threatened	May affect, likely to adversely affect
Gray wolf	*Canus lupus*	Threatened	May affect, not likely to adversely affect
Canada lynx	*Felis lynx*	Threatened	May affect, not likely to adversely affect
Bull trout	*Salvelinus confluentes*	Threatened	May affect, not likely to adversely affect

In the biological opinion, the USFWS determined that the project, as proposed, is not likely to jeopardize the continued existence of the Northern Continental Divide Ecosystem grizzly bears. In addition, the USFWS anticipated no more than one grizzly bear would be hit by a vehicle in this road corridor during any 10-year period and that this level of anticipated take would not jeopardize the species. In the biological opinion, the USFWS identified reasonable and prudent measures that they deemed necessary and appropriate to minimize impacts of incidental take of grizzly bears. These reasonable and prudent measures are discussed in the Grizzly Bear section below.

Bald Eagle

Direct Effects

The no-build alternative would require no earthwork, construction activities, or changes in the existing roadway configuration. Therefore, no direct impacts on bald eagles would be expected.

Construction and Post-construction

The bald eagle nest site at Two Medicine Lake would not be affected by the action alternatives because it is 5 kilometers (3 miles) from the proposed construction.

The construction of a new bridge at the US 89 crossing of South Fork Cut Bank Creek (reference post 13) under Alternatives B and C would result in the loss of riparian habitat and potential perch sites for wintering bald eagles. The proposed road widening would limit the amount of riparian habitat removal to the extent possible. While some perch trees would be removed, numerous available perch trees would remain. Construction of a parking area at Cut Bank Creek under the Duck Lake Road Option does not appear to require removal of perch trees.

The wintering period for bald eagles typically occurs between October 31 and March 31. Construction activities typically shut down during this period, although, as stated in the following discussion on grizzly bear, activities may continue through December and begin earlier in spring if weather permits. However, construction activities associated with the action alternatives are not expected to adversely affect wintering bald eagle populations in the project vicinity.

The *Montana Bald Eagle Management Plan* (MBEWG 1994) provides guidance for management of migratory bald eagles. Factors affecting migratory bald eagles include exposure to lead poisoning; secondary poisoning from insect and predator control programs; collisions and electrocutions with power transmission; and loss of perching, foraging, and roosting opportunities due to human disturbance. Construction activities associated with the action alternatives during the migratory period may cause bald eagles to avoid the immediate construction area. Ground squirrel populations displaced by construction are expected to re-colonize areas adjacent to the roadway once construction is complete. No poisons for insects or predators would be used to implement the action alternatives.

Construction of proposed pullouts under Alternatives B and C at scenic vistas may affect bald eagle habitat if these areas are located adjacent to riparian areas.

Indirect Effects

No indirect effects on bald eagles are expected to result from the action alternatives.

Interdependent and Interrelated Actions

Interrelated and interdependent actions associated with the US 89 improvement project include development of material source sites for gravel extraction. The roadway has been designed in an attempt to balance the amount of cut and fill; however, materials would be needed for the structural surfacing of the road including coarse crushed gravel, fine crushed gravel, and plant mix surfacing (asphalt). Material source site development includes the excavation of soils and rock for use in the construction of the roadway. Generally these materials are excavated from the site with excavators and materials are deposited into dump trucks for delivery to the work site or to a crushing operation where large rocks are ground into usable construction materials. Blasting may also be used during excavation within the material source site. Crushing operations may be located at the material source site or nearer the project corridor. Depending on the location of the material source site, development of access roads to the site may also be required.

Development of material source sites in the project vicinity may affect bald eagles if the site is located within 800 meters (2,600 feet) (line of sight) or 400 meters (1,300 feet) (out of line of sight) from documented bald eagle use areas. If blasting is implemented at material source sites, nesting bald eagles within 1.6 kilometers (1 mile) could be affected by this activity. However, material source sites are expected to be located within a certain practicable distance from the project corridor and only one nest has been identified in the vicinity to date. Therefore, there is a low likelihood that bald eagles would be affected by activities at material source sites and no adverse effects are anticipated.

Cumulative Effects

Planned activities in the project area include the construction of a resort facility north of Saint Mary, continued oil and gas exploration, construction along the Going-to-the-Sun Road, and construction of a water pipeline from lower Two Medicine Lake through East Glacier and extending to Browning. These projects may contribute to the cumulative loss of riparian habitat and bald eagle perch sites. To minimize this effect, each project would be expected to examine expected impacts on bald eagle habitat and implement appropriate conservation measures. However, these projects as well as Alternatives B and C would likely contribute to minor cumulative losses of potential perch sites at stream crossings.

Conservation Measures

Because it is the Montana Department of Transportation's standard practice to raptor-proof electric facilities when they are relocated within MDT right-of-way, and the action alternatives would restrict vegetation clearing outside the construction limits, no additional conservation measures are proposed to minimize potential project impacts on bald eagles.

If a nesting pair of bald eagles is identified within a 1.6-kilometer (1-mile) radius of the material source sites, blasting would be restricted to the period outside the nesting season for bald eagles, which extends from mid-March through August 31.

Effect Determination

Construction activities under the proposed action alternatives would not affect nesting bald eagles in the project vicinity. Material source site locations for the proposed project have not been identified. However, material source sites are expected to be located within a certain practicable distance from the project corridor and only one nest has been identified in the vicinity to date. Therefore, there is a low likelihood that bald eagles would be affected by activities at material source sites and no adverse effects are anticipated. Under Alternatives B and C, the new bridge at South Fork Cut Bank Creek would remove suitable perch trees for bald eagles; however, these effects would be minor Construction activities for all action alternatives may affect but are not likely to adversely affect bald eagles. In their biological opinion issued on January 28, 2005, the USFWS concurred with this determination.

Grizzly Bear

Direct Effects

The no-build alternative would require no earthwork, construction activities, or changes in the existing roadway configuration. However, as a result of increased traffic volumes that will occur with or without implementation of this project, traffic volumes are expected to exceed 2,000 vehicles per day during the spring foraging period for bears by year 2025. Though traffic volumes may cumulatively have an effect on grizzly bear movement in the corridor, it is not directly or indirectly linked to the proposed action.

Construction and Post-construction

The primary effects of Alternatives B and C on bears would be disturbance of foraging habits during construction, loss of habitat, a potential decrease in habitat value, and increased difficulty crossing the US 89 corridor. These impacts are attributed to the extent of vegetation disturbance, the wider road surface combined with reduced vegetative cover along the roadway.

Construction activities under Alternatives B and C may disrupt grizzly bear access to foraging habitats and may displace bears from key foraging areas near construction sites. April through June represents the primary period of activity for bears in the project area with riparian and aspen groveland habitats receiving the most use of all available habitats. These habitats are important foraging areas for bears when they emerge from their dens, and there are few other foraging opportunities available. Construction activities in the corridor would likely be conducted in phases so that only a portion of the project is under construction at a given time. The construction season typically extends from April through November, although activities may continue through December and begin earlier in spring if weather conditions allow.

The proposed project would remove aspen groveland and riparian habitat in the US 89 corridor and aspen groveland in the Duck Lake Road corridor potentially used by grizzly bears. Most of the habitat affected is roadside vegetation that likely provides cover when bears are crossing the roadway but is not used for foraging due to the proximity of the roadway. Areas disturbed by construction but not covered by fill would also likely begin to revert to their original condition once construction is complete. Only one riparian area in the US 89 corridor, Lake Creek (reference post 12), would be crossed at a new location. The proposed bridge at this location would improve hydrology in the system and facilitate long-term wildlife movement through this corridor. Under Alternatives B and C, the roadway alignment would shift, creating a new opening within three aspen groveland patches. The improved roadway would cross the remaining riparian areas and aspen grovelands at the existing alignment, which would create wider openings but would not cause impacts at new locations in these habitats. The portion of the Duck Lake Road Option that may support grizzly bears (reference post DLR-27 to DLR-34) would remain on the existing alignment.

In addition to the loss of habitat, the wider road surface and vegetation clearing in the corridor under Alternatives B and C would incrementally increase the difficulty for wildlife, including bears, crossing the road. The availability of adequate cover during movements between habitats is a critical component of bear habitat (Carney 2002 personal communication). It is generally accepted that grizzly bears avoid roads and usually avoid crossing them (Ruediger et al. 1999). However, bear responses to roads have been shown to vary.

In the Bow River watershed in Alberta, Canada, Gibeau et al. (2001) reported variable crossing rates by grizzly bears for the principal highways. Principal highways included the Trans-Canada Highway (four lanes), Highway 40 (two lanes), Highway 93 (two lanes), and the Bow Valley Parkway (two lanes). Gibeau et al. (2001) found that highway crossings by grizzly bears were concentrated in specific locations and occurred during the day as well as the night. Areas with a high frequency of bear crossings were characterized by close proximity to a major drainage, rugged terrain, high-quality habitat, and low human access. These findings demonstrate that cover and low human occurrence are key features at crossing sites in this study.

Aune and Kasworm (1989) concluded that on the east front of the Rocky Mountains, grizzly bears generally avoided habitats within 500 meters (1,600 feet) of roads during all seasons; however, many important foraging components used by bears were found closely associated with roads indicating that bears may be distributed closer to roads during the foraging season. The researchers also found that bears avoided roads in the fall, when berries were key foods. This behavior pattern seems likely for the project area, because bear movements peak in the corridor from April through June to take advantage of the abundant foods in riparian areas and aspen grovelands while other food sources at high elevations are still under snow. Bears move back to higher elevations mostly outside the project corridor when berries in avalanche slides have ripened.

Currently, bears appear to readily cross the US 89 corridor and the portion of the Duck Lake Road corridor between reference posts DLR-27 and DLR-34. While there is no published data on the frequency and locations of bear crossings in the US 89 and Duck Lake Road corridors, crossings have been observed on US 89 at reference post 11 through reference post 13 in the South Fork Cut Bank Creek drainages and reference post 21 through reference post 21.7 in the South Fork Milk River drainages. In addition, bears were recorded in habitats on both sides of the US 89 corridor on numerous occasions during the 1987 to late 1990s habitat study (Carney 2002 personal communication).

Existing conditions that likely facilitate bear and other wildlife movement across the US 89 roadway include the overall low traffic volumes; the dense vegetation in close proximity to the road, which provides secure cover; the low posted speed limit (70 kilometers per hour/45 miles per hour) and road sinuosity north of reference post 13, which helps maintain reasonable travel speeds; and the nature of the corridor's use as a scenic and wildlife viewing route for tourists accessing Glacier National Park.

Most of these conditions would be maintained after the roadway improvements under Alternatives B and C are implemented. The area of greatest concern from Browning to Kiowa is the vicinity of reference post 10 to 11. Overall, road widening and vegetation clearing for the segment from Browning to Kiowa would increase the road corridor width between 4.2 and 20.6 meters (11 and 65 feet).

The portion of the corridor north of reference post 13 would retain a 70 kilometer per hour (45 mile per hour) speed limit and much of its sinuosity, although some curves would be eliminated and others softened. This portion of the corridor currently averages about 10 meters (35 feet) in width. The areas of greatest concern from Kiowa to Hudson Bay Divide are reference posts 12 to 13, and reference posts 21 to 22. Vegetation clearing to widen and improve the roadway in this segment would result in an average width of 20 to 24 meters (65 to 80 feet).

Numerous provisions have been incorporated into the preliminary design for the US 89 corridor to retain and restore the existing condition of the corridor, which facilitates wildlife movement.

These provisions include minimizing vegetation clearing and restoring vegetation in disturbed areas beyond the clear zone of the roadway, particularly in known wildlife movement areas. In addition, the improved roadway would not contribute to increases in traffic volumes beyond the expected regional growth, which would occur even if the project was not constructed, and would not cause a change in use by local or tourist traffic (refer to the Transportation section in this chapter).

Roadside pullouts and scenic vistas with picnic tables and garbage facilities may attract bears if the garbage is not properly handled. These factors would be considered in determining the final configuration and design of these facilities, so that these conflicts are avoided.

Indirect Effects

Indirect effects of Alternatives B and C that may affect grizzly bears include increased travel speeds in localized areas where sharp curves are eliminated. One area of concern is the vicinity of reference post 21. The elimination of a series of sharp curves between reference posts 20 and 21 would likely result in increased travel speeds in this localized portion of the corridor. This area is also highly used by a variety of wildlife, and is a known bear crossing area. Increased travel speeds at this location may increase the risk of bear/vehicle collisions. During his observations in Yellowstone National Park, Gunther (2003 personal communication) attributed travel speeds to driver comfort rather than posted speed limits. Road improvements in Yellowstone National Park led to increased travel speeds and increased wildlife/vehicle collision rates. The applicability of Gunther's study to an assessment of the effect of travel speeds on the likelihood of vehicle-grizzly bear collisions on US 89 in the project corridor is uncertain, however. Most of the collisions recorded by Gunther in Yellowstone involved ungulates (elk, deer, bison, and moose). In eight years of study, only two grizzly bear were killed in collisions and these occurred at relatively low vehicle speeds (35 and 45 mph). The level of risk for this location is additionally difficult to assess, since the proposed widening and realignments would provide drivers with more distance and width to react to wildlife on the road, which would facilitate avoidance of collisions. No indirect effects on grizzly bears are expected from the Duck Lake Road Option, because bears are not expected where sharp curves would be reduced and travel speeds where bears are likely would be limited by nearby intersections and road grades.

Interrelated and Interdependent Actions

Interrelated and interdependent actions would be the same as those described above for the bald eagle. Development of material source sites would likely occur as near the project corridor as feasible and may be located within the boundaries of the grizzly bear recovery area. Development of material source sites within the boundaries of the grizzly bear recovery area would result in temporary adverse effects on grizzly bears. Development of material source sites in this area would result in temporary loss of grizzly bear habitat and could disrupt spring grizzly bear movement from Glacier National Park to the project area to access key foraging habitats and fall movements in the reverse direction to access berries in avalanche chutes. For most FHWA and MDT projects, the contractor is responsible for identifying material source sites and securing all required permits. However, for this project concerns were raised about the potential effects of material source sites on grizzly bears if they area located in the recovery area. Therefore, for this project, MDT and its contractor will be coordinate with the Blackfeet Fish and Wildlife Department during the selection of material source sites.

Cumulative Effects

Planned activities in the project area are the same as those described for bald eagles. These activities may also disturb grizzly bears during implementation and the Saint Mary resort facility may increase human presence in the vicinity of habitat areas. It is expected that these projects would go through the Blackfeet Nation's environmental review process and include appropriate measures to minimize impacts on grizzly bear habitat.

The Saint Mary resort facility is expected to attract numerous visitors each year and may generate increased traffic volumes or accelerate predicted increases in the project corridor. At present, the resort facility is in the early planning stages and no traffic analysis for the facility has been completed. Until planning progresses further, it will remain unclear which route visitors would use to access this facility or the population centers it would serve. Therefore, at this time, it is difficult to predict if this facility would affect traffic volumes in the corridor or result in a cumulative impact on grizzly bear.

The action alternatives are not expected to cause increased traffic volumes beyond those predicted for expected regional and national growth. However, traffic volumes for the portion of the corridor north of Kiowa (reference post 12) would exceed 2,000 vehicles per day for months May through October by year 2025. South of Kiowa, traffic volumes would exceed 2,000 vehicles per day for months July through August, and on weekend days in June and September, by year 2025. For the Duck Lake Road corridor, traffic volumes would exceed 2,000 vehicles per day for July and August, by year 2025.

According to Ruediger et al. (1999), when traffic volumes reach 2,000 to 4,000 vehicles per day, the roadway becomes a substantial barrier to wildlife movement. This is attributed to substantial increases in road kill and the continuous clustering of cars, which results in an insufficient number of breaks in traffic flow to provide opportunities for wildlife to cross (Ruediger 2002 personal communication). Therefore, while the US 89 corridor is not currently a barrier to most wildlife movement, it is expected that during the life of the improved roadway, increases in traffic volumes would make this roadway increasingly difficult for wildlife to cross without some accommodations for wildlife passage.

The information above relates to wildlife in general. Concerning the effects of traffic specifically on grizzly bears, it should be noted that grizzly bears rarely suffer fatal collisions on highways (Ruediger 2000). The reason for this is uncertain but it may be attributed to the grizzly bear's general avoidance of highways, low population densities, and/or adaptation to successfully crossing of highways. While it may seem intuitive that an increase in traffic volume would increase the risk of bear-vehicle collisions, historically direct mortality of grizzly bears as a result of crossing highways of various traffic volumes has not been a significant problem and therefore is not expected to be for this project. Of greater concern is the potential barrier effect of increased traffic volumes on grizzly bear crossings.

As reported in the Gibeau et al. 2001 study of variable crossing rates by grizzly bears for the principal highways in the Bow River watershed, summer average daily traffic volumes for Trans-Canada Highway (four lanes), Highway 40 (two lanes), Highway 93 (two lanes), and the Bow Valley Parkway (two lanes) were 21,000 vehicles, 3,075 vehicles, 3,530 vehicles, and 2,230 vehicles, respectively. Between 1994 and 1998, six bears crossed the Trans-Canada Highway a total of 33 times, 11 bears crossed Highway 40 a total of 130 times, two bears crossed Highway 93 a total of 17 times, and six bears crossed Bow Valley Parkway 51 times. Of the 12 bears studied in the Trans-Canada Highway basin, none of the six studied adult female bears crossed the highway (21,000 vehicles per day), one subadult female crossed, and one of five studied male bears accounted for the majority of crossings. In contrast, all of the 11 grizzly bears studied in the Highway 40 basin, regardless of sex or maturity, crossed the highway (3,075 vehicles per day). The study notes that the traffic volumes on Highway 40 may be less than reported.

The Gibeau et al. (2001) study indicates that grizzly bears crossed the highway unimpeded at traffic volumes near 3,000 but the highway posed a barrier particularly for female bears at 21,000 vehicles per day. It is unclear from this study at what traffic volume threshold between 3,000 and 21,000 a barrier effect becomes significant for grizzly bears. The threshold of 2,000 to 4,000 vehicles has been estimated and applied by some but this threshold is uncertain (Ruediger 2000) and not yet substantiated by research for grizzly bears. The current traffic volumes (700 – 2,500) pose little to no barrier to grizzly bear crossing. However, as traffic volumes increase, bears in the US 89 project corridor will likely need to adjust their crossing habits in response. At some presently unknown traffic volume threshold some bears may eventually be deterred from habitats on the east side of the corridor. Others bears may adapt to increased traffic volumes by learning where and when to cross or by timing their crossings with low traffic volumes (Brandenburg 1996). The proposed preliminary design and conservation measures will likely improve highway permeability for bears and may allow bears to remain un-affected below a higher traffic volume. Since the traffic volume threshold associated with adverse affects is uncertain, there is the potential within the project life that traffic could increase to a level at which adverse effects on grizzly bears result if some bears remain deterred from the corridor and from access to spring foraging habitats.

Conservation Measures

The following conservation measures will be implemented as part of the project to reduce the impacts to grizzly bears from direct mortality and from habitat fragmentation and displacement. These conservation measures adhere to reasonable and prudent measure #1 outlined in the biological opinion:

To ensure that final designs for proposed crossing structures meet minimum requirements for the targeted species, Montana Department of Transportation will consult with Blackfeet Nation and US Fish and Wildlife Service biologists during the design of the structures for comments on the bridge lengths and culvert sizes at Lake Creek and South Fork Cut Bank Creek.

- A new highway structure is proposed at reference post 12 at Lake Creek. This structure will be constructed to incorporate wildlife crossing features. The project design engineers will continue to involve staff biologists in the design and configuration of the highway structure at this location to enhance its attractiveness as a crossing location for wildlife. Along with structure design, a revegetation plan will be implemented at this site to provide additional crossing cover, and wildlife fencing may be incorporated to funnel wildlife through the crossing area.

- A new highway bridge will be constructed at main stem South Fork Cut Bank Creek (reference post 13). This structure will be enlarged from a 9-meter (30-foot) opening to a wider opening, to provide a narrow area of dry land passage underneath the bridge during most months of the year. Wildlife fencing may be incorporated to funnel wildlife toward the crossing area.

- The existing US 89 highway bridge over North Fork Cut Bank Creek (reference post 17) was constructed within the last 10 years in conjunction with improvements to the US 89 intersection with Starr School Road and, therefore, does not require replacement at this time. In order to improve this structure for wildlife crossing purposes, shrubs and trees will be planted along the banks of the river at the bridge crossing to enhance the vegetative cover at this site.

- Contractors and construction crews will be educated regarding the need for proper sanitation in grizzly bear habitat and would be instructed to report all grizzly bear sightings immediately to Tribal wildlife program biologists.

- All food and garbage on the construction site will be stored in bear-proof containers, and all garbage will be removed daily from temporary offices and sleeping quarters.

- Construction staging areas, field offices, and sleeping quarters will be located a minimum of 150 meters (500 feet) from riparian areas and reported grizzly bear crossing areas, such as the riparian area east of Kiowa (reference post 10 to 11), Lake Creek (reference post 12.5), South Fork Cut Bank Creek (reference post 13) and the South Fork Milk River branches (reference posts 21 and 21.7).

- Right-of-way fencing will be installed throughout the project corridor and may result in the natural expansion of some aspen stands within the road right-of-way.

- At all riparian areas throughout the corridor, construction limits and roadway fill widths will be minimized, and as much vegetation as feasible will be retained adjacent to the roadway.

- Scenic pullouts will be located and designed in consultation with Blackfeet wildlife biologists. At a minimum, scenic pullouts will:

  - Include warnings to visitors that they are in grizzly bear habitat and that they must remove all garbage from the site

  - Be limited to the project corridor and will not provide access to areas where humans may encounter grizzly bears, such as riparian areas

  - Be designed to provide viewing opportunities and to discourage picnicking.

- Prior to selection of material source sites, MDT and its contractor will consult with the Blackfeet Fish and Wildlife Department so that potential impacts to grizzly bear habitat are minimized in site selection.

The following conservation measures would be implemented as part of the project at the locations specified below to minimize impacts on grizzly bear in the project corridor:

- Segments of the existing roadway that currently bisect aspen grovelands and would be abandoned will be reclaimed. These areas occur at approximately reference post 14 and 15 and require detailed restoration plans including soil treatment, planting specifications, if needed, and fencing provisions.

- Construction will be staged to allow construction (including earthmoving) during any given construction year at only one of the following three locations: the riparian area east of Kiowa (approximately reference post 10 to 11.5), Lake Creek and South Fork Cut Bank Creek (approximately reference post 12.5 to 13), and South Fork Milk River, south and middle branches (approximately reference post 19.5 to 22). During any given construction year, no work will be conducted for the entire construction season at two of the three locations specified above. At the one location per year where construction is allowed, no work will be conducted from 6:00 PM to 9:00 AM from April 1 to June 30.

- Alternative slopes will be analyzed to reduce the impacts of fills at the following locations: the riparian area east of Kiowa (approximately reference post 10 to 11.5), Lake Creek and South Fork Cut Bank Creek (approximately reference post 12.5 to 13), and South Fork Milk River (approximately reference post 19.5 to 22). If, during final design there are areas that slopes can be safely steepened, they would be incorporated into the proposed project plans.

- Construction plans will specify that clearing and grubbing beyond the construction limits (not the right-of-way limits) for the riparian area east of Kiowa (approximately reference post 10 to 11.5), Lake Creek and South Fork Cut Bank Creek (approximately reference post 12.5 to 13), and South Fork Milk River (approximately reference post 19.5 to 22), and any temporary clearing necessary for culvert or utility line installation or similar activities outside the construction limits but within the right-of-way would be kept to the smallest area possible, to be reclaimed following construction.

- As appropriate, construction plans will specify that contractor stockpiles of topsoil must be contained within the construction limits and may not be stored at environmentally sensitive areas. Locations where this measure will be implemented will be specified in the special provisions for this project and will include cultural sites and high quality wetlands. (Special provisions are modifications to the Standard and Supplemental Specifications applicable to an individual project.)

- The V-shaped ditch will be applied to the extent feasible to minimize vegetation disturbance at the following locations along the project corridor: riparian area east of Kiowa (approximately reference post 10 to 11.5), Lake Creek and South Fork Cut Bank Creek (approximately reference post 12.5 to 13), and South Fork Milk River (approximately reference post 19.5 to 22).

- Onsite visits would be conducted by Montana Department of Transportation botanists and biologists, in consultation with the Blackfeet Nation, to develop appropriate post-construction revegetation plans that include a woody species component to enhance the vegetative cover at the following locations: riparian area east of Kiowa (approximately reference post 10 to 11.5), Lake Creek and South Fork Cut Bank Creek (approximately reference post 12.5 to 13), and South Fork Milk River (approximately reference post 19.5 to 22).

Determination of Effect

Alternatives B and C may affect and are likely to adversely affect grizzly bears in the project area. The Duck Lake Road Option may affect but is not likely to adversely affect grizzly bears. Implementation of the Alternatives B and C would result in the direct loss of grizzly bear habitat. Construction activities in the US 89 project corridor may disrupt grizzly bear access to spring foraging habitats and would deter bears from habitats near construction activities. Most bears would likely seek alternative routes to access habitats and would concentrate in habitats further from the road corridor.

Development of material source sites is likely to result in the temporary loss, until reclamation is complete, of grizzly bear habitat and disruptions in grizzly bear access to spring and fall foraging habitats. However, material source sites for the project will not be identified until the project's final design phase when material quantities and types needed for construction are determined in detail. For this reason, the expected effects of operation are uncertain, although as stated earlier in the Interrelated and Interdependent Actions subsection, the likelihood is that development of material source sites would result in the loss of grizzly bear habitat and could disrupt spring grizzly bear movement. Therefore, the extent of the effect due to material source site development is sufficiently uncertain that conservation measures cannot be developed at this time. When material source sites are identified, their use will be subject to review under the Endangered Species Act at that time.

Alternatives B and C would result in at least a doubling of the roadway width (pavement, roadside ditches, and adjacent slopes), despite the implementation of proposed conservation measures. The wider roadway coupled with potential increased travel speeds at localized areas where sharp curves are eliminated increases the difficulty for bears crossing the road as well as the risk of vehicle/grizzly bear collisions.

Current traffic volumes in the US 89 and Duck Lake Road corridors do not appear to be a barrier to wildlife movement and no grizzly bear mortalities have been reported. However, traffic volumes are expected to increase at a rate of approximately 3 percent each year, with or without implementation of the project. This growth rate would cause traffic volumes to exceed 2,000 vehicles per day during the spring foraging period for bears by year 2025. Though traffic volumes may cumulatively have an effect on grizzly bear movement in the corridor, it is not directly or indirectly linked to the proposed action. This cumulative impact is not reflected in the effect determination language provided in the paragraphs above.

In the biological opinion, the USFWS determined that the project, as proposed, is not likely to jeopardize the continued existence of the Northern Continental Divide Ecosystem grizzly bears. The USFWS anticipated no more than one grizzly bear would be hit by a vehicle in this road corridor during any 10-year period and that this level of anticipated take would not jeopardize the species.

In the biological opinion, the USFWS included the following reasonable and prudent measures that they deemed necessary and appropriate to minimize the impacts of incidental take of listed species:

1. "The FHWA and MDT shall identify and implement means to reduce the potential for incidental take of grizzly bears from direct mortality and from habitat fragmentation and displacement as a result of project-related increases in highway width and increases in traffic volume and speed. To fulfill this measure, reconstruction of the highway and the stream crossing structures shall be conducted as described in the biological assessment and biological opinion that were prepared for the project. These measures are described under Conservation Measures."

2. "The FHWA and MDT shall implement the reporting requirements as follows: Upon locating a dead or injured bear (or other federally-listed species), notification must be made within 24 hours to the USFWS's Montana Field Office at (406) 449-5225. Record information relative to the date, time, and location of the dead or injured animal when found, and if possible, the cause of injury or death of each animal and provide this information to the Service."

Gray Wolf

Direct Effects

The no-build alternative would require no earthwork, construction activities, or changes in the existing roadway configuration. Therefore, no construction-related or post-construction impacts on the gray wolf would be expected.

Construction and Post-construction

The primary direct effects of Alternatives B and C on wolves would be a disruption of wolf movements through the corridor during construction activities and a contribution to the impediment of wolf travel through the project area. These impacts are attributed to the proposed construction activities, wider road surface, and reduced vegetative cover along the roadway.

Construction activities in the corridor would likely deter wolves from the construction site and may cause wolves to travel farther distances seeking suitable crossing locations. Since there are no wolf packs in the project area, this impact would likely affect lone dispersing wolves. These effects are minor and would not be expected to result in adverse impacts on wolves.

Little is known about wolf use of habitats during dispersal, especially across fragmented habitats (Weaver et al. 1996). Kohn et al. (1999) found that wolves avoided developed lands and did not cross highways in areas adjacent to human development. Crossings were more likely in homogenous areas, particularly lowland complexes with greater visibility and ease of travel. Sightings reported in the project area indicate that wolves currently cross the US 89 corridor, although it is not known at what frequency or location. Loss of roadside vegetation and the wider corridor would incrementally increase the difficulty associated with crossing the existing roadway. Existing conditions that facilitate wildlife and grizzly bear movements in the US 89 corridor, likely also facilitate wolf movement through the corridor. These conditions and implementation of the measures to mitigate the effects of road widening described for grizzly bears would likely facilitate wolf movement through the corridor after completion of the project.

Effects on wolves under the Duck Lake Road Option would be similar to those described above, but of a lesser degree because the Duck Lake Road corridor provides less suitable habitat for gray wolves than the US 89 corridor.

Indirect Effects

Indirect effects of the proposed action alternatives that may affect wolves include higher travel speeds, which increase the chance for wolf-vehicle collisions (Gunther 2003 personal communication). However, the posted speed limit along US 89 and Duck Lake Road would not increase and much of the US 89 corridor would retain its sinuous nature. Only one area of concern has been identified for Alternatives B and C: the vicinity of reference post 21. At this location, proposed improvements would eliminate several sharp curves, which may result in increased travel speeds. The proposed widening and realignments at this location would provide drivers with more distance and width to react to wildlife on the road, which would facilitate avoidance of collisions. Currently, no wolf mortalities from vehicle collisions are reported for the US 89 or Duck Lake Road corridors and an increase in the mortality rate from vehicle collisions is not expected for this species.

Interrelated and Interdependent Actions

Interrelated and interdependent actions would be the same as those described above for the bald eagle. Interrelated and interdependent actions associated with the US 89 improvement project could disrupt gray wolf movement in the project vicinity. However, since there are no wolf packs in the project area, this impact would likely affect lone dispersing wolves. These effects are minor and would not be expected to result in adverse impacts on wolves.

Cumulative Effects

Cumulative effects on wolves would be the similar to those described for the grizzly bear. As described for grizzly bears, it is expected that under Alternatives B and C, increases in traffic volumes would, over time, make this roadway increasingly difficult for wildlife to cross. However, the proposed conservation measures for the road widening are likely sufficient to maintain the few gray wolf crossings that may occur at current and future traffic volumes, because wolf use of the overall project area is likely limited to dispersing individuals and because wolves are most commonly observed during lower traffic volume months in the spring and fall.

Conservation Measures

As previously described, the proposed crossing structures and vegetation retention guidelines will facilitate wildlife movement through the project corridor. No additional conservation measures are proposed.

Determination of Effect

Because wolf use of the US 89 corridor is likely limited to dispersing individuals, and because conservation measures to facilitate wildlife movement in the corridor are expected to benefit wolves, the proposed action alternatives may affect but are not likely to adversely affect gray wolves. In their biological opinion issued on January 28, 2005, the USFWS concurred with this determination.

Canada Lynx

Direct Effects

The no-build alternative would require no earthwork, construction activities, or changes in the existing roadway configuration. Therefore, no construction-related or post-construction impacts on Canada lynx would be expected.

Construction and Post-construction

Alternatives B and C would incrementally impede lynx movement through the project corridor and would result in loss of conifer habitat at the edge of large tracts of suitable habitat (referred to as fringe habitat). These impacts would result from road widening and loss of roadside vegetation.

Road widening and loss of roadside vegetation would incrementally increase the difficulty associated with crossing the existing US 89 roadway. Currently, there is no information to determine the level at which traffic volume or roadway design may influence lynx movements or create an impediment to movement (FR March 24, 2000), and no data are available on Canada lynx movements through the US 89 project corridor.

Lynx successfully cross many types of roads, including unpaved forest roads, secondary paved roads, and state and interstate highways (FR March 24, 2000). Little information is available on lynx highway crossing characteristics. It is likely that highways with high volumes of traffic and associated suburban developments inhibit lynx home range movement and dispersal, and may contribute to loss of habitat connectivity. Because the US 89 corridor is located in fringe habitat for the lynx and all impacts would occur within the existing corridor, loss of conifer and mixed forest habitats are not expected to adversely affect lynx. Lynx may occur in these areas following food sources or attempting to disperse; however, there is limited habitat availability on the east side of the corridor and regular crossings of US 89 are not expected. Further, conservation measures to facilitate wildlife movement in the South Fork Milk River drainage (see section on grizzly bear) are expected to benefit lynx.

Establishment of a scenic vista near the Hudson Bay Divide under Alternatives B and C may result in the loss of fringe habitat for Canada lynx. Because this area is fringe habitat and does not provide connectivity to other suitable habitat, loss of this habitat would have a minor effect on lynx.

There is no suitable habitat for Canada lynx in the Duck Lake Road corridor and no effects on lynx are expected from implementation of this option.

Indirect Effects

Indirect effects of Alternatives B and C that may affect lynx include higher travel speeds, which increase the chance for lynx-vehicle collisions (Gunther 2003 personal communication). However, the posted speed limit in the corridor would not increase and the portion of corridor that may be used by lynx would largely retain its sinuous nature. Only one area of concern in the US 89 corridor has been identified: the vicinity of reference post 21. However, lynx habitat in the US 89 corridor is considered fringe habitat and few crossings of the US 89 corridor are expected. Additionally, lynx are primarily nocturnal animals and no lynx mortalities are reported for the US 89 corridor. Based on the 2000 traffic counts, the highest traffic volumes in the project corridor occur during the day, prior to and immediately following the lunch hour. Road improvements and potential increases in traffic speed are not expected to result in an increased mortality risk for lynx. No indirect effects are expected for lynx under the Duck Lake Road Option.

Interrelated and Interdependent Actions

Interrelated and interdependent actions associated with the US 89 improvement project may result in the loss of additional Canada lynx habitat. If material source sites are located in large, contiguous tracts of conifer forests, this loss of habitat could have a greater effect on lynx than the effects of the proposed project. However, material source sites are expected to be located within a certain practicable distance from the project corridor. This distance would likely prohibit the site locations from occurring in large, contiguous tracts of conifer forest that provide lynx habitat.

Cumulative Effects

Cumulative effects on lynx would be the similar to those described for the grizzly bear. As described for grizzly bears, under Alternatives B and C, increases in traffic volumes would make the US 89 roadway increasingly difficult for wildlife to cross. However, the proposed conservation measures for the road widening are likely sufficient to maintain the few lynx crossings that may occur at current and future traffic volumes, because lynx are likely to cross the roadway during the evening hours when traffic volumes are low.

Conservation Measures

As previously described, numerous measures are proposed to facilitate wildlife crossing through the US 89 project corridor. Because lynx habitat is limited to the portion of the corridor near Hudson Bay Divide, it is proposed that construction plans specify that from reference post 23.5 to 24.5 clearing and grubbing are limited to the minimum amount necessary beyond the construction limits (not the right-of-way limits), and any temporary clearing necessary for culvert or utility line installation or other similar activities outside the construction limits but within the right-of-way will be kept to the smallest area possible, to be reclaimed following construction.

Determination of Effect

Because the US 89 project corridor is located in fringe habitat for the lynx, and because all impacts would occur within the existing corridor, loss of conifer and mixed forest habitats under Alternatives B and C would not result in substantial effects on lynx. Lynx may occur in these areas when following food sources or attempting to disperse; however, there is limited habitat availability on the east side of the corridor, and regular crossings of US 89 are not expected. Further, conservation measures to facilitate wildlife movement in the corridor are expected to benefit lynx. As a result, Alternatives B and C may affect but are not likely to adversely affect Canada lynx. Material source sites are expected to be located within a certain practicable distance from the project corridor. This distance would likely prohibit the site locations from occurring in large, contiguous tracts of conifer forest that provide lynx habitat. Thus, material source sites may affect but are not likely to adversely affect Canada lynx. Further, there is no suitable habitat for Canada lynx in the Duck Lake Road corridor and implementation of this option would not affect Canada lynx. In their biological opinion issued on January 28, 2005, the USFWS concurred with this determination.

Bull Trout

Direct Effects

The no-build alternative would require no earthwork, construction activities, or changes in the existing roadway configuration. Therefore, no direct impacts on bull trout would be expected.

Construction and post-construction

Bull trout do not occur in the Missouri River drainage and therefore would not be affected by Alternatives B and C. Bull trout in the Saint Mary River may be affected by construction under the Duck Lake Road Option if runoff from recently cleared and graded areas and soil stockpiles results in increased sediment entering streams in the corridor. However, implementation of BMPs and a temporary erosion and sediment control plan during construction would minimize this effect. Accidental spills of fuels, oils, concrete leachate, and chemicals used during construction could also enter project area streams; however, the contractor is expected to store and handle petroleum products, chemicals, cement, and other deleterious materials to prevent their entering streams and associated wetlands. Because bull trout do not occur in the streams along Duck Lake Road, no direct effects from habitat loss or construction disturbance are expected.

Indirect Effects

No indirect effects on this species have been identified for this project.

Interrelated and Interdependent Actions

Interrelated and interdependent actions associated with the US 89 improvement project would be similar to those described for the bald eagle. In addition, a roadside pullout is proposed in the Duck Lake Road corridor at reference post DLR-4.5. However, the location of this pullout is within the Missouri River drainage, which does not support bull trout. Impacts on fisheries from construction of this pullout are discussed in the Fisheries Resources section of this chapter.

Development of material source sites along Duck Lake Road may generate increased sediment in tributary streams to Saint Mary River. However, implementation of BMPs and a temporary erosion and sediment control plan during construction would minimize this effect.

Cumulative Effects

The proposed water pipeline project (described in Chapter 3 – Affected Environment, Services and Utilities under the Water Services subsection) would not contribute to cumulative effects on populations of bull trout because bull trout do not occur in the watersheds affected by the project. While the proposed Saint Mary Resort facility would be located within watersheds that support bull trout, no bull trout are known in the immediate project vicinity and are therefore not likely to be directly or adversely affected by this Saint Mary Resort project.

Conservation Measures

Conservation measures are the same as those described in the Fisheries Resources, Mitigation Measures section of this chapter.

Determination of Effect

The no build alternative and Alternatives B and C would have no effect on bull trout. The Duck Lake Road Option may affect but is not likely to adversely affect bull trout. In their biological opinion issued on January 28, 2005, the USFWS concurred with this determination.

Human Environment

Socioeconomic Considerations

Direct Effects

Alternative A is not expected to result in short-term construction-related or lasting post-construction impacts on social and economic issues in the project area.

Construction

Population

Construction of the action alternatives would not result in any change to the population of the Blackfeet Indian Reservation, Glacier County, or Montana. While some workers would be from outside the area, few are expected to permanently relocate to the area.

Employment

In accordance with the current memorandum of understanding, hiring requirements would be determined through a project specific agreement between the Blackfeet Nation and Montana Department of Transportation. As a result, Native Americans would secure some portion of the jobs generated by the proposed project. Given the high rate of unemployment on the reservation, there would be sufficient labor available for the project.

Construction of Alternatives B and C would not substantially affect tourism and tourism-related employment on the Blackfeet Indian Reservation, Glacier County, or in Glacier National Park. Travelers can avoid construction along US 89 by using Duck Lake Road (if no construction is simultaneously occurring on that road) as an alternative.

The seasonal café/general store at Kiowa may suffer a loss of tourist-related business during roadway construction along US 89, especially if travelers seek an alternative route to avoid construction. The project corridor would likely be divided into several segments and constructed in several phases. Loss of tourist-related business at the café/general store at Kiowa would primarily occur when construction occurs from Kiowa to Hudson Bay Divide. This loss of business would be partially offset by increases in construction-related business. The net effect is uncertain. The café/general store and its customers would also experience temporary inconveniences such as increased noise, possible increases in dust pollution, and having to drive around construction vehicles and on temporary surfaces to access the site.

The privately owned campgrounds situated along US 89 also would suffer a loss of business during the construction period, especially if travelers seek an alternate route to avoid construction. In general, impacts on campgrounds would be greatest when roadway construction is being performed directly in front of a campground, which may lead to increases in noise and dust pollution and having to drive around construction vehicles and on temporary surfaces to access the facilities. Two of the campgrounds on US 89, nearest Browning, are a sufficient distance from the roadway that increased noise and dust pollution are not likely to deter tourists from camping at these sites. During periods when construction is being performed away from the campgrounds, indirect impacts to these businesses would be minor.

Construction of Alternative B is expected to cost (exclusive of right-of-way) approximately $45.9 million (2010 dollars), and Alternative C would cost (exclusive of right-of-way) approximately $49.6 million (2010 dollars). For a six-year construction duration, Alternative B would generate approximately 135 direct jobs and 15 indirect jobs, with a total of approximately 150 jobs. For a six-year construction duration, Alternative C would generate approximately 145 direct jobs and 20 indirect jobs, with a total of approximately 165 jobs (Montana Department of Labor and Industry 2000b and Council of Energy Resource Tribes 1993). These jobs would be temporary and would end soon after construction is finished.

Construction of the Duck Lake Road Option is expected to cost (exclusive of right-of-way) approximately $14.4 million (2006 dollars). It is estimated that this option would generate approximately 82 direct jobs for the 3 years of construction (Montana Department of Labor and Industry 2000b), with a total of approximately 94 jobs, 82 direct and 12 indirect (Council of Energy Resource Tribes 1993). These jobs would be temporary and would end soon after construction is finished.

The café near reference post DLR-33.5 may benefit from an increase in business if traffic is directed to Duck Lake Road during construction on US 89. During construction in improvement area 3 on Duck Lake Road, this business may lose some tourist-related business. The bed and breakfast at DLR-33 may lose some tourist-related business during construction within improvement area 3, which may be offset by an increase in business if traffic is directed to Duck Lake Road during construction on US 89. The bed and breakfast serves a high proportion of fisherman using Duck Lake. This user group is not expected to be deterred by roadway construction.

Income

Information about the division of construction costs between materials purchases and income is not currently known for the proposed project. However, based on guidance provided by the US Bureau of Economic Analysis Handbook for Regional Input-Output Modeling System (Bureau of Economic Analysis 1997) and information from other input-output models (e.g., Washington State Office of Financial Management, Forecasting Division 1993), it is estimated that 72 percent of the cost to construct the project would go to materials purchases and 28 percent would go to workers as income.

The proposed project is expected to result in an economic benefit to the community during construction activities.

Construction of Alternatives B and C would not substantially affect tourism and tourism-related income on the Blackfeet Indian Reservation, Glacier County, or in Glacier National Park. Travelers could avoid construction along US 89 by using Duck Lake Road as an alternative. Construction along Duck Lake Road is expected to be minor and would result in minor delays that would not affect tourism or tourism-related income.

Construction of Alternative B would result in the direct infusion of an estimated $12.8 million to the local economy, Alternative C would result in an estimated $13.9 million, and Duck Lake Road would result in an estimated $4.0 million. Based on the low income multiplier for the reservation of 1.12 (Council of Energy Resource Tribes 1993), very little new money would be generated: an estimated total infusion of $14.3 million for Alternative B, $15.6 million for Alternative C, and $4.5 million for Duck Lake Road. Given the low per capita income on the reservation and the high level of poverty, the proposed project would not lead to a shortage of goods or services and would not result in local inflation.

Housing

In order to live reasonably close to the job site, construction workers on large projects often rent housing in the local market and temporarily move to the area. Given the shortage of housing on the Blackfeet Indian Reservation, the contractor may have to furnish temporary housing for the construction workers for Alternatives B and C and the Duck Lake Road Option. Workers who are hired from outside the local area may also choose to live in campgrounds or motels during construction, which would provide a benefit to these local businesses.

Environmental Justice

Guidance provided to comply with Executive Order 12898 the *Environmental Justice Guidance Under the National Environmental Policy Act* (Council on Environmental Quality 1998) states that in order to form a minority/low-income community, the minority/low-income populations of the affected area should exceed 50 percent of the total population, or the minority/low-income populations should be “meaningfully greater” than the minority/low-income population in the general population or other appropriate unit of geographic analysis. Environmental justice is a consideration for this project because of the large minority population (84.2 percent of the project area is American Indian, Eskimo, or Aleut) and the high incidence of poverty (33.8 percent of the population is below the poverty level).

In order to ensure environmental justice through meaningful community representation, the Montana Department of Transportation has conducted scoping meetings, worked with the Blackfeet Nation, and offered newsletters to all interested parties.

Roadway construction of Alternatives B and C and the Duck Lake Road Option would disrupt traffic in the immediate area and would temporarily increase levels of noise and dust along US 89 and Duck Lake Road. Because there are only a small number of residences located in the immediate vicinity of the project, and because construction activity would be limited in duration at any one location, construction is not expected to be a major disruption. Therefore, these construction impacts have not been identified as major consequences and would not be substantial impacts for low income or minority populations. In addition, the Montana Department of Transportation would minimize or avoid these temporary construction impacts through implementation of best management practices. While the residents of the project area are minority and low income they are representative of the overall population on the Blackfeet Indian Reservation; therefore, the impacts resulting from the project would not fall disproportionately on minority and low income populations. The same populations that would experience project impacts would also capture a majority of the benefits. Nearby residents would be subjected to construction impacts and disruptions, but they also would enjoy the safety and convenience associated with the improved road. Residents of the reservation would also benefit from the infusion of money into the local economy and the construction jobs associated with the project.

In summary, minority populations would not suffer disproportionately high environmental impacts, and the benefits of the project to the affected community outweigh the impacts post-construction.

Post-construction

Population

Operation of the proposed project under Alternative B, C, or the Duck Lake Road Option is not expected to affect the population of the area, nor is it expected to change population growth rates in the project area.

Employment

Operation of the proposed project under any of the action alternatives would not have any post-construction impact to the society or economy of the area. After construction is complete, the business environment along the US 89 route would return to preconstruction conditions.

After the project's completion, operation of US 89 or Duck Lake Road is not expected to change employment on the reservation, within the county, or in the state.

Income

After construction is finished, the improved roadways would have little or no effect on income in the project area.

Housing

After construction is finished, the improved roadways would have little or no affect on housing resources in the area or on the demand for housing.

Environmental Justice

Environmental justice is a consideration because of the large minority population and the high incidence of poverty.

The proposed project has not been designed, revised, or situated based on the presence or absence of low-income or minority populations. The proposed project extends from the border of the community core area of Browning through rural areas to the Hudson Bay Divide. The proposed project does not require the siting and construction of a new road, but rather widens and improves the existing road. Because the proposed project is not within a community core area or an urban area, it would not affect neighborhood quality and community cohesion.

Indirect Effects

There are no indirect impacts associated with Alternatives B or C or the Duck Lake Road Option that would affect socioeconomic conditions.

Mitigation Measures

Because no impacts are expected under the no-build alternative, no mitigation measures are proposed.

Hiring for construction of any of the action alternatives will be in accordance with the current memorandum of understanding between the Blackfeet Nation and Montana Department of Transportation. The infusion of money into the local economy from the proposed construction project will benefit the Blackfeet Nation by decreasing unemployment and increasing income and economic activity on the reservation.

To minimize impacts on the café/general store at Kiowa and campgrounds on US 89 under Alternatives B and C, the Montana Department of Transportation will keep US 89 open to travel during construction and will minimize traffic delays to the extent feasible during the peak tourist season (Fourth of July through Labor Day).

To minimize impacts on the café at DLR-33.5 and the bed and breakfast establishment at DLR-33 under the Duck Lake Road Option, the Montana Department of Transportation will keep Duck Lake Road open to travel during construction and will minimize traffic delays to the extent feasible.

Displacements and Right-of-Way Acquisition

This discussion of property acquisition provides a preliminary estimate of the property to be acquired, either fully or partially, for the proposed project. This estimate is based upon the current preliminary roadway design, which has not yet been finalized. The final set of properties to be affected by the project would be determined only after the surveyor lays out the roadway alignment and the property owners and the Montana Department of Transportation negotiate property purchase arrangements.

The quantity of unimproved land to be acquired for the proposed project has been estimated using a proposed preliminary design for the project, but the estimate contained in this final EIS does not differentiate between the types of property to be acquired for the project.

All privately-owned property to be acquired for the project, whether residential or commercial, would be purchased by the Montana Department of Transportation for fair market value, regardless of land ownership type. An easement would be purchased for fair market value for all allotted and Tribal-owned lands.

Structural displacements were estimated by a review of preliminary designs and detailed maps.

Direct Effects

Under the no-build alternative, there would be no displacement or right-of-way impacts.

Construction

Selection of Alternative B would result in the acquisition of approximately 151 hectares (373 acres) of undeveloped property. Selection of Alternative C would result in the acquisition of approximately 154 hectares (381 acres) of undeveloped property. Selection of the Duck Lake Road would not result in the displacement of any residences or businesses; however, the acquisition of approximately 37 hectares (91 acres) of undeveloped property would be required.

Displacements and property acquisition for each of the action alternatives is summarized in Table 24.

Table 24. Summary of displacements and property acquisition required for the US 89 corridor project.

	Alternative B 9.8 Meters (32 Feet) Wide	Alternative C 11 Meters (36 Feet) Wide	Duck Lake Road Option
Residences	0	0	0
Businesses	0	0	0
Property [a]	151 hectares (373 acres)	154 hectares (381 acres)	37 hectares (91 acres)

[a] The area of property acquisition is approximate.

The current alignment for Alternatives B and C avoids the café/general store at Kiowa and would not require displacing the business. Tourist-related business at the café/general store and at privately owned campgrounds along US 89 may decline during construction, especially if travelers seek an alternate route to avoid construction. However, construction-related business would likely increase. The net effect is uncertain.

Property along Duck Lake Road that is needed for the project would be purchased prior to construction and would become part of the Duck Lake Road right-of-way. Acquisition of the café near reference post DLR-33.5 and the bed and breakfast establishment at DLR-33 is not required for implementation of the project, although construction could disrupt those businesses. This disruption may be partially offset by an increase in construction-related business from improvements along US 89 and Duck Lake Road.

Post-construction

After construction of the action alternatives is complete, the business environment along US 89 and Duck Lake Road would return to preconstruction conditions.

Indirect Effects

There are no indirect impacts associated with Alternatives B or C or the Duck Lake Road Option that would affect displacement or right-of-way acquisition.

Mitigation

Because no impacts are expected under the no-build alternative, no mitigation measures are proposed.

The Montana Department of Transportation will purchase property at fair market value or will purchase an easement for unimproved trust lands at fair market value. The acquisition program will be conducted in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Public Law [PL] 91-646), as amended and the Uniform Relocation Act Amendments of 1987 (PL 100-17).

Acquisition of the café/general store at Kiowa and the Aspenwood Café and campground is not required for implementation of the project, although construction of Alternative B or C along US 89 could disrupt business for the café/general store for a period of up to 3 years. This disruption may be partially offset by an increase in construction-related business. To minimize impacts on the café/general store at Kiowa and the Aspenwood Café and campground on US 89, the Montana Department of Transportation will keep US 89 open to travel during construction and will minimize traffic delays to the extent feasible during the peak tourist season (Fourth of July through Labor Day).

To minimize impacts on the café near reference post DLR-33.5 and the bed and breakfast establishment at DLR-33, the Montana Department of Transportation will keep Duck Lake Road open to traffic and will minimize traffic delays to the extent feasible.

Land Use and Farmlands

Direct Effects

Under the no-build alternative, the existing US 89 and Duck Lake Road project corridors would be maintained and would remain operational. With or without improvement of the road corridor, some residential or commercial development may occur in the corridor. However, no substantial changes in land use or use of farmlands would be expected from the no-build alternative.

Construction

Road widening, proposed realignments, and proposed pullouts would require obtaining approximately 151 hectares (373 acres) of additional right-of-way for Alternative B, and approximately 154 hectares (381 acres) for Alternative C. Right-of-way would be purchased from private landowners along the highway corridor. Landowners would be compensated for their loss of land. An easement would be purchased for right-of-way needs on Tribal lands and Indian allotted trust lands. Based on preliminary estimates of right-of-way needs for the project, approximately 108 hectares (268 acres) of allotted and Tribal lands would be affected under Alternative B, and under Alternative C approximately 111 hectares (273 acres) of allotted and Tribal lands would be affected. Right-of-way would be acquired only as needed to construct the roadway, accommodate the new width, implement realignments, and provide pullouts and informational kiosks. Where topographic features, safety issues, and environmental concerns restrict road widening, the width of the right-of-way may be reduced.

Within the Duck Lake Road corridor, approximately 37 hectares (91 acres) of land would be acquired for right-of-way needs. Of this total, approximately 16 hectares (39 acres) of Tribal lands and Indian allotted trust lands would be affected for right-of-way.

Post-construction

Implementation of the proposed project would result in the conversion of land from one land use to another. No substantial changes in land use or development patterns would be expected from the implementation of Alternative B or C, because the existing corridor does not limit traffic levels or access and use of adjacent lands. Widening the US 89 roadway corridor and providing pullouts and informational kiosks would facilitate recreational access to fishing and hunting opportunities in the project area and may generate a modest increase in use of these facilities. The wider shoulder under Alternative C would better accommodate bicyclists and would further facilitate recreational opportunities in the project area. A more detailed discussion of expected project effects on recreational access and use patterns is presented in the Recreation section of this chapter. Widening the roadway may generate a modest increase in tourist traffic, but is not expected to contribute substantially to increased traffic levels over those projected for future conditions without road improvements. Road improvement may spur development of roadside facilities; however, current and anticipated future tourist use patterns will probably limit this type of development to moderate levels. A more detailed discussion of expected project effects on local businesses and employment opportunities is presented in the Socioeconomic section of this chapter. The Blackfeet Tribal Land Department and the Land Committee of the Blackfeet Tribal Business Council would ultimately dictate the types of development that may occur on Tribally-owned trust property within the project area.

The right-of-way would be fenced through the entire corridor as required for all Montana Department of Transportation projects. This requirement is contained in MCA 60-7-103, which states in part: *…the department shall fence the right-of-way of any part of a primary or secondary highway or a county road or bridge that is constructed or reconstructed after July 1, 1969, through open range where livestock present a hazard to the safety of the motorist.* This law includes an exception (Section 60-7-103(3)) to the fencing requirement where an improved secondary highway passes through open range in a county park, a condition not applicable to the US 89 project. Livestock is present through much of the project corridor and animal-vehicle collisions have occurred along this stretch of US 89. Incidental grazing that currently occurs in portions of the right-or-way would cease. No farmlands of local or statewide significance or listed as prime or unique were identified in the US 89 project corridor.

No long-term impacts on land use are expected to result from the Duck Lake Road Option. No farmlands of local or statewide significance or prime or unique farmlands were identified along the Duck Lake Road corridor.

Indirect Effects

Potential indirect effects to farmlands from Alternatives B and C and the Duck Lake Road Option include noxious weeds that spread from road corridors onto adjacent lands.

As discussed above, some minor indirect impacts to land use may result from redevelopment of the roadway corridor, including the development of material source sites. The Blackfeet Tribal Land Department and the Land Committee of the Blackfeet Tribal Business Council would ultimately dictate the types of development that may occur on Tribally-owned trust property within the project area. Development within the project area on fee property or individual trust property is not subject to Tribal approval.

The area in the vicinity of the project corridor is expected to experience some continued development with or without the project. While induced growth is often attributed to roadway projects, improvements to existing roadways are typically not the primary cause of growth in an area. Growth is the result of many factors, including local conditions such as proximity to good jobs; availability of affordable housing; tax rates; quality of schools; the presence of adequate infrastructure, including roads; and presence of aesthetic and recreational resources. Ultimately, growth is controlled by existing land use policies and plans as well as local, regional, and national economic conditions and the other factors listed above. The uncertainty in future economic conditions, and the difficulty in assessing the influence of the many factors listed above that influence growth, results in considerable uncertainty regarding the rate and pattern of future growth.

The scope of indirect effects from the Duck Lake Road Option will likely be minimal.

Mitigation Measures

Because substantial changes in land use are not expected to result under the no-build alternative, no mitigation is proposed.

Because substantial changes in land use are not expected to result from the action alternatives, no mitigation is proposed. The *Blackfeet Tribal Comprehensive Land Use Plan*, which is currently being drafted, will provide the most appropriate opportunity and strategy to control or enhance patterns of economic development within the project corridor.

Right-of-way will be acquired only as needed to construct the roadway, accommodate the new roadway width, implement realignments, and provide pullouts and informational kiosks. The Montana Department of Transportation will purchase property at fair market value or will purchase an easement for right-of-way needs on Tribal lands and Indian allotted trust lands. Where topographic features, safety issues, and environmental concerns restrict road widening, the width of the right-of-way may be reduced.

Transportation Systems

Direct Effects

Under the no-build alternative, post-construction traffic volumes along US 89 and Duck Lake Road would increase due to a general increase in background traffic levels. Table 25 compares estimated annual average daily traffic (AADT) in the year 2000 with projected AADT for 2025 for various roadway sections within the corridor.

Table 25. Current and future traffic volumes in the US 89 corridor.

Location	2000 AADT	2025 AADT
US 89 – west of US 2/US 89 junction	1,000	1,320
US 89 – southeast of Kiowa	640	1,510
US 89 – north of Kiowa	690	1,450
US 89 – south of Saint Mary	890	1,990
Duck Lake Rd – east of US 89	660	980
Duck Lake Rd – north of Starr School Rd	785	1,170

Under Alternative A, the level of service for the section of US 89 from Browning to Kiowa for the design year 2025 would decrease to LOS C as traffic volumes increase (Table 26). For the design year 2025, the section of US 89 from Kiowa to Hudson Bay Divide would also decrease to LOS C. Under the no-build alternative, the existing insufficient roadway shoulders and pullout areas for bicycle and pedestrian use would continue.

Table 26. Existing and future expected level of service for roadway segments in the US 89 project area.

Roadway Section	2000	Alternative A 2025	Alternative B 2025	Alternative C 2025
US 89 – Browning to Kiowa	A	C	C	C
US 89 – Kiowa to Hudson Bay Divide	B	C	C	C
Duck Lake Road	A	A	A	A

Under the no-build alternative, the level of service would remain at LOS A along Duck Lake Road for the design year 2025. The level of service would not change because expected annual growth rate is only 1.6 percent. Currently, Duck Lake Road is underused: only 6 percent of its total capacity is realized. In 2025, with a growth rate of 1.6 percent, only 9 percent of its total capacity would be used.

Construction

During construction of Alternatives B and C and the Duck Lake Road Option, US 89 and Duck Lake Road would remain open; however, travel times along the roadway would increase. Pilot cars would probably be used to lead traffic through the construction zone, and delays of up to 40 minutes are possible (up to a 30-minute wait for the pilot car plus an additional 10 minutes for slower travel speeds through the construction zone). Access to properties adjacent to the construction zone would be less convenient for periods of several weeks to a month or more. Construction of US 89 would likely occur in several phases of approximately two years each, totaling approximately six to eight years of construction.

Post-construction

Due to the general lack of nearby alternative routes from which traffic could be drawn to the improved roadway, motorized traffic volumes under Alternative B are expected to increase at the same rate as the no-build alternative. With implementation of the Duck Lake Road Option, truck traffic volumes on US 89 would decrease by approximately one percent. Alternative B provides a shoulder width of 1.2 meters (4 feet) on either side of the roadway, which would enhance bicycle safety compared to the no-build alternative and may result in an increase in bicycle traffic compared to the current levels of use. Post-construction impacts under Alternative C would be similar, although the wider shoulders of 1.8 meters (6 feet) would result in an incremental increase in safety for bicyclists compared to Alternative B.

Similar to Alternative A, the level of service on US 89 from Browning to Kiowa under Alternatives B and C would decrease to LOS C for the design year 2025 (Table 26). (The level of service calculations for this alternative assume implementation of the Duck Lake Road Option and the resulting one percent decrease in truck traffic volumes on US 89). The level of service on US 89 from Kiowa to Hudson Bay Divide would also decrease to LOS C for the design year

2025. The Montana Department of Transportation goal for all roadway projects is to achieve LOS C or better.

Accident frequency on US 89 would be expected to be less than under the no-build alternative because of the reductions of both vertical and horizontal curves in the roadway and the resulting improvements in sight distance. In addition, right-of-way fencing would be installed throughout the corridor to keep domestic livestock off the roadway.

Under the Duck Lake Road Option, Duck Lake Road would be designated as a truck route, resulting in increased traffic volumes along Duck Lake Road and decreased volumes along US 89. The frequency of accidents along Duck Lake Road would be expected to decrease with implementation of this option, with improvements in the unsafe pavement conditions in improvement area 3 and an increase in the radius and slope of the curve in improvement area 2 to lessen its severity.

Designating Duck Lake Road as a truck route would result in an approximate 1.3 percent traffic volume increase on Duck Lake Road. Despite the expected increase in truck traffic volumes, the level of service would remain at LOS A for the design year 2025, based on the overall low traffic volumes on Duck Lake Road, which is currently under-used.

Indirect Effects

There are no indirect impacts associated with Alternatives B and C or the Duck Lake Road Option that would affect transportation.

Mitigation Measures

No mitigation measures are proposed for the no-build alternative.

Mitigation for increased travel times and general traveler inconvenience during construction will include the following measures for Alternatives B and C and the Duck Lake Road Option:

- Contractor preparation and implementation of a detailed traffic control plan (with approval by Montana Department of Transportation) describing methods for maintaining access to adjoining properties, keeping one lane of traffic open at all times, and minimizing traffic delays, all in accordance with Montana Department of Transportation specifications and plans and the most recent *Manual on Uniform Traffic Control Devices*

- Preparation and implementation of a public information plan by the Montana Department of Transportation to warn motorists in advance of construction activity and indicate potential alternative routes

- Installation of work zone signage to alert motorists of construction activity

- Removal of work zone signage when construction is complete

- Coordination with Glacier National Park—in the event that Going-to-the-Sun Road reconstruction occurs when US 89 construction is in progress—to minimize travel delays, particularly during peak travel times (Fourth of July through Labor Day).

Bicycle and Pedestrian Facilities

The action alternatives do not require acquisition of public bicycle and pedestrian facilities. However, the US 89 project corridor directly serves Glacier National Park, and US 89 is a conduit for bicyclists and incidental pedestrians making their way south to Yellowstone National Park, or traveling north to Canada's Waterton Lakes National Park, Jasper National Park, and Banff National Park. Although pedestrian use is incidental on US 89 (which is not a recreational resource itself), and bicycle use is low between Kiowa and the Hudson Bay Divide, US 89 is a recreational channel for occasional bicyclists and pedestrians.

Direct Effects

Under the no-build alternative, the existing insufficient roadway shoulders and pullout areas for bicycle and pedestrian use would continue.

Construction

Bicyclists and pedestrians along US 89 would encounter limited access in construction areas along US 89. Short-term impacts on bicyclists and pedestrians would include construction equipment and construction-related noise encroaching areas used by bicyclists and pedestrians, such as scenic overlooks, wildlife viewing areas, hunting and fishing areas, and local campgrounds. Bicyclists may experience delays during construction. The construction-related impacts under Alternatives B and C would be similar. The intensity and duration of the construction-related impacts discussed above would be slightly greater under Alternative C.

The potential construction-related impacts associated with the Duck Lake Road Option would be similar to those for Alternatives B and C. However, because the work proposed on Duck Lake Road is limited to three specific areas, the duration and intensity of those impacts would be less for Duck Lake Road than for US 89. Construction would primarily affect pedestrians in the vicinity of Cut Bank Creek at reference post DLR-4.5.

Post-construction

Post-construction, proposed curve realignments, wider shoulders, and increased clear zones would improve visibility in the road corridor, thereby increasing the safety for bicyclists. These improvements would create a more relaxed and enjoyable recreational experience for bicyclists.

Alternative B also provides a shoulder width of 1.2 meters (4 feet) on both sides of the roadway, which would enhance bicycle safety compared to the no-build alternative and may result in increased use of the roadway by bicyclists compared to the current levels of use. Alternative C provides a shoulder width of 1.8 meters (6 feet) on both sides of the roadway, which would enhance bicycle safety compared to Alternative B and may result in increased use of the roadway by bicyclists compared to the current levels of use.

Direct post-construction impacts resulting from the Duck Lake Road Option are not anticipated, as the proposed changes would not substantially alter the speed, level, or type of traffic using this roadway. Construction of an off-road parking area in improvement area 1 would improve pedestrian access to Cut Bank Creek.

Indirect Effects

There are no indirect impacts associated with Alternatives B or C or the Duck Lake Road Option.

Mitigation Measures

Because no impacts are expected under the no-build alternative, no mitigation measures are proposed.

Mitigation measures for impacts on bicyclists and pedestrians from Alternatives B and C include the following:

- Implementation of a traffic control plan and public information plan as submitted by the contractor and approved by the Montana Department of Transportation will warn bicyclists and pedestrians in advance of construction activity and indicate possible alternative routes.

- In the event that Going-to-the-Sun Road reconstruction occurs concurrently with US 89 construction, the Montana Department of Transportation will coordinate with Glacier National Park to minimize traffic delays to the extent feasible, particularly during peak tourist season (Fourth of July through Labor Day).

- The Montana Department of Transportation will keep US 89 open to travel during construction and will minimize traffic delays to the extent feasible during the peak tourist season (Fourth of July through Labor Day).

In addition, the use of shoulder rumble strips in accordance with MDT policy (latest revision dated June 23, 2000) will be considered during final design of Alternative C to provide additional safety for bicyclists.

Under the Duck Lake Road Option, no mitigation measures are needed and no mitigation measures are proposed.

Services and Utilities

Direct Effects

Services

The no-build alternative would have no impact upon existing public services, including emergency services, school bus services, Eagle Shield meals, and solid waste collection. With the no-build alternative, safety and efficiency issues along US 89 would remain unchanged and conditions which render Duck Lake Road undesirable to truck travelers would remain.

Utilities

The no-build alternative would have no impact on existing public utilities, including water, wastewater treatment, natural gas, sanitary service, electricity, and telecommunications within the US 89 and Duck Lake Road corridors.

Construction

Services

It is anticipated that most construction for Alternatives B and C and the Duck Lake Road Option would occur from spring through summer. The proposed construction time may be longer for Alternative C due to the increased roadway width. Temporary lane closures resulting in traffic delays could occur during construction on US 89 associated with either alternative and on Duck Lake Road for the option. Emergency service providers would develop contingency plans in coordination with contractors to reduce response time delays during construction. Blackfeet Transit, Browning Public Schools, and the Eagle Shield meals-on-wheels program may need to develop alternative routes and contingency plans to ensure transportation and in-home senior services continue during construction. School bus routes would not be affected during the summer months.

Solid waste collection services along the Kiowa/Starr School Road collection route are provided once each week, year around. Contractors would coordinate with the Blackfeet Utilities Commission to schedule pick-up days or times that avoid peak construction activities.

Duck Lake Road is used daily for solid waste pick-up services during summer months. Construction activities and solid waste collection times along Duck Lake Road would be coordinated to avoid excessive impact on the Blackfeet Utilities Commission solid waste collection schedule. In addition, the commission may need to develop alternate routes or schedules and contingency plans to ensure solid waste collection services continue during construction.

Utilities

The potential disruptions to utility services during construction of Alternatives B and C would likely be minimal because temporary connections to customers typically are established before relocating utility conveyances and connections. Project construction is not likely to affect the major utility facilities in Browning, including the water main west of the city; however, the current cover of the water main would be maintained as the roadway is widened. Wastewater treatment is confined to municipalities and would not be affected by proposed roadway realignment activities.

Natural gas pipelines in the proposed project area are located sufficiently deep to avoid construction-related impacts. As a result, the proposed alternatives for US 89 are unlikely to have an impact on these services.

Impacts on telecommunications cables and utility lines along US 89 may occur, especially in areas where substantial realignments are proposed and at sites where substantial cutting is required. For example, near reference post 10 where US 89 is constrained by dwarf aspen stands on both sides of the road, distribution lines run very close to the road and would experience impact from road widening. In those areas where utility services are close to the roadway, impacts associated with either alternative would be avoided by moving cables and electrical lines outward from the existing roadway to avoid areas where substantial construction is proposed or by widening the roadway to only one side. As a result, once an alternative is selected, precise locations and depths of all utilities would need to be verified in the design phase and prior to construction to determine where relocations would be required. Relocations of telecommunication and electrical services would likely occur more frequently under Alternative C than Alternative B.

The only utilities along Duck Lake Road that would potentially be affected by proposed construction activities are telecommunications cables and electrical lines. Telecommunications cables run alongside Duck Lake Road on both and alternating sides. These cables likely would not be affected by construction in improvement area 3; however, they would likely require relocation for construction in improvement area 2. Similarly, the electrical distribution and transmission lines along Duck Lake Road likely would not be affected by road repairs in improvement area 3 but would require relocation in improvement area 2. For the most part, electrical lines are a sufficient distance from the existing roadway to ensure minimal impacts associated with proposed construction activities.

Post-construction

Services

Alternatives B and C are not expected to increase fire, police or other emergency service needs in the project area. Any fire suppression required on reservation lands would be conducted in accordance with Bureau of Indian Affairs fire safety standards and guidelines. Similarly, transportation services for schools and senior programs are not expected to increase as a result of the proposed project. But the proposed widening and straightening of US 89 would improve the efficiency and safety of transportation, emergency, and solid waste collection services. No post-construction or lasting impacts associated with the Duck Lake Road Option are anticipated.

Utilities

Normal electric service, potentially affected during construction, would be restored to the residents and businesses in the project area under Alternatives B and C and no long-term impacts are expected. No additional utility service is proposed as part of this project, and no utility impacts in the Blackfeet Indian Reservation or surrounding communities are expected. No post-construction or lasting impacts associated with the Duck Lake Road Option are anticipated.

Indirect Effects

There are no indirect impacts associated with Alternatives B and C and the Duck Lake Road Option.

Mitigation Measures

No mitigation measures are proposed for the no-build alternative.

Mitigation measures for impacts on public services and utilities from Alternatives B and C and the Duck Lake Road Option include the following:

- Coordinate anticipated road closures or schedules during construction with the fire departments on the reservation and in surrounding communities, as well as the police service in the area, to ensure that reliable emergency access is maintained and alternative plans or reroutes (where possible) are developed to avoid substantial delays in response times.
- Identify precise locations of underground utilities prior to construction using base maps, as-built drawings, and field checks.
- Appropriate use of pipe support systems, trench sheeting and shoring, or other precautionary measures to minimize potential for damage to exposed utilities.
- Work with the city of Browning, Indian Health Service, Glacier Electric Co-op, Blackfeet Utilities Commission, Montana Power, AT&T, and Three-Rivers Disposal to minimize potential utility service disruptions during construction; utility companies would be required to notify customers of any planned disruptions.
- If feasible, bury any utilities that would be affected during construction.

Hazardous Materials

Direct Effects

No construction-related or post-construction impacts are expected to result from the no-build alternative.

Construction

Potential short-term impacts could result from the use of hazardous materials (lubricants, fuels, solvents, etc.) during construction of Alternatives B and C. While no documented or potential release sites have been identified in the right-of-way or on adjacent properties, project construction could encounter sites with existing soil or ground water contamination. The likelihood of impacts (releases) from construction activities is low. The likelihood of impacts from encountering existing contaminated sites depends upon the extent and character of contamination and would be minimized by identifying the sites and potential sites prior to construction and employing appropriate control, cleanup, and disposal measures. A variety of impacts, both beneficial and adverse, could result from encounters with existing hazardous materials sites. Potential beneficial effects include:

- Contamination that otherwise would remain in place and potentially migrate may be discovered and addressed by the project.

- Contamination may be cleaned up faster to accommodate project construction.

- Contamination may be prevented by removing potential existing sources, such as underground storage tanks, before they release.

Potential adverse effects include:

- Contaminated materials may be uncovered, allowing more direct exposure to the public.

- Contamination may be spread as a result of construction.

Project impacts on the environment at each hazardous materials site cannot be assessed without detailed evaluations of site-specific conditions. However, with proper control techniques, contaminated soil and any contaminated demolition material (e.g., asbestos, lead-based paint) would be removed and disposed of or treated at locations designed for hazardous materials management; contaminated ground water would be treated either on site or at a licensed offsite facility. By using licensed carriers and vehicles equipped for the task, limited risk of public exposure would occur during removal and transport off site. Onsite treatment of ground water would employ techniques engineered for the specific contaminants encountered.

As far as has been determined at this time, there are no contaminated sites that will be affected by this project.

For the Duck Lake Road Option, impacts associated with the use of construction equipment, such as generators and construction vehicles, would be the same as those described for Alternatives B and C. No documented release sites have been identified on the right-of-way or on adjacent properties. However, if a hazardous material release site is encountered during construction, impacts would be the same as those described for Alternatives B and C.

Post-construction

No post-construction impacts from releases or encounters with hazardous materials are expected for Alternatives B and C and the Duck Lake Road Option.

Indirect Effects

There are no indirect impacts associated with Alternatives B and C and the Duck Lake Road Option.

Mitigation Measures

No mitigation measures are proposed for the no-build alternative.

There would be special provisions included in the contract documents to address management of contaminated soil and ground water, as needed.

If hazardous materials are encountered during construction, the contractor will stop work and coordinate with the MDT Project Manager to ensure the material is managed in accordance with applicable laws and regulations.

Long-term maintenance of the roadways will include standard operating procedures to address management of hazardous materials if hazardous materials are encountered.

Historic and Cultural Resources

Direct Effects

Under the no-build alternative, no construction-related or long-term impacts on historic or cultural resources are expected.

Construction

Cultural resources and historic properties have been identified in the project corridor and adjustments have been made to avoid most of these sites under Alternatives B and C and the Duck Lake Road Option. In addition, the Blackfeet Cultural Department has agreed to move a few cultural resources (tipi rings and cairns) and several cloth-offering sites from the project corridor (see Section 4(f) Documentation in Appendix D). Therefore, construction is not expected to disturb these culturally sensitive sites. Additional impacts would occur on historic bridges and roads in the project corridor and modifications to these historic resources would be in accordance with the Section 4(f) evaluation contained in Appendix D.

Post-construction

Project design engineers, Montana Department of Transportation, Bureau of Indian Affairs, and Blackfeet Nation representatives met in the project corridor and determined Tribal priorities for avoiding impacts on cultural and historic resources in the project corridor. As a result, the preliminary roadway design avoids impacts on these resources where feasible. Impacts on a few sites and the numerous cloth-offering sites in the project corridor are unavoidable. Impacts on the previously documented historic properties are described below.

Within the US 89 corridor, remnants of a historic roadway, the Blackfeet Highway (Site 24GL846) are evident. These include stretches of road exhibiting a raised, constructed bed or grade. Segments of these remnants would be eliminated within the proposed reconstruction limits of US 89. Alternative C would disturb slightly more areas of historic roadways than Alternative B. The Duck Lake Road Option would eliminate segments of several historic roads, including the Browning to Babb to Saint Mary Stage Road (Site 24GL208) and Old Duck Lake Road (Site 24GL209) and possibly the Browning to Peskan Road (Site 24GL210).

The South Fork Milk River Bridge (Site 24GL213) is a reinforced concrete arch bridge, eligible for listing on the National Register of Historic Places. Based on preliminary investigations, the bridge would be left in place and widened under Alternatives B and C. However, if the bridge cannot be brought to current standards through modification of the existing structure, it would be removed and replaced with a new bridge.

The South Fork Cut Bank Creek/Kiowa Bridge (Site 24GL212), also eligible for listing on the National Register of Historic Places, would be removed and replaced with a new bridge under Alternatives B and C. The bridge requires removal and replacement because the existing structure is in poor condition and cannot be brought to current bridge standards. In addition, the structure constricts streamflow, creating a pool upstream of the bridge and causing erosion during high flows. Retaining a portion of the bridge or removing it completely and reusing it somewhere else was also considered. However, because of the nature of the materials used in its construction, it is not possible to retain a portion onsite or even remove it intact to be reused at another site. As a result, prior to its removal, the bridge will be photographed, measured, and described in detail in a written summary and historic record of the site. This record will be retained at the Blackfeet Cultural Department and the Montana State Historic Preservation Office.

Evidence of the Old North Trail (no site number) was not observed during field surveys of the US 89 and Duck Lake Road project corridor and no impacts on this resource are expected.

Indirect Effects

Development of material source sites any of the action alternatives could result in additional disturbance of historic and cultural sites. It is expected that any new material source sites developed for this project would undergo a cultural resources review by the Blackfeet Cultural Program prior to the start of operation.

Mitigation Measures

Because no impacts are expected, no mitigation measures are proposed under the no-build alternative.

Post-construction impacts on cultural and historic sites in the corridor have been avoided at several locations through modifications to the preliminary roadway design for Alternatives B and C and the Duck Lake Road Option. No additional mitigation is required for these sites. Several cloth-offering sites that lie within the project corridor would be directly affected by the proposed project. These cloth-offering sites located within the construction limits will be moved prior to construction in accordance with Resolution Number 53-2002 as approved by the Blackfeet Tribal Business Council on January 17, 2002. While numerous cultural resources have been identified and avoided in the project corridor, field surveys may not have identified all cultural resources in the project corridor. Therefore, construction activities have the potential to encounter additional sites. The following measures would be implemented during construction under any of the action alternatives:

- If a cultural resource is encountered during construction, the contractor will stop work and coordinate with the MDT Project Manager, who will notify the MDT cultural resource specialist. The MDT cultural specialist will coordinate with the Blackfeet Cultural Department and the State Historic Preservation Office, as appropriate.

- Cloth-offering sites within the project corridor will be moved by the Blackfeet Cultural Department.

- Historic roads and bridges in the project corridor are covered under a programmatic agreement, dated May 1989, between the Montana Department of Transportation, Federal Highway Administration, Advisory Council on Historic Preservation, and Montana State Historic Preservation Office (Appendix D). The state will meet its obligations under USC Title 23, Section 144(o)(4) which states in part:

***Preservation**—Any State which proposes to demolish a historic bridge for a replacement project with funds made available to carry out this section shall first make the bridge available for donation to a State, locality, or responsible private entity if such State, locality, or responsible entity enters into an agreement to—*

(A) maintain the bridge and the features that give it its historic significance; and

(B) assume all future legal and financial responsibility for the bridge, which may include an agreement to hold the State highway agency harmless in any liability action.

The South Fork Milk River Bridge (Site 24GL213) and South Fork Cut Bank Creek/Kiowa Bridge (Site 24GL212) are historic bridges in the project corridor eligible for listing on the National Register of Historic Places and are considered important resources, thereby warranting protection under Section 4(f) of the Department of Transportation Act. There are no historic bridges in the area of project impact on Duck Lake Road.

A Section 4(f) evaluation for this project is included in Appendix D of this document. Measures proposed in the evaluation are summarized below.

- The South Fork Milk River Bridge (Site 24GL213) will retain some historic integrity as it undergoes construction. Based on preliminary investigations, one side of the bridge will retain its original concrete arch and the other side of the bridge that would undergo widening will be reconstructed to resemble the original concrete arch bridge. However, if the bridge cannot be brought to current standards through modification of the existing structure, this bridge may be removed and replaced. Prior to modification or removal, historic bridges and road segments will be documented in accordance with Historic American Buildings Survey and Historic American Engineering Record standards.

- The South Fork Cut Bank Creek/Kiowa Bridge (Site 24GL212) will be documented in accordance with Historic American Buildings Survey and Historic American Engineering Record standards.

- Prior to construction, historic road segments that may be affected by construction will be documented in accordance with Historic American Buildings and Historic American Engineering Record standards.

Recreation

The action alternatives do not require acquisition of publicly owned parks or recreational areas. However, the US 89 project corridor directly serves Glacier National Park, and US 89 extends between major recreational areas, including Yellowstone National Park and Canada's Waterton Lakes National Park, Banff National Park, and Jasper National Park. Although US 89 itself is not a recreational resource, a substantial proportion of the tourists visiting the project area rarely leave their cars while sightseeing. Therefore, changes in traffic or the visual quality of the corridor would have an impact on the sightseeing experience of those tourists. Visual impacts are discussed in the Visual Quality section of this chapter.

Direct Effects

No new construction or post-construction impacts on parks or recreational facilities would result from the no-build alternative.

Construction

During construction, access to Glacier National Park, campgrounds, and recreational areas would be limited due to lane closures, and the quality of the recreational experience would be reduced along the project corridor due to construction-related activities. Adverse impacts on parks and recreation would include construction equipment and construction-related noise encroaching on scenic overlooks, wildlife viewing areas, hunting and fishing areas, and local campgrounds. In addition, travelers destined for various campgrounds and entrances to Glacier National Park located adjacent to US 89 or passing through the project area to access recreational areas to the north and south may experience delays during construction. Because an increased road width is proposed under Alternative C, it would have an impact on a slightly larger area. Therefore, the intensity and duration of the short-term construction-related impacts would be greater under Alternative C.

Although there are four entrances to Glacier National Park accessible from US 89, only one (the Cut Bank Creek entrance) is within the project corridor. It is the least utilized eastern entrance to the park (Table 18). The Cut Bank Creek campground is accessible from this entrance and rarely fills to capacity during the peak season (July to August). Between 1990 and 1991, this entrance received an average of 1,598 visitors in August, whereas the Saint Mary entrance (the most popular eastern entrance) received an average of 120,479 visitors in August. Construction activities are not expected to result in temporary closures of the Cut Bank Creek entrance and, because of the distance (at least 6 kilometers [4 miles]) between construction activity and the campground, construction is not expected to have an adverse impact on the recreational quality of the Cut Bank Creek campground.

Tourists that are traveling through the project area may use alternate routes to avoid construction delays on US 89 and would therefore not utilize recreational opportunities accessible from the US 89 project corridor. Bicyclists may choose an alternate route based on safety concerns during construction. Construction-related economic impacts on local campgrounds and businesses are discussed under the Displacements and Rights-of-Way section of this chapter.

The potential construction impacts associated with the Duck Lake Road Option would be similar to those discussed above for Alternatives B and C. However, because the work proposed on

Duck Lake Road is limited to three specific areas, the duration and intensity of those impacts would be less for Duck Lake Road than for US 89. Although Duck Lake Road does not directly serve a publicly owned park or recreational area, there are recreational opportunities adjacent to the corridor, such as camping, hiking, hunting, fishing, bird watching, wildlife viewing, horseback riding, and snowmobile riding. Travelers heading to Duck Lake or other private recreation areas adjacent to Duck Lake Road may experience delays or be inconvenienced by the construction proposed under this option. However, adverse impacts on parks and recreation are not anticipated under this option.

Post-construction

In the long term, the proposed action under Alternatives B and C would enhance the recreational experience of individuals using the road for sightseeing. Visibility resulting from proposed curve realignments, wider shoulders, and increased clear zones would increase the safety for bicyclists and motorcyclists. These improvements would create a more relaxed and enjoyable recreational experience for bicyclists and motorcyclists and may result in increased use of the roadway by individuals utilizing those modes of transportation. The 11-meter (36-foot) roadway width proposed under Alternative C would provide slightly greater sight distance and more space for bicyclists, which would lead to an incremental increase in safety for bicyclists using US 89 compared to Alternative B.

The proposed highway improvements would also create opportunities for improved access to the eastern entrances to Glacier National Park and recreational areas adjacent to the roadway, which would promote increased public use of these facilities. However, assuming that many visitors choose this area based on its remoteness, increased use of the area would reduce the quality of the recreational experience for some individuals.

US 89 is most heavily traveled in the summer months, although the area is also accessed in the winter for cross-country skiing, snowshoeing, and snowmobile riding. The proposed widening and realignment would improve the safety of the roadway in the winter months and may lead to increased use of the area by recreational travelers in the winter as well.

The proposed improvements may promote a faster average speed for motorized vehicles at localized areas where improvement are made, and may lead to increased use of the roadway by local residents, who currently use Duck Lake Road as an alternate route between Browning and Saint Mary. The travel pace of visitors is generally slower than that of local traffic, particularly through scenic areas offering views of the mountains. With the pressure of faster-moving traffic attempting to pass, the sightseeing experience may be reduced for visitors. Proposed pullouts would partially mitigate this potential adverse impact.

Pullouts and scenic overlooks are proposed along the Cut Bank Creek valley, the Milk River valley, and several other key vistas in the corridor. Scenic and cultural pullouts would enhance opportunities for viewing scenic overlooks, bird and wildlife watching, photographing the area, and would improve access to fishing areas in the Cut Bank Creek valley.

Direct post-construction impacts resulting from the Duck Lake Road Option are not anticipated, as the proposed changes would not substantially alter the speed, level, or type of traffic using this roadway.

Indirect Effects

Depending on the location of material source sites for the action alternatives, operation of the site, truck hauling, and blasting may reduce the quality of the recreation experience in nearby areas.

Mitigation Measures

Because no impacts are expected under the no-build alternative, no mitigation measures are proposed.

Mitigation for potential adverse impacts resulting from Alternatives B and C are presented in Table 27.

Table 27. Mitigation measures for potential recreational impacts in the project area.

Potential Impact	Mitigation Measures
Construction activities and lane closures would limit access to Glacier National Park entrances and campgrounds and other recreational facilities near the project area.	Keep US 89 open to travel during construction and minimize traffic delays to the extent feasible during peak tourist season (Fourth of July through Labor Day).
Construction equipment and associated noise would encroach on adjacent scenic overlooks, wildlife viewing areas, hunting and fishing areas, and local campgrounds and reduce the quality of the recreational experience.	Store construction materials and equipment in designated stockpile and staging areas. Only equipment being used in the area of active construction would be located in the construction area, other equipment would be stored at staging areas.
Travelers may experience delays during construction.	Keep US 89 open to travel during construction and minimize traffic delays to the extent feasible during peak tourist season (Fourth of July through Labor Day).
The proposed improvements may promote a faster average speed for motorized vehicles and may lead to increased use of the roadway by local residents. The resulting increase in traffic volume and speed, associated noise, and visual distraction may reduce the sightseeing experience of visiting tourists and encroach upon adjacent recreational areas.	Provide a sufficient shoulder width for slower-moving tourists to pull over and allow faster-moving traffic to pass. Provide scenic pullouts for tourists.
Cumulative construction-related impacts resulting from proposed improvements on Going-to-the-Sun Road.	In the event that Going-to-the-Sun Road reconstruction occurs when US 89 construction is occurring, Montana Department of Transportation will coordinate with Glacier National Park to minimize traffic delays to the extent feasible, particularly during peak tourist season (Fourth of July through Labor Day).
Cumulative long-term impacts resulting from proposed improvements on Going-to-the-Sun Road (primarily increased use and development).	The *Blackfeet Tribal Comprehensive Land Use Plan*, which is currently being drafted, will provide the most appropriate opportunity and strategy to control or enhance patterns of land use and development within the project corridor.

Appropriate mitigation measures for the Duck Lake Road Option include the following:

- Construction materials and equipment will be stored in designated stockpile and staging areas. Only equipment being used in the area of active construction will be located in the construction area; other equipment will be stored at staging areas.
- The Montana Department of Transportation will keep Duck Lake Road open to traffic and will minimize traffic delays to the extent feasible.

Visual Quality

Aesthetic values and the perception of visual impacts are subjective and vary from person to person. Although this section attempts to present objective descriptions of the potential visual impacts of the proposed alternatives, it cannot address every individual's unique perception of the project area. This section's assessment of impacts is based on ideas of contrast and harmony underlying most systems of visual evaluation. Visual impacts were evaluated based on the predicted response of both viewers of the road and viewers from the road.

Direct Effects

No new construction impacts or post-construction impact on visual quality would result from the no-build alternative.

Construction

All proposed action alternatives would result in construction-related visual impacts. During construction, the visual quality of the project corridor may be compromised for both viewers of the road and viewers from the road, and access to scenic overlooks may be restricted, limited, or inconvenient. Adverse visual impacts to areas adjacent to the project corridors would result from the following elements of construction:

- Traffic congestion in areas of active construction
- Construction vehicles and equipment
- Clearing and grading activities resulting in exposed soils until replanting occurs
- Erosion control devices such as silt fences and straw bales
- Dust, exhaust, and airborne debris in areas of active construction
- Stockpiling of excavated material
- Staging areas used for equipment storage and construction materials.

Under Alternative C, the duration of construction-related visual impacts would be longer and the intensity of the construction-related impacts would be greater than under Alternative B. The area required for the 11-meter (36-foot) road width under Alternative C would result in more extensive clearing and grading, cut-and-fill activities, erosion control devices, and greater amounts of excavated materials than would be required to increase US 89 to a 9.8-meter (32-foot) width under Alternative B.

Under the Duck Lake Road Option, visual impacts would be similar to those described above for Alternatives B and C. Construction in the improvement areas and one section of realignment proposed under the Duck Lake Road Option would require much less time than the realignment and widening of US 89 proposed under Alternatives B and C. Individually, visual impacts resulting from the Duck Lake Road Option would have the shortest duration because this option does not propose widening or other changes throughout the corridor. The intensity of the visual impacts resulting from the Duck Lake Road Option would be negligible in comparison to the widening proposed for US 89.

Post-construction

The proposed project is not expected to result in increased traffic levels in the corridor above those predicted for future growth rates. Under all of the alternatives, including the no-build alternative, increased traffic levels over time may increase the demand for highway and tourist-related services. The improvements proposed for US 89 under the action alternatives may lead to increased use of this route by local residents who presently use Duck Lake Road as a preferred route. The expected growth of traffic and the potential increased use along the US 89 project corridor due to the proposed improvements could result in a proliferation of roadside development and associated billboard advertising and signage. Over time, this could lead to the degradation of the scenic quality of US 89.

Scenic pullouts would be incorporated into the final US 89 corridor design. Potential vista sites include views of the north and south forks of Cut Bank Creek valley, the South Fork Milk River valley, and the Rocky Mountains.

Permanent visual changes resulting from the action alternatives would be the most apparent to individuals who reside in or are familiar with the project area. Based on the proposed road widths, the intensity of the post-construction visual impacts would be slightly greater under Alternative C than for Alternative B. Under the Duck Lake Road Option, long-term visual impacts would be similar to those described for Alternatives B and C. Because the overall width of the roadway would not change and there would be a smaller area of proposed disturbance, the Duck Lake Road Option would have a much smaller visual impact than the other two action alternatives.

Proposed changes, resulting construction related visual impacts, and suggested mitigation are summarized in Table 28.

Table 28. Mitigation measures for construction-related visual impacts on the US 89 corridor.

Construction-Related Impact	Mitigation Measures
Traffic congestion in areas of active construction	Minimize traffic delays to the extent feasible during the peak tourist season (Fourth of July through Labor Day).
Clearing and grading activities resulting in exposed soils until replanting occurs	Replant sections of the corridor in accordance with the Montana Department of Transportation Standard Specifications.
Visually obtrusive erosion control devices such as silt fences, plastic ground cover, and straw bales	Maintain erosion control structures and remove them as soon as the area is stabilized.
Reduced visibility resulting from dust, exhaust, and airborne debris in areas of active construction	During dry periods, apply water to exposed soils to minimize airborne sediment.
Visually obtrusive stockpiling of excavated material and staging areas used for equipment storage and construction materials	Store construction materials and equipment in designated stockpile and staging areas. Only equipment currently used in the area of active construction would be located in the construction area, other equipment would be stored at staging areas.

Indirect Effects

If material source sites are developed for Alternatives B and C and the Duck Lake Road Option, they may degrade visual quality in their vicinity. However, since the location of these sites has not been determined it is difficult to predict the level or extent of this potential impact.

Mitigation Measures

Because no impacts are expected under the no-build alternative, no mitigation measures are proposed.

Mitigation measures for long-term visual impacts under Alternatives B and C and the Duck Lake Road Option are summarized in Table 29.

Table 29. Proposed changes to the US 89 corridor, potential long-term visual impacts, and required mitigation.

Proposed Change	Potential Long-Term Impact	Required Mitigation
Expanded road, shoulder width, clear zone; new signage; clearly marked center line and fog lines; guardrails; and new bridges	Alter the rural character and result in the appearance of a more modern two-lane highway	Plant adjacent cut-and-fill slopes with grasses and other low-profile plants.
Proposed cut-and-fill sections and road realignment	Block existing opportunities for scenic overlooks from US 89	Provide scenic pullouts in areas with exceptional opportunities for views and minimize fill that would block unique views.
Proposed bridges, guardrails, and culverts	Encroach upon the view of the road as well as the view from the road	None proposed.
Proposed scenic pullouts	Enhance opportunities for viewing land and water features	Beneficial impact; no mitigation needed.

Mitigation Summary

Table 30 summarizes the impacts and mitigation measures for each alternative evaluated for the US 89 project.

Table 30. Environmental impacts and mitigation measures by alternative.

No-Build Alternative (Alternative A)	Alternative B	Alternative C (Preferred Alternative)	Duck Lake Road Alternate Route
Geology and Soils			
Impacts ▪ No impacts are expected.	*Impacts* ▪ Excavation and fill activities would expose soils susceptible to erosion, landslides, and seismic hazards (i.e., liquefaction). ▪ Earthwork is estimated to be 1,150,000 cubic meters (1,504,000 cubic yards) of excavation and 1,000,000 cubic meters (1,308,000 cubic yards) of fill.	*Impacts* ▪ Impacts would be generally similar to those described for Alternative B but would affect a slightly larger area. ▪ Earthwork is estimated to be 1,300,000 cubic meters (1,700,000 cubic yards) of excavation and 1,100,000 cubic meters (1,439,000 cubic yards) of fill.	*Impacts* ▪ Impacts would be similar to those described for Alternative B. ▪ Earthwork is estimated to be 500,000 cubic meters (654,000 cubic yards) of excavation and 390,000 cubic meters (510,000 cubic yards) of fill.
Mitigation Measures ▪ No mitigation is required.	*Mitigation Measures Common to All Action Alternatives* ▪ All excavation and grading for roadways and slope stabilization will be designed and executed in accordance with recommendations of a geotechnical engineer based on site-specific soil exploration. ▪ Standard erosion control measures and best management practices (BMPs) will be implemented during the earthwork stages of the proposed project to control surface water drainage and reduce erosion. ▪ Appropriate seismic parameters will be used in final design of the roadway and for slope stabilization. ▪ If liquefaction-prone areas are encountered, soil improvement techniques will be considered during development of the final design to enhance the engineering properties of the soil.		
Floodplains			
Impacts ▪ Existing undersized culverts and bridges would continue to contribute to localized flooding.	*Impacts* ▪ A reduction in stream channel capacity at US 89 crossings in the project corridor is not expected under any of the proposed action alternatives. ▪ Additional impervious roadway areas draining to streams would lead to impacts from increased stormwater flow rates. Although the increased stormwater flows from the project corridor represent a minor amount of the total flow in these streams, the affected streams could experience minor adverse flooding impacts or increased channel scour.	*Impacts* ▪ Impacts would be the same as those described for Alternative B.	*Impacts* ▪ Impacts would be similar to those described for Alternative B.
Mitigation Measures ▪ No mitigation measures are proposed.	*Mitigation Measures Common to All Action Alternatives* ▪ All culverts to be replaced or constructed in the US 89 corridor will be designed in accordance with Montana Department of Transportation guidelines. ▪ All bridges to be replaced or constructed in the US 89 corridor will be designed to pass the 50-year flood and to provide the minimum required 0.3-meter (1-foot) clearance above the 100-year flood elevation to the low beam elevation. ▪ New stormwater outfalls associated with new or reconfigured surface drainage systems will be designed to prevent erosion over the long term, accounting for increased flow rates from the roadway.		

Table 30 (continued). Environmental impacts and mitigation measures by alternative.

<table>
<tr><th>No-Build Alternative
(Alternative A)</th><th>Alternative B</th><th>Alternative C (Preferred Alternative)</th><th>Duck Lake Road Alternate Route</th></tr>
<tr><td colspan="4">Water Resources</td></tr>
<tr>
<td>Impacts
▪ Structural and safety improvements at bridges may introduce sediment into surface waters.
▪ There would be continued runoff of vehicle pollutants entering surface waters.
▪ Existing undersized culverts and bridges would continue to contribute to localized flooding.
▪ No impacts on ground water are expected.</td>
<td>Impacts
▪ Short-term impacts on surface water quality would occur because of erosion associated with excavation and grading activities, roadway widening, and bridge replacement.
▪ Accidental spills and leaks from heavy equipment may result in decreased water quality in surface waters.
▪ New stormwater outfalls (i.e., drainpipe or ditch discharge points) at bridges would have localized effects on streamflow rates and water quality and would result in long-term erosion of channel bank areas if not maintained appropriately.
▪ A wider roadway would result in greater amounts of surface runoff conveyed to streams and wetlands.
▪ No impacts on ground water are expected.
▪ Increased rates and volumes of stormwater runoff would cause increased erosion in ditches and small streams and potentially would induce localized flooding in drainage conveyance systems if design measures are not implemented adequately to offset those flows.
▪ Improved ditches would increase conveyance efficiency of runoff to desired locations, potentially inducing high flow damage at the discharge points.</td>
<td>Impacts
▪ Impacts would be similar to those of Alternative B.
▪ There would be greater potential for soil erosion during construction due to the larger area affected.
▪ The greater impervious surface area under Alternative C would result in slightly greater volumes of runoff entering surrounding surface water.</td>
<td>Impacts
▪ Impacts would be similar to those of Alternative B.
▪ Adding off-road parking areas near Cut Bank Creek would result in sedimentation to Cut Bank Creek during construction and may contribute to decreases in water quality if runoff from the parking area is not directed away from the stream.</td>
</tr>
<tr>
<td>Mitigation Measures
▪ No mitigation measures are proposed.</td>
<td colspan="2">Mitigation Measures Common to Alternatives B and C
▪ To comply with the Clean Water Act, the Montana Department of Transportation and the contractor will obtain authorization from the U.S. EPA for a National Pollutant Discharge Elimination System permit. This permit requires the completion of a stormwater pollution prevention plan, including a description of BMPs and stormwater management controls appropriate for the construction site.
▪ Appropriate BMPs for the site will be selected from the current version of Erosion and Sediment Control Best Management Practices: Field Manual, prepared for Montana Department of Transportation.
▪ In accordance with MDT’s standard specifications, the contractor would be required to secure the necessary permits associated with material source sites, including those permits required to prevent a violation of water quality standards.
▪ New stormwater outfalls associated with new or reconfigured surface drainage systems will be designed to prevent erosion over the long term, accounting for increased flow rates from the roadway.
▪ Impacts of high flow damage at discharge points on drainage ditches would be managed by considering erosion prevention in the design of the ditches.</td>
<td>Mitigation Measures
▪ Mitigation measures are similar to those for Alternatives B and C.
▪ As appropriate, the off-road parking area at Cut Bank Creek will be sloped to the southeast, so that runoff flows away from the stream. As a result, runoff will move to an area of heavier vegetation and higher filtering capacity, reducing runoff to the stream.</td>
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Table 30 (continued). Environmental impacts and mitigation measures by alternative.

No-Build Alternative (Alternative A)	Alternative B	Alternative C (Preferred Alternative)	Duck Lake Road Alternate Route
Air Quality			
Impacts ▪ Although background traffic volumes are projected to increase under the no-build alternative, future levels of criteria pollutants from highway traffic and maintenance would not be expected to exceed any national ambient air quality standards (NAAQS).	*Impacts* ▪ Roadway construction would generate fugitive dust emissions resulting in localized decreases in air quality. However, exceeding the 24-hour average particulate matter NAAQS is not expected, nor would any short-term impacts on air quality be expected during construction. ▪ Emissions from construction equipment are typically not excessive and would not be expected to exceed any NAAQS or interfere with attainment or maintenance of long-term air quality standards. ▪ Future levels of criteria pollutants attributed to highway traffic and maintenance would not be expected to exceed any NAAQS because of the low background concentrations of criteria pollutants in the project corridor's rural location.	*Impacts* ▪ Impacts would be similar to those described for Alternative B.	*Impacts* ▪ Impacts would be similar to those described for Alternative B.
Mitigation Measures ▪ No mitigation measures are proposed.	*Mitigation Measures Common to All Action Alternatives* ▪ No operational mitigation measures are required. ▪ Controlling and minimizing offsite tracking of sediments as required for the stormwater pollution prevention plan will help to control dust produced by construction. ▪ Implementation of a traffic control plan as submitted by the contractor and approved by the Montana Department of Transportation will minimize prolonged periods of vehicle idling due to traffic delays.		
Noise			
Impacts ▪ Noise levels along US 89 and Duck Lake Road would increase over time as traffic volumes increase.	*Impacts* ▪ There would be temporary increases in noise from construction activities. ▪ Predicted future traffic volumes are the same as those for the no-build alternative. Therefore, increases in noise levels from Alternative B would be the same as those predicted for Alternative A.	*Impacts* ▪ Impacts would be the same as those described for Alternative B.	*Impacts* ▪ Impacts would be similar to those described for Alternative B.
Mitigation Measures ▪ No mitigation measures are proposed.	*Mitigation Measures Common to All Action Alternatives* ▪ No mitigation measures are required.		
Vegetation and Wildlife Habitat			
Impacts ▪ Wildlife would have increasing difficulty crossing the road as traffic volumes increase. ▪ Existing undersized culverts or a lack of culverts would contribute to decreased functions in wetlands over time.	*Impacts* ▪ There would be a direct loss of approximately 55 hectares (135 acres) of wildlife habitat. ▪ A temporary displacement of wildlife from the project corridor would occur due to increased human activity during construction. ▪ Mortality of wildlife with limited mobility would occur during vegetation removal. ▪ There would be increased fragmentation of habitats along the roadway.	*Impacts* ▪ Impacts would be similar to those described for Alternative B. ▪ There would be a direct loss of approximately 59 hectares (146 acres) of wildlife habitat.	*Impacts* ▪ Impacts would be similar to those described for Alternative B. ▪ There would be a direct loss of approximately 18 hectares (45 acres) of wildlife habitat.

Table 30 (continued). Environmental impacts and mitigation measures by alternative.

No-Build Alternative (Alternative A)	Alternative B	Alternative C (Preferred Alternative)	Duck Lake Road Alternate Route
Vegetation and Wildlife Habitat (continued)			
Impacts (continued)	▪ The value of upland habitat would be reduced and forested areas would be converted into disturbed grasslands. ▪ Disturbed areas could be colonized by noxious weeds.		
Mitigation Measures ▪ No mitigation measures are proposed.	*Mitigation Measures Common to Alternatives B and C* ▪ BMPs will be implemented to minimize construction impacts. ▪ Segments of the existing roadway that currently bisect aspen grovelands and would be abandoned will be reclaimed. These areas occur at approximately reference posts 14 and 15. ▪ Clearing and grubbing will be limited to the minimum amount necessary beyond the construction limits (not the right-of-way limits) at known wildlife crossing locations. ▪ As appropriate, construction plans will specify that contractor stockpiles of topsoil must be contained within the construction limits and may not be stored at environmentally sensitive areas. Locations where this measure will be implemented will be specified in the special provisions for this proposed project. ▪ The project design engineers will continue to involve staff biologists in the design and configuration of the new highway bridge at Lake Creek to enhance its attractiveness as a crossing location for wildlife. ▪ In order to improve the bridge over North Fork Cut Bank Creek for wildlife crossing purposes, shrubs and trees will be planted along the banks of the river at the bridge crossing to enhance the vegetative cover at this site. ▪ If possible, the new highway bridge at South Fork Cut Bank Creek (reference post 13) will be enlarged to provide an area of dry land passage for large mammals underneath the bridge during most months of the year. ▪ V-shaped ditches will be included to the extent feasible in order to minimize vegetation disturbance. ▪ A Montana Department of Transportation staff botanist, in consultation with the Blackfeet Nation will conduct a site visit and prepare a site-specific revegetation plan. This plan will include provisions for a temporary erosion control seed mix to be used during construction as well as provisions for post-construction revegetation of the disturbed road corridor to provide suitable cover for wildlife crossing the road and to minimize colonization by noxious weeds.		*Mitigation Measures* ▪ BMPs similar to those described for Alternatives B and C would be implemented.
Wetlands			
Impacts ▪ Existing undersized culverts or a lack of culverts would continue to limit hydrology in some systems along the corridor.	*Impacts* ▪ Construction activities would result in temporary fill for construction access, temporary vegetation clearing, displacement of wildlife, and temporary increases in sedimentation to wetlands. ▪ A total of approximately 6.4 hectares (16.1 acres) of wetland habitat would be lost under this alternative, as follows: □ Loss of approximately 3.8 hectares (9.4 acres) of large riverine wetlands, affecting fish/aquatic habitat, wildlife and threatened and endangered species habitat, and other wetland functions □ Loss of approximately 0.6 hectares (1.5 acres) of small riverine wetlands, affecting fish/aquatic habitat, sediment/nutrient/ toxicant retention, and production export/food chain support	*Impacts* ▪ Impacts would be similar to those of Alternative B. ▪ A total of approximately 7.2 hectares (17.9 acres) of wetland habitat would be lost under this alternative, as follows: □ Loss of approximately 4.5 hectares (11.0 acres) of large riverine wetlands. □ Loss of approximately 0.6 hectares (1.5 acres) of small riverine wetlands. □ Loss of approximately 1.4 hectares (3.5 acres) of depressional wetlands	*Impacts* ▪ Impacts would be similar to those of Alternative B. ▪ A total of approximately 0.8 hectares (1.9 acres) of wetland habitat would be lost under this alternative, as follows: □ Loss of approximately 0.2 hectares (0.4 acres) of large riverine wetlands □ Loss of approximately 0.6 hectares (1.5 acres) of small riverine wetlands.

Table 30 (continued). Environmental impacts and mitigation measures by alternative.

No-Build Alternative (Alternative A)	Alternative B	Alternative C (Preferred Alternative)	Duck Lake Road Alternate Route
Wetlands (continued)			
Impacts (continued)	◻ Loss of approximately 1.3 hectares (3.4 acres) of depressional wetlands, affecting migratory bird habitat and ground water discharge and recharge functions ◻ Loss of approximately 0.7 hectares (1.8 acres) of slope wetlands, affecting secondary habitat for threatened and endangered species and wildlife habitat.	◻ Loss of approximately 0.7 hectares (1.9 acres) of slope wetlands.	
Mitigation Measures ▪ No mitigation measures are proposed.	*Mitigation Measures* ▪ Work in and around wetlands will be performed from an existing roadway or upland site where possible. ▪ Locate staging areas for construction equipment and materials in upland areas a minimum distance of approximately 15 meters (50 feet) from wetlands and stream crossings. ▪ Replace culverts with properly sized culverts, where necessary, and through the final design process determine the need for any equalizer culverts. ▪ A stormwater pollution prevention plan will be prepared prior to construction site disturbance, and it will be updated as necessary as the project proceeds. ▪ The limits of clearing will be clearly marked to minimize intrusion into wetland habitats. ▪ Compensation for wetland impacts will be provided in accordance with current replacement ratios required by the U.S. Army Corps of Engineers and the Blackfeet Nation.	*Mitigation Measures* ▪ Mitigation will be similar to that for Alternative B. A slightly greater amount of wetland compensation is required.	*Mitigation Measures* ▪ Mitigation will be similar to that for Alternative B, although less wetland compensation is required.
Fisheries Resources			
Impacts ▪ Undersized or poorly placed culverts affecting fish passage at Willow Creek, Flatiron Creek, Lake Creek, and an unnamed tributary to South Fork Cut Bank Creek would remain.	*Impacts* ▪ Temporary in-water work could displace fish and aquatic organisms and disturb instream habitat. ▪ Erosion and sedimentation to streams from exposed soils could increase during construction. ▪ Increased stormwater runoff could be conveyed to streams and wetlands. ▪ Road widening would require the relocation of approximately 396 meters (1,300 feet) of the South Fork Cut Bank Creek stream channel near reference post 13. ▪ Road widening at reference post 9 in the vicinity of South Fork Cut Bank Creek would require the relocation of two short segments of stream channel located on the north side of the US 89 project corridor. ▪ Road widening in the vicinity of Willow Creek (reference post 3) would require the relocation of two short segments of stream channel.	*Impacts* ▪ Impacts would be similar to those of Alternative B. However, a slightly greater amount of stream channel habitat would be affected.	*Impacts* ▪ Impacts on streams and fisheries resources would be similar to those described for Alternative B. Existing culverts would be lengthened or replaced and no stream channel relocation would be required.

Table 30 (continued). Environmental impacts and mitigation measures by alternative.

No-Build Alternative (Alternative A)	Alternative B	Alternative C (Preferred Alternative)	Duck Lake Road Alternate Route
Fisheries Resources (continued)			
Mitigation Measures ▪ No mitigation measures are proposed.	*Mitigation Measures Common to All Action Alternatives* ▪ BMPs and a stormwater pollution prevention plan will be implemented during construction activities. ▪ The contractor will be expected to store and handle petroleum products, chemicals, cement and other deleterious materials to prevent their entering streams and associated wetlands. ▪ MDT will work with resource agencies during the permitting process to avoid and minimize impacts to fish spawning. ▪ Stream banks will be revegetated with appropriate species at bridge and culvert installations. ▪ The use of bottomless culverts or countersunk culverts will be considered to provide a natural streambed for the length of the culvert. ▪ Culverts in fish-bearing streams will be designed and installed to accommodate fish passage. ▪ Culverts will be installed and maintained to avoid inlet scouring and to prevent erosion of stream banks downstream of the project site. ▪ For stream channel impacts, the affected stream reach will be surveyed in order to adequately size, locate, and reconstruct the new stream channel. ▪ Under the Duck Lake Road Option, the proposed parking area adjacent to Cut Bank Creek will be designed and constructed to minimize the adverse impacts related to runoff. As appropriate, drainage of the proposed parking area could be routed to the east of the parking area. The parking area will be sloped to the southeast so that runoff flows away from the stream.		
Rare and Sensitive Species			
Impacts ▪ No impacts on rare plants or animals are expected.	*Impacts* ▪ No impacts on rare plants or animals are expected. ▪ Impacts on rare fish species would be the same as impacts described for Fisheries Resources.	*Impacts* ▪ Impacts would be the same as those for Alternative B.	*Impacts* ▪ Impacts would be the same as those for Alternative B.
Mitigation Measures ▪ No mitigation measures are required.	*Mitigation Measures Common to All Action Alternatives* ▪ Because no rare and sensitive species would be affected by the proposed project, no mitigation measures are required. If rare and sensitive species are identified at the proposed material source sites, mitigation measures would be implemented to avoid or minimize impacts to those species. ▪ Conservation measures for potential effects on pearl dace and westslope cutthroat trout would be the same as those described in Fisheries Resources.		
Threatened and Endangered Species			
Impacts ▪ Increased traffic levels could become a barrier to wildlife movement through the corridor.	*Impacts* ▪ Bald eagles would be temporarily disturbed during their wintering and migratory period. ▪ Grizzly bear foraging habits would be disturbed during construction, grizzly bear habitat would be lost, habitat value would decrease, and, because of the wider roadway, grizzly bears would have more difficulty crossing the US 89 corridor. ▪ Wolf movements would be disrupted through the corridor during construction activities. ▪ This alternative would contribute to the impediment of lynx movement through the US 89 project corridor and loss of conifer habitat at the edge of large tracts of suitable habitat (considered to be fringe habitat). ▪ No impacts on bull trout are expected.	*Impacts* ▪ Impacts would be similar to those for Alternative B. However, a wider roadway would result in incremental increases in fragmentation and difficulty associated with crossing the roadway.	*Impacts* ▪ Construction near reference post DLR-4.5 may disturb bald eagles during the wintering period. Grizzly bears may be deterred from activities between reference post DLR-27 and DLR-34 during construction. ▪ No impacts on Canada lynx or gray wolves are expected. ▪ With implementation of BMPs and a temporary sedimentation and erosion control plan, the proposed project may affect but is not likely to adversely affect bull trout.

Table 30 (continued). Environmental impacts and mitigation measures by alternative.

No-Build Alternative (Alternative A)	Alternative B	Alternative C (Preferred Alternative)	Duck Lake Road Alternate Route
Threatened and Endangered Species (continued)			
Mitigation Measures ▪ No mitigation measures are proposed.	*Mitigation Measures Common to Alternatives B and C. The following mitigation measures are from the January 28, 2005, biological opinion from the U.S. Fish and Wildlife Service. The project will likely be divided into phases for construction purposes. During the final design of each segment, MDT will coordinate with the USFWS and the Blackfeet Nation to ensure mitigation measures are appropriate and applicable to current conditions.* ***Bald Eagle*** ▪ Because it is the Montana Department of Transportation's standard practice to raptor-proof electric facilities when they are relocated within MDT right-of-way, and the action alternatives would restrict vegetation clearing outside the construction limits, no additional conservation measures are proposed to minimize potential project impacts on bald eagles. ▪ If a nesting pair of bald eagles is identified within a 1.6-kilometer (1-mile) radius of the material source sites, blasting would be restricted to the period outside the nesting season for bald eagles, which extends from mid-March through August 31. ***Grizzly Bear*** ▪ The following corridor-wide conservation measures will be implemented as part of the proposed project to minimize impacts to grizzly bears and facilitate wildlife movement through the US 89 project corridor: □ To ensure that final designs for proposed crossing structures meet minimum requirements for the targeted species, Montana Department of Transportation will consult with Blackfeet Nation and US Fish and Wildlife Service biologists during the design of the structures for comments on approval of the bridge lengths and culvert sizes at Lake Creek and South Fork Cut Bank Creek. □ A new highway structure is proposed at reference post 12 at Lake Creek. This structure will be constructed to incorporate wildlife crossing features. The project design engineers will continue to involve staff biologists in the design and configuration of the highway structure at this location to enhance its attractiveness as a crossing location for wildlife. Along with structure design, a revegetation plan will be implemented at this site to provide additional crossing cover, and wildlife fencing may be incorporated to funnel wildlife through the crossing area. □ A new highway bridge will be constructed at main stem South Fork Cut Bank Creek (reference post 13). This structure will be enlarged from a 9-meter (30-foot) opening to a wider opening, to provide a narrow area of dry land passage underneath the bridge during most months of the year. Wildlife fencing may be incorporated to funnel wildlife toward the crossing area. □ The existing US 89 highway bridge over North Fork Cut Bank Creek (reference post 17) was constructed within the last 10 years in conjunction with improvements to the US 89 intersection with Starr School Road and, therefore, does not require replacement at this time. In order to improve this structure for wildlife crossing purposes, shrubs and trees will be planted along the banks of the river at the bridge crossing to enhance the vegetative cover at this site. □ Contractors and construction crews will be educated regarding the need for proper sanitation in grizzly bear habitat and would be instructed to report all grizzly bear sightings immediately to Tribal wildlife program biologists. □ All food and garbage on the construction site will be stored in bear-proof containers, and all garbage will be removed daily from temporary offices and sleeping quarters. □ Construction staging areas, field offices, and sleeping quarters will be located a minimum of 150 meters (500 feet) from riparian areas and reported grizzly bear crossing areas, such as the riparian area east of Kiowa (reference post 10 to 11), Lake Creek (reference post 12.5), South Fork Cut Bank Creek (reference post 13) and the South Fork Milk River branches (reference posts 21 and 21.7). □ Right-of-way fencing will be installed throughout the project corridor and may result in the natural expansion of some aspen stands within the road right-of-way.		*Mitigation Measures* ▪ Measures are the same as those described for wildlife and vegetation, wetlands, and fisheries resources.

Table 30 (continued). Environmental impacts and mitigation measures by alternative.

<table>
<tr><th>No-Build Alternative
(Alternative A)</th><th>Alternative B</th><th>Alternative C (Preferred Alternative)</th><th>Duck Lake Road Alternate Route</th></tr>
<tr><td colspan="4">Threatened and Endangered Species (continued)</td></tr>
<tr><td>Mitigation Measures (continued)</td><td colspan="2">Grizzly Bear (continued)
□ At all riparian areas throughout the corridor, construction limits and roadway fill widths will be minimized, and as much vegetation as feasible will be retained adjacent to the roadway.
□ Scenic pullouts will be located and designed in consultation with Blackfeet wildlife biologists. At a minimum, scenic pullouts will:
– Include warnings to visitors that they are in grizzly bear habitat and that they must remove all garbage from the site
– Be limited to the project corridor and will not provide access to areas where humans may encounter grizzly bears, such as riparian areas
– Be designed to provide viewing opportunities and to discourage picnicking.
□ Prior to selection of material source sites, MDT and its contractor will consult with Blackfeet Fish and Wildlife Department so that potential impacts to grizzly bear habitat are minimized in site selection.
■ The following conservation measures would be implemented as part of the project at the locations specified below to minimize impacts to grizzly bear in the project corridor:
□ Segments of the existing roadway that currently bisect aspen grovelands and would be abandoned will be reclaimed. These areas occur at approximately reference post 14 and 15 and require detailed restoration plans including soil treatment, planting specifications, if needed, and fencing provisions.
□ Construction will be staged to allow construction (including earthmoving) during any given construction year at only one of the following three locations: the riparian area east of Kiowa (approximately reference post 10 to 11.5), Lake Creek and South Fork Cut Bank Creek (approximately reference post 12.5 to 13), and South Fork Milk River, south and middle branches (approximately reference post 19.5 to 22). During any given construction year, no work will be conducted for the entire construction season at two of the three locations specified above. At the one location per year where construction is allowed, no work will be conducted from 6:00 PM to 9:00 AM from April 1 to June 30.
□ Alternative slopes will be analyzed to reduce the impacts of fills at the following locations: the riparian area east of Kiowa (approximately reference post 10 to 11.5), Lake Creek and South Fork Cut Bank Creek (approximately reference post 12.5 to 13), and South Fork Milk River (approximately reference post 19.5 to 22). If, during final design there are areas that slopes can be safely steepened, they would be incorporated into the proposed project plans.
□ Construction plans will specify that clearing and grubbing beyond the construction limits (not the right-of-way limits) for the riparian area east of Kiowa (approximately reference post 10 to 11.5), Lake Creek and South Fork Cut Bank Creek (approximately reference post 12.5 to 13), and South Fork Milk River (approximately reference post 19.5 to 22), and any temporary clearing necessary for culvert or utility line installation or similar activities outside the construction limits but within the right-of-way would be kept to the smallest area possible, to be reclaimed following construction.
□ As appropriate, construction plans will specify that contractor stockpiles of topsoil must be contained within the construction limits and may not be stored at environmentally sensitive areas. Locations where this measure will be implemented will be specified in the special provisions (modifications to the Standard and Supplemental Specifications applicable to an individual project) for this proposed project and will include cultural sites and high quality wetlands.
□ The V-shaped ditch will be applied to minimize vegetation disturbance at the following locations along the project corridor: riparian area east of Kiowa (approximately reference post 10 to 11.5), Lake Creek and South Fork Cut Bank Creek (approximately reference post 12.5 to 13), and South Fork Milk River (approximately reference post 19.5 to 22).
□ Onsite visits would be conducted by Montana Department of Transportation and Tribal botanists and biologists to develop appropriate post-construction revegetation plans that include a woody species component to enhance the vegetative cover at the following locations: riparian area east of Kiowa (approximately reference post 10 to 11.5), Lake Creek and South Fork Cut Bank Creek (approximately reference post 12.5 to 13), and South Fork Milk River (approximately reference post 19.5 to 22).</td><td></td></tr>
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Table 30 (continued). Environmental impacts and mitigation measures by alternative.

No-Build Alternative (Alternative A)	Alternative B	Alternative C (Preferred Alternative)	Duck Lake Road Alternate Route
Threatened and Endangered Species (continued)			
Mitigation Measures (continued)	***Gray Wolf*** ■ As previously described, the proposed crossing structures and vegetation retention guidelines will facilitate wildlife movement through the project corridor. No additional conservation measures are proposed. ***Canada Lynx*** ■ As previously described, numerous measures are proposed to facilitate wildlife crossing through the US 89 project corridor. Because lynx habitat is limited to the portion of the corridor near Hudson Bay Divide, it is proposed that construction plans specify that from reference post 23.5 to 24.5 clearing and grubbing are limited to the minimum amount necessary beyond the construction limits (not the right-of-way limits), and any temporary clearing necessary for culvert or utility line installation or other similar activities outside the construction limits but within the right-of-way will be kept to the smallest area possible, to be reclaimed following construction. ***Bull Trout*** ■ Conservation measures are the same as those described in the Fisheries Resources section of this table.		
Socioeconomic Considerations			
Impacts ■ No impacts are expected.	*Impacts* ■ For a 4-year construction period, there would be a direct generation of approximately 200 construction-related jobs and an indirect benefit of approximately 25 additional jobs. For a 6-year construction period, there would be a direct generation of approximately 135 construction-related jobs and an indirect benefit of approximately 15 additional jobs. ■ There would be a direct infusion of approximately $12.8 million to the local economy. ■ The café/general store at Kiowa may lose some tourist-related business, which would be partially offset by increases in construction-related business. ■ Privately owned campgrounds would lose some tourist business during the construction period but would gain some business from construction workers.	*Impacts* ■ For a 4-year construction period, there would be a direct generation of approximately 220 construction-related jobs and an indirect benefit of approximately 25 additional jobs. For a 6-year construction period, there would be a direct generation of approximately 145 construction-related jobs and an indirect benefit of approximately 20 additional jobs. ■ There would be a direct infusion of approximately $13.9 million to the local economy. ■ The café/general store at Kiowa may lose some tourist-related business, which would be partially offset by increases in construction-related business. ■ Privately owned campgrounds would lose some tourist business during the construction period but would gain some business from construction workers.	*Impacts* ■ There would be a direct generation of approximately 82 construction-related jobs and an indirect benefit of approximately 12 additional jobs. ■ There would be a direct infusion of approximately $4.0 million to the local economy. ■ The businesses at reference posts DLR-33 and DLR 33.5 in improvement area 3 could lose business during construction on Duck Lake Road. These businesses would likely benefit from an increase in business during construction on US 89.

Table 30 (continued). Environmental impacts and mitigation measures by alternative.

No-Build Alternative (Alternative A)	Alternative B	Alternative C (Preferred Alternative)	Duck Lake Road Alternate Route
Socioeconomic Considerations (continued)			
Mitigation Measures ▪ No mitigation measures are required.	*Mitigation Measures Common to Alternatives B and C* ▪ Hiring for project construction will be managed in accordance with the current memorandum of understanding between the Blackfeet Nation and the Montana Department of Transportation. ▪ To minimize impacts on the café/general store at Kiowa and the Aspenwood Café and campground on US 89, the Montana Department of Transportation will keep US 89 open to travel during construction and will minimize traffic delays to the extent feasible during the peak tourist season (Fourth of July through Labor Day).		*Mitigation Measures* ▪ Mitigation measures would be similar to those described for Alternatives B and C. ▪ To minimize impacts on the café at reference post DLR-33.5 and the bed and breakfast establishment at reference post DLR-33, the Montana Department of Transportation will keep Duck Lake Road open to travel during construction and will minimize traffic delays to the extent feasible.
Displacements and Right-of-Way Acquisition			
Impacts ▪ No impacts are expected.	*Impacts* ▪ An area of approximately 151 hectares (373 acres) of unimproved lands would be acquired.	*Impacts* ▪ An area of approximately 154 hectares (381 acres) of unimproved lands would be acquired.	*Impacts* ▪ An area of approximately 37 hectares (91 acres) of unimproved lands would be acquired.
Mitigation Measures ▪ No mitigation measures are required.	*Mitigation Measures Common to Alternatives B and C* ▪ The Montana Department of Transportation will purchase property at the fair market value or will purchase an easement for unimproved trust lands at the fair market value.		*Mitigation Measures* ▪ Measures are similar to those described for Alternatives B and C.
Land Use and Farmlands			
Impacts ▪ No impacts are expected.	*Impacts* ▪ Approximately 151 hectares (373 acres) of additional right-of-way would be acquired either through purchase or easement.	*Impacts* ▪ Approximately 154 hectares (381 acres) of additional right-of-way would be acquired either through purchase or easement.	*Impacts* ▪ Approximately 37 hectares (91 acres) of additional right-of-way would be acquired either through purchase or easement.
Mitigation Measures ▪ No mitigation measures are proposed.	*Mitigation Measures Common to All Action Alternatives* ▪ The Montana Department of Transportation will purchase property at fair market value or will purchase an easement for right-of-way needs on Tribal lands and Indian allotted trust lands.		

Table 30 (continued). Environmental impacts and mitigation measures by alternative.

No-Build Alternative (Alternative A)	Alternative B	Alternative C (Preferred Alternative)	Duck Lake Road Alternate Route
Transportation			
Impacts ▪ Traffic volumes would increase because of the general increase in background traffic levels. ▪ Duck Lake Road would remain at level of service (LOS) A in 2025. ▪ By 2025, US 89 between Browning and Kiowa falls to LOS C, and US 89 between Kiowa and Saint Mary falls to LOS C. ▪ The existing insufficient roadway shoulders and pullout areas for bicycle and pedestrian use would continue.	*Impacts* ▪ Travel times during construction would increase. ▪ Access to properties adjacent to the construction zone would be less convenient for periods of several weeks to a month or longer. ▪ Motorized traffic volumes are expected to increase at the same rate as under the no-build alternative, although bicycle traffic may increase due to the provision of wider shoulders. ▪ By 2025, US 89 between Browning and Kiowa would function at LOS C (same as the no-build alternative), and US 89 between Kiowa and Saint Mary would function at LOS C (same as the no-build alternative). ▪ Designating Duck Lake Road as an alternate truck route for US 89 would result in approximately 1.3 percent lower traffic volumes on US 89. ▪ Accident frequency would be expected to be less than under the no-build alternative.	*Impacts* ▪ Impacts would be similar to those of Alternative B. However, wider shoulders would result in an incremental increase in safety for bicyclists than that under Alternative B.	*Impacts* ▪ Traffic volumes would increase approximately 1.3 percent as a result of designating Duck Lake Road as an alternative truck route for US 89. Frequency of accidents would be expected to decrease as a result of roadway improvements associated with this option (i.e., better pavement conditions and increased radius of existing curve at reference post DLR-24).
Mitigation Measures ▪ No mitigation measures are proposed.	*Mitigation Measures Common to All Action Alternatives* ▪ A detailed traffic control plan will be prepared and implemented in accordance with Montana Department of Transportation specifications and plans and the most recent Manual on Uniform Traffic Control Devices. ▪ A public information plan will be prepared and implemented by the Montana Department of Transportation that warns motorists in advance of construction activity and indicates possible alternate routes. ▪ Work zone signing will be installed to alert motorists of construction activity. ▪ In the event that Going-to-the-Sun Road reconstruction occurs while US 89 construction is occurring, the Montana Department of Transportation will coordinate with Glacier National Park to minimize traffic delays to the extent feasible, particularly during peak tourist season (Fourth of July through Labor Day).		
Bicycle and Pedestrian Facilities			
Impacts ▪ Under the no-build alternative, the existing insufficient roadway shoulders and pullout areas for bicycle and pedestrian use would remain.	*Impacts* ▪ Bicyclists and pedestrians along US 89 would encounter limited access and delays in construction areas. ▪ This alternative would enhance bicycle safety compared to the no-build alternative and may result in increased use of the roadway by bicyclists compared to current levels of use. ▪ Proposed improvements would create a more relaxed and enjoyable recreational experience for bicyclists.	*Impacts* ▪ Impacts would be similar to those described under Alternative B. ▪ This alternative would enhance bicycle safety slightly more than Alternative B due to the wider shoulder width.	*Impacts* ▪ Construction impacts would be similar to those described under Alternative B. ▪ This option would not result in direct long-term impacts, because the proposed changes would not substantially alter the speed, level, or type of traffic using this roadway. ▪ Construction of an off-road parking area at reference post DLR-4.5 would improve pedestrian access to Cut Bank Creek.

Table 30 (continued). Environmental impacts and mitigation measures by alternative.

No-Build Alternative (Alternative A)	Alternative B	Alternative C (Preferred Alternative)	Duck Lake Road Alternate Route
Bicycle and Pedestrian Facilities (continued)			
Mitigation Measures ▪ No mitigation measures are proposed.	*Mitigation Measures Common to Alternatives B and C* ▪ Implementation of a traffic control plan and a public information plan as submitted by the contractor and approved by the Montana Department of Transportation will warn bicyclists and pedestrians of construction activity in advance and indicate possible alternative routes. ▪ In the event that Going-to-the-Sun Road reconstruction occurs concurrently with US 89 construction, the Montana Department of Transportation will coordinate with Glacier National Park to minimize traffic delays to the extent feasible, particularly during peak tourist season (Fourth of July through Labor Day). ▪ The Montana Department of Transportation will keep US 89 open to travel during construction and will minimize traffic delays to the extent feasible during the peak tourist season (Fourth of July through Labor Day). ▪ The use of shoulder rumble strips in accordance with MDT policy (latest revision dated June 23, 2000) will be considered during final design of Alternative C to provide additional safety for bicyclists.		*Mitigation Measures* ▪ No mitigation measures are required.
Services and Utilities			
Impacts ▪ No impacts are expected.	*Impacts Common to Alternatives B and C* ▪ During construction, temporary lane closures would result in traffic delays, affecting the timeliness of emergency service. ▪ Blackfeet Transit, Browning Public Schools, and the Eagle Shield meals-on-wheels program may need to develop alternative routes and contingency plans to ensure that transportation and in-home senior services continue during construction. ▪ Solid waste collection services would require coordination with construction activities. ▪ Relocation of telecommunications cables and utility lines along US 89 may be required, especially in areas where realignments are proposed and in sites where substantial cutting is required.		*Impacts* ▪ Impacts would be similar to those of Alternative B. ▪ Relocations of telecommunication and electrical services likely would be required in some areas along Duck Lake Road.
Mitigation Measures ▪ No mitigation measures are proposed.	*Mitigation Measures Common to All Action Alternatives* ▪ Anticipated road closures or schedules during construction will be coordinated with the fire departments on the reservation and in surrounding communities and the local police services to ensure that reliable emergency access is maintained and alternative plans or reroutes (where possible) are developed to avoid significant delays in response times. ▪ Precise locations of underground utilities will be identified prior to construction by using base maps, as-built drawings, and field checks. ▪ Appropriate use of pipe support systems, trench sheeting and shoring, or other precautionary measures will be used to minimize potential for damage to exposed utilities. ▪ The city of Browning, Indian Health Service, Glacier Electric Co-op, Blackfeet Utilities Commission, Montana Power, AT&T, and Three Rivers Disposal will be consulted to minimize any potential utility service disruptions during construction; utility companies will be required to notify customers of any planned disruptions. ▪ Any utilities that may be affected during construction will be buried, if feasible.		
Hazardous Materials			
Impacts ▪ No impacts are expected.	*Impacts* ▪ Potential short-term impacts could result from the use of hazardous materials (lubricants, fuels, solvents, etc.) during construction. ▪ There would be a low likelihood of impacts (releases) from construction activities or from encountering sites with existing soil or ground water contamination.	*Impacts* ▪ Impacts would be similar to those of Alternative B.	*Impacts* ▪ Impacts would be similar to those of Alternative B.

Table 30 (continued). Environmental impacts and mitigation measures by alternative.

No-Build Alternative (Alternative A)	Alternative B	Alternative C (Preferred Alternative)	Duck Lake Road Alternate Route
Hazardous Materials (continued)			
Mitigation Measures ▪ No mitigation measures are proposed.	*Mitigation Measures Common to All Action Alternatives* ▪ There will be special provisions included in the contract documents to address management of contaminated soil and ground water, as needed. ▪ If hazardous materials are encountered during construction, the contractor will stop work and coordinate with the MDT Project Manager to ensure the material is managed in accordance with applicable laws and regulations. ▪ Long-term maintenance of the roadways will include standard operating procedures to address management of hazardous materials if hazardous materials are encountered.		
Historic and Cultural Resources			
Impacts ▪ No impacts are expected.	*Impacts* ▪ Based on preliminary investigations, the historic bridge at South Fork Milk River, a Section 4(f) resource and historic site, would be left in place and widened. However, if the bridge cannot be brought to current standards through modification of the existing structure, it would be replaced. ▪ The historic bridge at South Fork Cut Bank Creek, a Section 4(f) resource and historic site, would be removed. ▪ Segments of the historic Blackfeet Highway would be removed within the US 89 construction limits. ▪ Construction would disturb several cloth-offering sites in the project corridor.	*Impacts* ▪ Impacts would be similar to those of Alternative B.	*Impacts* ▪ Segments of the historic Browning to Babb to Saint Mary Stage Road, Browning to Peskan Road, and Old Duck Lake Road within the Duck Lake Road construction limits would be removed.
Mitigation Measures ▪ No mitigation measures are proposed.	*Mitigation Measures Common to All Action Alternatives* ▪ If a cultural resource is encountered during construction, the contractor will stop work and coordinate with the MDT Project Manager, who will notify the MDT cultural resource specialist. The MDT cultural resource specialist will coordinate with the Blackfeet Cultural Department and the State Historic Preservation Office, as appropriate. ▪ The bridges will be documented in accordance with Historic American Buildings Survey and Historic American Engineering Record standards. ▪ Any historic bridge intended for removal would first be offered for adoption, if required, in accordance with the requirements of USC Title 23 Section 144(o)(4). ▪ Cloth-offering sites within the project corridor will be moved by the Blackfeet Cultural Department.		
Recreation			
Impacts ▪ No impacts are expected.	*Impacts* ▪ Short-term impacts on recreation would stem from construction-related noise encroaching on scenic overlooks, wildlife viewing areas, hunting and fishing areas, and local campgrounds. ▪ Construction delays or detours would decrease user enjoyment or use of recreational areas accessible from US 89.	*Impacts* ▪ Impacts would be similar to those of Alternative B.	*Impacts* ▪ Impacts would be similar to those of Alternative B, although intensity and duration of short-term impacts would be slightly less due to the smaller construction area.
Mitigation Measures ▪ No mitigation measures are proposed.	*Mitigation Measures Common to Alternatives B and C* ▪ Construction materials and equipment will be stored in designated stockpile and staging areas. Only equipment being used in the area of active construction will be located in the construction area, other equipment will be stored at staging areas. ▪ US 89 will remain open to travel during construction, and traffic delays will be minimized to the extent feasible during peak tourist season (Fourth of July through Labor Day). ▪ In the event that Going-to-the-Sun Road reconstruction occurs while US 89 construction is occurring, the Montana Department of Transportation will coordinate with Glacier National Park to minimize traffic delays to the extent feasible, particularly during peak tourist season (Fourth of July through Labor Day). ▪ Provide scenic pullouts for tourists.		*Mitigation Measures* ▪ Duck Lake Road will remain open to travel during construction, and traffic delays will be minimized to the extent feasible during the peak tourist season.

Table 30 (continued). Environmental impacts and mitigation measures by alternative.

No-Build Alternative (Alternative A)	Alternative B	Alternative C (Preferred Alternative)	Duck Lake Road Alternate Route
Visual Quality			
Impacts ▪ No impacts are expected.	*Impacts* ▪ Visual quality in the corridor for both viewers of the road and viewers from the road would be compromised due to construction stockpiling and equipment storage, exposed soils from clearing and grading activities, traffic congestion in areas of active construction, and reduced visibility resulting from dust, exhaust, and airborne debris in areas of active construction. ▪ Expanded roadway width, new structures and signage, and clearly marked center and fog lines would slightly diminish the rural character of the US 89 corridor.	*Impacts* ▪ Impacts would be similar to those of Alternative B. The impacts would be slightly greater in duration and intensity due to increased roadway width and the construction area.	*Impacts* ▪ Impacts would be similar to those of Alternative B, but of shorter duration and less intensity, because improvements would be limited to three locations and the overall roadway width would not change substantially.
Mitigation Measures ▪ No mitigation measures are proposed.	*Mitigation Measures Common to All Action Alternatives* ▪ Sections of the corridor will be replanted in accordance with the Montana Department of Transportation Standard Specifications. ▪ Erosion control structures will be maintained and removed as soon as the area is stabilized. ▪ During construction, when dry periods occur, water will be applied to exposed soils as needed to minimize airborne sediment. ▪ Construction materials and equipment will be stored in designated stockpile and staging areas. Only equipment being used in the area of active construction will be located in the construction area; other equipment will be stored at staging areas. ▪ Placement of fill that would block unique views will be minimized. ▪ Adjacent cut-and-fill slopes will be planted with desirable grasses and other low-profile plants.		

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Cumulative Effects

A cumulative effect is "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." (40 CFR 1508.7). Actions that have resulted in cumulative effects upon specific resources in the vicinity of US 89 are addressed below.

Past, Present, and Future Actions

Past actions considered in the cumulative impact analysis for this project that have contributed, in general, to the present environmental conditions in the project area include road development, residential development, oil and gas exploration, ranching and livestock grazing, irrigation withdrawals, and limited business development. Activities with the most substantial effects on wetlands, streams, and wildlife habitat availability include ranching, livestock grazing, and irrigation withdrawals. These past actions have resulted in the loss of riparian vegetation and erosion of stream banks, decreases in stream flows, loss of native grasslands, introduction of nonnative and noxious weeds, and fragmentation of habitat on the reservation. In addition, past road development has resulted in limitations on wetland and stream hydrology and decreases in water quality from untreated roadway runoff. Because much of the residential and business development in the project area is located around the city of Browning, many habitat areas have been spared the effects of development and encroachment and still provide highly valuable habitat for numerous species of wildlife. Past road development has, for the most part, not resulted in adverse effects on the visual quality of the project area. The narrow, two-lane road and preservation of vegetation in close proximity to the road in the segment from Kiowa to Hudson Bay Divide have preserved the wide open views of the Rocky Mountains and the plains. Past actions that influence transportation, including bicyclists and pedestrians in the project area, include road development with no vehicle pullouts or bicycle or pedestrian lanes. Past roadway and land development have contributed to losses of physical evidence of cultural sites and historic roads in the project area.

Present actions considered in this cumulative impact analysis include ongoing oil and gas exploration, reconstruction of Going-to-the-Sun Road in Glacier National Park, and construction of a water pipeline from lower Two Medicine Lake through East Glacier to Browning.

Reasonably foreseeable future actions considered in the cumulative impact analysis for this project include the construction of a resort facility at Saint Mary.

Analysis of Cumulative Effects

The potential cumulative effects resulting from the incremental effects of the proposed action alternatives when added to other past, present, and future actions are described below. The proposed action alternatives are not expected to contribute to cumulative effects on the following resources for the reasons stated: air quality, noise, rare species, displacements and right-of-way, services and utilities, hazardous materials, transportation, bicyclists and pedestrians, and visual quality.

- Air quality is excellent and ambient noise levels are low in the project area, so that air quality and noise are not likely to become issues of concern. The proposed project would not result in increased traffic levels beyond those predicted for expected regional growth; therefore, this project is not expected to contribute to cumulative impacts on air quality or noise in the project area.
- Because there are no rare species in the project corridor, no cumulative impacts are expected.
- None of the present or future actions (other than the US 89 project) would contribute to displacements within the US 89 project corridor.
- Project coordination with utility companies would eliminate potential cumulative impacts on public services and utilities.
- There are no known or documented release sites, and past actions, future actions, and the proposed project are not expected to contribute to cumulative impacts from hazardous materials in the project corridor.
- The proposed project would rectify past actions that have limited bicyclist and pedestrian use of US 89 by providing a wider shoulder and establishing pullouts for scenic vistas; therefore, no cumulative impacts are expected.
- Present and future actions such as the Saint Mary resort facility and the water storage tank in Browning would occur in developed areas and are not expected to contribute to additional impacts on the visual quality of the roadway corridor.

Geology and Soils

The geographic area considered for the analysis of cumulative effects on geology and soils includes a 0.8-kilometer (0.5-mile) radius extending from the limits of construction in the US 89 and Duck Lake Road corridors, including staging and storage areas, and the same radius extending from material source sites and access roads to those sites. The primary past effects on geology and soils in the project area include development of the existing roadway alignment, and the limited residential and commercial development that has occurred. Land uses, such as growing crops and grazing cattle have also contributed to some erosion of soils in the project area.

Construction of Alternatives B and C and the Duck Lake Road Option and exposure of cut slopes and development of material source sites would contribute to incremental cumulative effects on geology and soils, such as erosion and topographical modifications. The water pipeline and resort facility at Saint Mary are located outside the geographical area considered for this analysis. Ongoing oil and gas exploration may occur near the US 89 project area and Duck Lake Road corridor and may contribute to erosion and topographical modifications in addition to those expected for the project. The proposed project would contribute minor cumulative effects on geology and soils because excavation and grading along the roadway would be designed and executed in accordance with recommendations of a geotechnical engineer. Oil and gas exploration would likely also contribute only minor cumulative effects on geology and soils because the area of disturbance would be limited to the area needed to access the site and drill the test hole. Test holes are typically refilled after sampling is complete. If oil or gas is found and plans are developed to exploit those resources, greater cumulative effects on geology and soils would be expected, although these effects would probably be confined to the immediate vicinity of the extraction location.

Floodplains

The geographic area considered for the analysis of cumulative effects on floodplains includes the subbasin associated with each stream in the project corridor.

Past and ongoing activities with the most substantial effects on floodplains include ranching, livestock grazing, and irrigation withdrawals. These actions have resulted in the loss of riparian vegetation and erosion of stream banks, and decreases in stream flows which alter the natural floodplain. Because much of the residential and business development in the project area is located around the city of Browning, area floodplains have been spared the effects of development and encroachment. Where dense vegetation dominates the floodplain, these areas still provide movement corridors and highly valuable habitat for numerous species of wildlife.

The proposed action would contribute to the incremental cumulative loss of floodplain area, although mitigation would be provided to ensure there is no net loss in floodplain storage. The additional proposed, future actions are not expected to affect floodplains in the project area, since these projects are located a substantial distance from the project vicinity.

Water Resources

The geographic area considered for the analysis of cumulative effects on water resources includes all project area watersheds, which support wetlands in the project corridor. Past and ongoing activities with the most substantial effects on water resources include ranching, livestock grazing, and irrigation withdrawals. These actions have resulted in the erosion of stream banks, decreases in stream flows, and decreases in water quality. In addition, past road development has resulted in limitations on wetland and stream hydrology and decreases in water quality from untreated roadway runoff.

While the proposed drainage ditches would likely result in less debris, pollutants, and sediment entering project area water resources, the proposed project is expected to contribute to incremental increases in contaminants in surface waters and therefore can contribute, along with other ongoing activities, to cumulative effects on water resources in the project area. These cumulative impacts are expected to be minor with respect to the overall pollutant content of project area receiving waters.

Actions such as construction of the water pipeline or the Saint Mary resort would contribute to decreases in water quality in project area streams and watersheds, primarily during construction due to erosion and sedimentation of exposed soils. Once construction is complete, operation of the water pipeline would contribute to decreased stream flows or water levels at the water source. Operation of the resort facility may contribute to increased traffic levels in the project corridor, increasing the level of contaminants in roadway runoff.

Vegetation and Wildlife Habitat

The geographic area considered for the analysis of cumulative effects on vegetation and wildlife habitat includes the area within the home range for species likely to occur in the project corridor. For some species, this may include an area extending from the Saint Mary River to the north into Glacier National Park. For other species, this may include the area within a 0.8-kilometer (0.5-mile) radius of the construction limits for the US 89 and Duck Lake Road corridors.

Past actions such as road development, residential development, oil and gas exploration, ranching and livestock grazing, irrigation withdrawals, and limited business development have contributed to the loss of wildlife habitat and the conversion of native grasslands to grasslands that are dominated by nonnative species and that exhibit different characteristics from the native lands. Because much of the project area is used for ranching, large areas of land are still available to wildlife and still provide highly valuable habitat for numerous species of wildlife.

The proposed action, along with proposed future actions, would contribute to the cumulative loss of wildlife habitat in the project area. Future actions may cause traffic volumes in the corridor to increase at a greater rate than currently predicted. This would contribute to cumulative impacts on wildlife difficulty crossing the road. This impact is most likely to occur in the summer months, when traffic volumes are at their highest levels. Implementation of wildlife crossing areas and measures to facilitate wildlife movement in the project corridor would reduce some of the cumulative effects of this project.

Wetlands

The geographic area considered for the analysis of cumulative effects on wetlands includes all watersheds in the project area which support wetlands in the project corridor.

All past actions have contributed to some degree of loss of wetland acreage and decreases in wetland functions. Beaver activities have contributed to the creation and expansion of wetland communities in the project area. Present actions including construction of the water pipeline and future actions including the resort facility, as well as ongoing gas and oil exploration, will likely result in incremental losses in wetland habitat in the project area. While the proposed designs for this project would minimize and avoid impacts on wetlands to the extent feasible, it would result in the loss of wetland habitat within the project corridor. Adverse impacts on wetlands would be mitigated through wetland compensation to restore or create additional wetland acreage. Despite these measures, the proposed action, as well as ongoing and future actions, is likely to contribute to minor cumulative losses of wetland habitat in all watersheds in the project corridor.

Fisheries Resources

The geographic area considered for the analysis of cumulative effects on streams encompasses the area of potential direct impacts from this project (approximately 0.8-kilometers (0.5 miles) upstream from the area of direct highway impacts to approximately 3.2 kilometers (2 miles) downstream from the area of direct highway impacts). The distance of 0.8 kilometers (0.5 miles) upstream is selected because that is the maximum distance from which loud noise could possibly disturb fish. The distance of 3.2 kilometers (2 miles) downstream is selected because sediment generated by construction would settle out within that distance from the corridor (and likely less than that distance).

Past road construction has resulted in poorly placed culverts and undersized culverts in the project corridor. Present actions, particularly ongoing oil and gas exploration and construction of the water pipeline, would likely result in cumulative impacts on streams and fish resources. Because the location of the Saint Mary resort is not known, cumulative effects on fisheries from that project are not known. The proposed action would rectify impacts on streams from past actions by replacing or adding culverts where they are currently undersized or lacking. In addition, a bridge would replace undersized culverts at Lake Creek and the bridge at South Fork Cut Bank Creek would be lengthened to improve hydraulic capacity at the stream crossings. However, the proposed project would also fill a portion of several stream channels. While these impacts would be mitigated to replicate the channel that was lost, cumulative effects on these systems may occur.

Threatened and Endangered Species

The geographic area considered for the analysis of cumulative effects on threatened and endangered species includes a 1.6-kilometer (1-mile) radius extending from the limits of construction in the US 89 and Duck Lake Road corridors, including staging and storage areas, and the same radius extending from material source sites and access roads to those sites.

Bald Eagle

Planned actions may contribute to the cumulative loss of riparian habitat and bald eagle perch sites. To minimize this effect, each project would be expected to examine expected impacts on bald eagle habitat and implement appropriate conservation measures. However, these projects as well as Alternatives B and C would likely contribute to minor cumulative losses of potential perch sites at stream crossings.

Grizzly Bear

Planned actions in the project area may disturb grizzly bears and the Saint Mary resort facility may increase human presence in the vicinity of habitat areas. It is expected that these projects would go through the Blackfeet Nation's environmental review process and include appropriate measures to minimize impacts on grizzly bear habitat.

The Saint Mary resort facility is expected to attract numerous visitors each year and may generate increased traffic volumes or accelerate predicted increases in the project corridor. At present, the resort facility is in the early planning stages and no traffic analysis for the facility has been completed. Until planning progresses further, it will remain unclear which route visitors would use to access this facility or the population centers it would serve. Therefore, at this time, it is difficult to predict if this facility would affect traffic volumes in the corridor or result in a cumulative impact on grizzly bear.

The action alternatives are not expected to cause increased traffic volumes beyond those predicted for expected regional and national growth. However, traffic volumes for the portion of the corridor north of Kiowa (reference post 12) would exceed 2,000 vehicles per day for months May through October by year 2025. South of Kiowa, traffic volumes would exceed 2,000 vehicles per day for months July through August, and on weekend days in June and September, by year 2025. For the Duck Lake Road corridor, traffic volumes would exceed 2,000 vehicles per day for July and August, by year 2025.

According to Ruediger et al. (1999), when traffic volumes reach 2,000 to 4,000 vehicles per day, the roadway becomes a substantial barrier to wildlife movement. This is attributed to substantial increases in road kill and the continuous clustering of cars, which results in an insufficient number of breaks in traffic flow to provide opportunities for wildlife to cross (Ruediger 2002 personal communication). Therefore, while the US 89 corridor is not currently a barrier to most wildlife movement, it is expected that during the life of the improved roadway, increases in traffic volumes would make this roadway increasingly difficult for wildlife to cross without some accommodations for wildlife passage.

As reported in the Gibeau et al. 2001 study of variable crossing rates by grizzly bears for the principal highways in the Bow River watershed, summer average daily traffic volumes for

Trans-Canada Highway (four lanes), Highway 40 (two lanes), Highway 93 (two lanes), and the Bow Valley Parkway (two lanes) were 21,000 vehicles, 3,075 vehicles, 3,530 vehicles, and 2,230 vehicles, respectively. Between 1994 and 1998, six bears crossed the Trans-Canada Highway a total of 33 times, 11 bears crossed Highway 40 a total of 130 times, two bears crossed Highway 93 a total of 17 times, and six bears crossed the Bow Valley Parkway 51 times. (One male bear accounted for the majority of crossings on the Trans-Canada Highway and no female bears crossed the highway. Also, only two bears included Highway 93 in their home range, and traffic volumes on Highway 40 may be less than reported.)

While Gibeau et al. (2001) recorded regular grizzly bear crossings on highways where traffic volumes exceeded 3,000 vehicles per day and bears in the US 89 project corridor would likely adjust their crossing habits in response to changes in traffic patterns, increased traffic volumes may deter some bears from habitats on the east side of the corridor. Other bears may adapt to traffic volumes by learning where and when to cross or by timing their crossings with low traffic volumes (Brandenburg 1996). The proposed conservation measures for the action alternatives are likely to be sufficient to maintain bear crossings at current traffic volumes and for some bears at projected traffic volumes. However, as traffic volumes increase, adverse effects on grizzly bears could result if bears are deterred from the corridor, resulting in substantial effects on grizzly bear access to spring foraging habitats. In addition, increased traffic volumes could increase the risk of bear-vehicle collisions.

Gray Wolf

Cumulative effects on wolves would be the similar to those described for the grizzly bear. As described for grizzly bears, under Alternatives B and C, increases in traffic volumes would make this roadway increasingly difficult for wildlife to cross. However, the proposed conservation measures for the road widening are likely sufficient to maintain the few gray wolf crossings that may occur at current and future traffic volumes, because wolf use of the project corridor is likely limited to dispersing individuals and because wolves are most commonly observed during lower traffic volume months in the spring and fall.

Canada Lynx

Cumulative effects on lynx would be the similar to those described for the grizzly bear. As described for grizzly bears, under Alternatives B and C, increases in traffic volumes would make this roadway increasingly difficult for wildlife to cross. However, the proposed conservation measures for the road widening are likely sufficient to maintain the few lynx crossings that may occur at current and future traffic volumes, because lynx are likely to cross the roadway during the evening hours when traffic volumes are low.

Bull Trout

This project is not expected to contribute to cumulative effects on populations of bull trout.

Socioeconomics, Land Use, and Farmlands

The geographic area considered for the analysis of cumulative effects on socioeconomics, land use, and farmlands includes the land area within the Blackfeet Indian Reservation boundary. The several-hundred year history of the modern Blackfeet Nation in the project area and the interactions between the Blackfeet and Europeans is outlined briefly in the Socioeconomic Considerations discussion in Chapter 3. This past history has resulted in the present socioeconomic conditions in the project area, which are described in some detail in Chapter 3. Past development in the project area has been limited outside of the city of Browning, so that the cumulative effects of past actions on land use has been limited and only minor conversions of farmland to other uses have occurred.

Depending on the timing of construction at the resort facility in Saint Mary, this project could contribute to increased jobs or an extended employment period for local residents. Construction of the Saint Mary resort, in conjunction with the proposed road improvements, may spur development of roadside facilities resulting in additional changes in land use and additional tourist-oriented employment opportunities. However, the proposed project is not expected to contribute to increased traffic levels beyond expected regional growth and therefore the level of development of roadside facilities would likely be low. Construction of the Saint Mary resort in conjunction with the proposed project would likely contribute to cumulative losses of farmlands in the project area. Construction of the water pipeline may spur development, some of which may be tourist-oriented, creating additional employment opportunities. Construction of the pipeline may also spur residential development, although any development facilitated by the new pipeline would occur within the city of Browning rather than along the project corridor and likely would not contribute to cumulative impacts on farmlands. The Blackfeet Tribal Land Department and the Land Committee of the Blackfeet Tribal Business Council would ultimately dictate the types of development that may occur on Tribally-owned trust property within the project area.

The area in the vicinity of the project corridor is expected to experience some continued development with or without the project. While induced growth is often attributed to roadway projects, improvements to existing roadways are typically not the primary cause of growth in an area. Growth is the result of many factors, including local conditions such as proximity to good jobs; availability of affordable housing; tax rates; quality of schools; the presence of adequate infrastructure, including roads; and presence of aesthetic and recreational resources. Ultimately, growth is controlled by existing land use policies and plans as well as local, regional, and national economic conditions and the other factors listed above. The uncertainty in future economic conditions, and the difficulty in assessing the influence of the many factors listed above that influence growth, results in considerable uncertainty regarding the rate and pattern of future growth.

Historic and Cultural Resources

The geographic area considered for the analysis of cumulative effects on historic and cultural resources includes the land area within the Blackfeet Indian Reservation boundary. Past actions that have likely contributed to the loss of evidence of historical and cultural resources in the project area include roadway development; ranching activities, particularly growing crops; and the amount of time that has passed since the resources were placed. The proposed reconstruction of US 89, along with past roadway projects and land development, would contribute to cumulative losses of the evidence of historic roads in the project area. It is expected that other present and future projects, such as the water pipeline and the Saint Mary resort, may also contribute to cumulative losses of physical evidence of cultural sites or historic roads in the project area.

Recreation

The geographic area considered for the analysis of cumulative effects on recreational facilities includes the land area within the Blackfeet Indian Reservation boundary. Overall, past effects on recreation resources have, on balance, been positive with the development over the years of recreational opportunities associated with Glacier National Park and the development of the Kiowa campground, fishing access at Duck Lake, and similar facilities in the area. Past actions such as land development and ranching/agriculture, which have been comparatively limited in the project area, have had little adverse effect on recreation.

If construction on Going-to-the-Sun Road occurs in the same period as construction on US 89 and Duck Lake Road, cumulative adverse effects on recreation, particularly bicyclists and driving tours, would occur. The water pipeline is not expected to contribute to cumulative effects on recreation. The Saint Mary resort may attract additional tourists and cause them to spend more time in the area, which would increase demand on existing recreation resources, but may also spur the development of other recreational facilities to meet this demand. Due to the low level of recreational use on the reservation, the area could easily support and would likely benefit from the development of additional recreational facilities.

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Construction Impacts

Table 31 summarizes construction impacts described in the previous narrative that have the potential to occur as a result of the US 89 corridor project action alternatives.

Table 31. Potential US 89 construction impacts.

Affected Environment	Construction Impacts
Geology and soils	Excavation and fill activities would expose soils susceptible to erosion, landslides, and seismic hazards (i.e., liquefaction).
Water resources	Short-term impacts on surface water quality would occur because of erosion associated with excavation and grading activities, roadway widening, and bridge replacement. Accidental spills and leaks from heavy equipment may result in decreased water quality in surface waters.
Floodplains	Construction activities would require temporary work in floodplains for the placement of bridge abutments and culverts.
Air quality	Roadway construction would generate fugitive dust emissions resulting in localized decreases in air quality. However, exceeding the 24-hour average particulate matter NAAQS is not expected, nor would any short-term impacts on air quality be expected during construction. Emissions from construction equipment are typically not excessive and would not be expected to exceed any NAAQS or interfere with attainment or maintenance of long-term air quality standards.
Noise	There would be temporary increases in noise from construction activities.
Vegetation and wildlife habitat	A temporary displacement of wildlife from the project corridor would occur because of increased human activity during construction. Mortality of wildlife with limited mobility during vegetation clearing. Temporary disturbance of up to approximately 86 hectares (213 acres) of wildlife habitat during construction.
Wetlands	Construction activities would result in temporary fill for construction access, temporary vegetation clearing, displacement of wildlife, and temporary increases in sedimentation to wetlands.
Fisheries resources	Temporary in-water work would displace fish and aquatic organisms and disturb instream habitat. Erosion and sedimentation to streams from exposed soils would increase during construction.
Rare and sensitive species	No construction-related impacts on rare or sensitive plants or animals are expected. Construction-related impacts on rare or sensitive fish would be similar to those described above for Fisheries resources.
Threatened and endangered species	Bald eagles would be temporarily disturbed (during construction) during their wintering and migratory period. Grizzly bear access to foraging habits would be disturbed during construction, and grizzly bears may be displaced from habitat in the vicinity of construction. Wolf movements would be disrupted through the corridor during construction activities.
Socioeconomics	For a 4-year construction period, there would be a direct generation of approximately 218 construction-related jobs and an indirect benefit of approximately 26 additional jobs. For a 6-year construction period, there would be a direct generation of approximately 145 construction-related jobs and an indirect benefit of approximately 18 additional jobs. Construction may cause the café/general store at Kiowa to lose some tourist-related business, but an increase in business from construction workers may occur.

Table 31 (continued). Potential US 89 construction impacts.

Affected Environment	Construction Impacts
Displacements and right-of-way	Construction may cause the café/general store at Kiowa to lose some tourist-related business, but an increase in business from construction workers may occur. Customers to privately owned campgrounds would be inconvenienced when construction is concentrated directly in front of the campground and its access point.
Land Use and Farmlands	Up to approximately 154 hectares (381 acres) of additional right-of-way would be acquired.
Transportation	Travel times during construction would increase. Access to properties adjacent to the construction zone would be less convenient for periods of a few weeks to a month or longer.
Pedestrians and bicyclists	Bicyclists and pedestrians would encounter limited access in construction areas. Construction equipment and construction-related noise would encroach on areas used by bicyclists and pedestrians. Bicyclists may experience delays during construction.
Services and utilities	During construction, temporary lane closures would result in traffic delays affecting the timeliness of emergency service. Blackfeet Transit, Browning Public Schools, and the Eagle Shield meals-on-wheels program may need to develop alternative routes and contingency plans to ensure that transportation and in-home senior services continue during construction. Coordination with the Blackfeet Utilities Commission would be required to schedule solid waste collection days or times that avoid peak construction activities.
Hazardous materials	Potential short-term impacts could result from the use of hazardous materials (lubricants, fuels, solvents, etc.) during construction. While no documented or potential release sites have been identified in project corridor, existing soil or ground water contamination could be encountered.
Historic and cultural resources	Construction would eliminate segments of historic roads and disturb or remove two historic bridges on US 89.
Recreation	Short-term impacts on parks and recreation would stem from construction-related noise encroaching on scenic overlooks, wildlife viewing areas, hunting and fishing areas, and local campgrounds. Construction delays or detours would decrease user enjoyment and use of recreational opportunities accessible from US 89.
Visual quality	Visual quality in the corridor for both viewers of the road and viewers from the road would be compromised because of construction stockpiling and equipment storage; exposed soils from clearing and grading activities; traffic congestion in areas of active construction; and reduced visibility resulting from dust, exhaust, and airborne debris in areas of active construction.

Other Considerations

Joint Development

Joint developments are generally defined as a voluntary joining of governmental entities with private organizations to undertake beneficial development in connection with a public infrastructure. There are no joint development activities currently planned in conjunction with this proposed project.

Energy Impacts

Energy impacts relate to the energy consumed by vehicles and equipment used in the construction of the facility and the long-term usage of the facility. The action alternatives would consume more energy over the short term, through road construction activities and workers traveling to and from the work site. Alternative C would use somewhat more energy because of the wider roadway. If constructed, the operational energy consumed by the action alternatives and the Duck Lake Road Option would be less than those of the no-build alternative. The action alternatives would allow vehicles to move with more constant speeds than the existing highway, thereby using fuel more efficiently. There are no substantial differences between the action alternatives in operational energy consumption. The Duck Lake Road Option, which designates Duck Lake Road as an alternate truck route for US 89, would be more efficient for energy consumption. Reduced truck traffic on US 89 would potentially reduce sources of congestion or slowing of traffic and the Duck Lake Road route would provide a straighter, more direct route for trucks.

No major changes in vehicle usage are expected as a result of the proposed action. The proposed action has little, if any, potential for resulting in cumulative energy impacts.

Regulatory Impacts on Private Property Rights

The Montana Code Annotated Title 2, Chapter 10, Part 1 (Private Property Assessment Act), requires an analysis of any regulatory impacts on private property rights, including whether alternatives reduce, minimize, or eliminate the regulation of private property rights. Section 105 of Part 1 states in part:

> *(1) Each state agency shall assign a qualified person or persons in the state agency the duty and authority to ensure that the state agency complies with this part. Each state agency action with taking or damaging implications must be submitted to that person or persons for review and completion of an*

impact assessment. The state agency may not take the action unless the review and impact assessment have been completed, except that the action with taking or damaging implications may be taken before the review and impact assessment are completed if necessary to avoid an immediate threat to public health or safety.

(2) Using the attorney general's guidelines and checklist, the person shall prepare a taking or damaging impact assessment for each state agency action with taking or damaging implications that includes an analysis of at least the following:

(a) the likelihood that a state or federal court would hold that the action is a taking or damaging;

(b) alternatives to the action that would fulfill the agency's statutory obligations and at the same time reduce the risk for a taking or damaging; and

(c) the estimated cost of any financial compensation by the state agency to one or more persons that might be caused by the action and the source for payment of the compensation.

Regulatory impacts for a project such as the US 89 project may include implementation of an access control plan or an outdoor advertising signage plan. However, the US 89 project will not include access control, and Montana Department of Transportation regulation of signs is separate from this project. The Attorney General’s checklist (Private Property Assessment Act Checklist) was completed for this project and no regulatory impacts were identified.

Short-Term Adverse Effects Versus Long-Term Benefits

An evaluation of the relationship between the local short-term uses of the human environment and the maintenance and enhancement of long-term productivity discloses the trade-off between short-term adverse impacts and long-term benefits of the proposed project. Short-term impacts, disruptions, and uses of the local environment may be worthwhile if there are long-term benefits to the environment resulting from the action.

Short-term uses of and impacts on the local environment are associated with the construction of the project and are listed below. Discussions of these impacts are documented in Chapter 4, Environmental Consequences. Many of these impacts could be minimized with the application of mitigation measures, as recommended in Chapter 4.

- Noise and emissions from construction equipment
- Energy and fuel consumption associated with construction equipment
- Temporary stream turbidity

- Increased potential for erosion
- Traffic disruption
- Ground disturbance
- Visual degradation
- Risk of hazardous material exposure
- Wetland disruption or loss
- Aquatic resource disruption
- Displacement of wildlife
- Wildlife habitat alteration.

The long-term benefits to be gained through the implementation of the proposed improvements include:

- Safer and more efficient motorized transportation movement within the corridor
- Safer and more efficient bicycle and pedestrian transportation movement within the corridor
- Accommodation of projected transportation growth
- Improved fish passage and water movement at road crossings
- Improved recreational and visual opportunities through the creation of scenic pullouts and fishing access.

Context-Sensitive Design

The principle of context-sensitive design incorporates concepts of quality and excellence in transportation design. These concepts are:

- The project satisfies the purpose and needs as agreed to by a full range of stakeholders.
- The project is safe for the user and the community.
- The project is in harmony with the community and preserves environmental, scenic, aesthetic, historic, cultural, and natural resource values of the area.
- The project involves efficient and effective use of the resources of all parties involved.
- The project is designed and built with minimal disruption to the community.
- The project is seen as having added lasting value to the community.

The process contributing to the application of these concepts includes open, honest, and early communication with all stakeholders, involving a full range of stakeholders, and early establishment of a multidisciplinary team. Communication and sensitivity to the landscape, community, and valued resources are at the heart of context-sensitive design.

The US 89 project has incorporated the principles of context-sensitive design into planning, public involvement, and design. The project corridor passes through the Blackfeet Indian Reservation, an area rich in cultural, historical, and natural resources. Tribal representatives were involved in the steering committee, providing early and continual input to project development. The preliminary road designs have incorporated scenic pullouts to enhance the driver's opportunity to safely enjoy the visual qualities. In addition, the preliminary road designs have been altered to avoid impacts on culturally significant sites and wetlands and to facilitate wildlife crossings. The steering committee and the technical interdisciplinary team provided input throughout the process on reducing impacts and enhancing opportunities for multiple resources.

Wild and Scenic Rivers

There are no designated Wild and Scenic Rivers (as designated by P.L. 90-542 as amended and 16 United States Code 1271-1287 and administered by the Bureau of Land Management, National Park Service, USFWS, and U.S. Forest Service) within the project area or its vicinity to be affected by any of the alternatives being considered in this environmental impact statement.

Irreversible and Irretrievable Commitment of Resources

Implementation of the action alternatives would involve a commitment of resources constituting an irreversible and irretrievable loss. Implementation of proposed improvements would require additional land for right-of-way. Direct use of this land would remove it from current agricultural, residential, and commercial uses. This is considered to be an irretrievable commitment during the time of use until a future decision was made to convert it to its former use. The right-of-way requirements for the preferred alternative are approximately 154 hectares (381 acres).

Significant quantities of gravel, steel, concrete, bituminous pavement, and other construction materials would be required to implement the proposed alternative. These materials are generally considered irretrievable; however they are not in short supply and their use would not have an adverse or cumulative impact on the continued availability of these resources. Some materials, such as gravel, pavement products, and steel may be recycled for future use.

Petroleum products, in the form of fuel and engine oil, would be consumed by equipment needed to construct the project. An improved roadway would enhance transportation efficiency over the long term and would, to some degree, compensate for the irretrievable use of fuel and oil during the construction phase.

Human resources would be used for the design, construction, and maintenance of the project. Economic commitments are also an irretrievable investment. The estimated cost of the preferred alternative (excluding the cost of right-of-way) is $49.6 million (2010 dollars). Funds have already been committed and spent for planning, preliminary design, environmental studies, and developing the draft and final environmental impact statement.

The project implementation would result in some loss of fish and wildlife habitat and displacement of fish and wildlife during construction. Stream habitat lost through the realignment of the road would be replaced. Some minor losses of wildlife habitat would occur as a result of the larger footprint of the road on the landscape. This would be an irretrievable loss. Wetland habitat and their associated functions and values lost as a result of the project would be replaced or enhanced.

The commitment of resources is based on the belief that the users of the transportation system (local, regional, state, national, and international) would benefit by the proposed improvements. The primary benefits are increased safety, improved traffic flow, and more cost-efficient road maintenance.

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CHAPTER 5

References and Distribution Lists

Documents Incorporated by Reference

The discipline studies prepared in support of the draft and final EIS and listed in Chapter 5 – References are incorporated herein by reference and are available for public inspection.

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Whitehead, R.L. 1996b. Principal Aquifers. Ground Water Atlas of the United States-Montana, North Dakota, South Dakota, Wyoming-HA 730-I. U.S. Geological Survey. Information obtained November 22, 2000 from agency website: <http://capp.water.usgs/gov/gwa/ch_i/I-text1.html>.

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Preparers of the Environmental Impact Statement

The Federal Highway Administration and Montana Department of Transportation are responsible for the preparation of this document including all conclusions and recommendations contained herein. Other state and federal agencies cooperated in the preparation of this document. The Citizen's Advisory Committee and the Interdisciplinary Team, composed of agency representatives, also provided considerable guidance. The following sections outline the responsibilities and qualifications of all those participating in the preparation of this document.

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Subcontractors were retained by Skillings-Connolly, Inc. to provide detailed study and necessary expertise in many areas of environmental analysis.

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Consultation and Coordination

Agency and Tribal Coordination

The planning process for the project included a steering committee and an interdisciplinary team. The Steering Committee was made up of representatives from the Blackfeet Nation, Bureau of Indian Affairs, Federal Highway Administration, Montana Department of Transportation, City of Browning, Glacier County, Glacier National Park, and Glacier-Waterton Visitors Bureau. The Steering Committee provided one of several forums for Tribal and agency coordination of the process. Seven Steering Committee meetings have taken place for the US 89 project.

As part of the NEPA process, an interdisciplinary team was formed to provide project input and communication among many different technical experts and agency representatives. Four Interdisciplinary Team meetings were held for the US 89 project. The Interdisciplinary Team was composed of representatives from Montana Department of Transportation, the Blackfeet Nation, Bureau of Indian Affairs, Federal Highway Administration, U.S. Environmental Protection Agency, Glacier County, Glacier National Park, Glacier-Waterton Visitors Bureau, Saint Mary KOA Campground, Montana Department of Commerce, Saint Mary Lodge, Montana State Historic Preservation Office, U.S. Army Corps of Engineers, and U.S. Fish and Wildlife Service.

In addition to the formal coordination that has taken place through the Steering Committee and Interdisciplinary Team, informal ongoing communication has taken place between agency staff specialists and the Blackfeet Nation, particularly relating to the topics of wetlands, threatened and endangered species, cultural sites, and displacements.

Resource agencies consulted during the development of this EIS include the Montana Department of Fish, Wildlife, and Parks and the Montana Department of Environmental Quality. Agencies that were requested to participate as cooperating agencies but that did not provide responses to the request include the U.S. EPA, USFWS, and the Blackfeet Nation. Pertinent correspondence regarding cooperating agency status is contained in Appendix F.

Public Involvement

Several opportunities for involvement and comment were provided throughout the development of the draft EIS. When it was decided that an EIS was to be completed for this proposed project, a notice of intent was published in the *Federal Register*. Several public mailings took place. An initial scoping letter was mailed to people and organizations. Subsequent newsletters and postcards were mailed to keep interested public members informed of the project status and to solicit additional comments.

In addition, a project website was established at <www.skillings.com/us89>. The project website includes a summary of the project, provides access to newsletters, explains the environmental process, presents the results of traffic surveys, and provides project contacts and a registry for the mailing list.

Public Scoping Meetings on Project Alternatives

A total of five public scoping meetings were been held for the US 89 project. The first scoping meeting was held on September 13, 1999 in Browning, Montana. In attendance were 21 community members, as well as representatives from the Federal Highway Administration, the Montana Department of Transportation, and the consultant team. During the course of the meeting the purpose and need of the project was discussed, the community was offered a question-and-answer period, and a survey questionnaire was distributed. A second public scoping meeting, with the same agenda, was held on September 14, 1999 in Babb. In attendance were nine community members, as well as the agency and consultant representatives.

The next two public scoping meetings were held on February 14, 2000 in Browning and February 15, 2000 in East Glacier. Community members were invited to discuss project objectives and view visuals relating to the project corridor.

The fifth public scoping meeting was held in Browning on June 20, 2002. This meeting provided the public with a project update, a review of the alternatives being considered in the NEPA process, and an opportunity to provide comments. The meeting was attended by representatives from Federal Highway Administration, Montana Department of Transportation, the consultant team, and 10 members of the public.

The key issues identified in these meetings include:

- Concern about project cost
- Importance of Tribal coordination
- Importance of maintaining aesthetic qualities in the corridor
- Economic impacts of the project
- Snow removal
- Safety for vehicles, bicycles, and pedestrians
- Importance of bicycle lanes
- Preservation of historic bridges.

Notice of Availability of the Draft EIS

Availability of the draft EIS and the scheduled public hearings was announced in the *Federal Register* and through notices in the following local newspapers: the Glacier Reporter in Browning, the Pioneer Press in Cut Bank, and the Great Falls Tribune in Great Falls, the Shelby Promoter in Shelby, and The Valerian in Valier.

In addition, press releases were distributed to 27 media outlets, including newspapers and radio stations; postcard invitations were mailed to 128 addresses along the project corridor; and meeting flyers were posted in Blackfeet Nation community buildings. These materials announced the release of the draft EIS, explained where citizens could go to review a copy of the draft EIS, and explained how citizens could submit comments on the draft EIS.

The draft EIS also was mailed to federal and state agencies, municipal offices, and others who submitted requests for a copy of the document. Those who commented on the draft EIS are listed in Appendix H along with their comments.

Formal Public Hearing on the Draft EIS

Two formal public hearings on the draft EIS were held during the 45-day comment period on the draft EIS. The first hearing was held in Browning at the Eagle Shield Senior Center on September 21, 2004 from 6:00 pm to 8:30 pm. The second hearing was held in Babb at the Babb Elementary School on September 22, 2004 from 6:00 pm to 8:30 pm.

The purpose of the hearings was to explain the information contained in the draft EIS and to solicit comments from the public on the draft EIS. Several displays were posted at the public hearing, including presentation boards on the project area, purpose and need, timeline, roadway alternatives under consideration, and potential impacts on threatened and endangered species. In addition, fact sheets were handed out as well as comment forms.

The public had numerous opportunities to comment on the draft EIS. The first opportunity included the public hearings, where written comment forms were obtained; verbal comments were recorded on tape; and questions were raised during the Q&A sessions at both hearings. Additional comments were received during the comment period via email submitted to MDT. Written letters were received from the resource agencies. In addition, in-person meetings were held with Tribal staff to record their comments on the draft EIS.

Appendix H describes the public hearing format and contains the public hearing comments, comments on the draft EIS, and responses to comments received.

Notice of Availability of the Final EIS

The FEIS was sent to all Federal, State, and local agencies and private organizations, and members of the public who provided substantial comments on the DEIS or requested a copy.

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Glossary

50-year flood flow. A flood level with a 2 percent or greater probability of being equaled or exceeded in any given year

100-year flood flow. A flood level with a 1 percent or greater probability of being equaled or exceeded in any given year.

Accident rate. The number of accidents per million vehicle miles.

Accident severity. A measure of the effects of accidents based on the incidence of injuries, fatalities, and costs.

Accidents per mile. The number of accidents per mile of highway.

Acre-foot. The volume of water needed to cover 1 acre of land to a depth of 1 foot.

Alluvium. Sediment deposited by running water, especially soil formed in river valleys and deltas from material washed down by the river.

Ambient air. The portion of the atmosphere, external to buildings, to which the general public has access.

Ambient air quality. A measure of atmospheric pollution based on the concentration of various contaminants in the ambient atmosphere.

American Association of State Highway and Transportation Officials (AASHTO). A professional organization that provides guidelines and standards, forming policies for individual state design practices.

Aquifer. A layer of gravel, sand, or porous rock capable of holding or conducting water, which can supply wells and springs.

Aquifer recharge. The addition of water to an aquifer as a result of infiltration of rainfall or surface water flow.

Attainment area. A geographic area in which levels of a criteria air pollutant meet the health-based primary standard (national ambient air quality standard) for the pollutant. An area may be considered an attainment area for one pollutant but a nonattainment area for another. Attainment areas are defined on the basis of federal pollutant limits set by the U.S. Environmental Protection Agency.

A-weighted decibels (dBA). A measure of sound intensity in which frequencies are weighted differentially to approximate the sensitivity of the human ear.

Average daily traffic. The total number of vehicles passing a point or segment of a roadway, in both directions, during a 24-hour period.

Best management practices. The tools used by designers, contractors, construction and maintenance staff to minimize impacts on the natural environment. These tools often include measures to control soil erosion, prevent stormwater erosion, and limit intrusion into native vegetation.

Class I area. Any area that is designated for the most stringent degree of protection from future degradation of air quality. The Clean Air Act designates as mandatory Class I areas each national park larger than 6,000 acres and each national wilderness area larger than 5,000 acres.

Class II area. Any area that meets the federal air quality standards and is designated for a moderate degree of protection from future degradation of air quality. Moderate increases in pollutant emissions may be permitted in a Class II area.

Clear zone. An area adjacent to the paved roadway that is kept clear of shrubs and trees.

Cobble. Rock fragment that is smaller than a boulder and larger than a piece of gravel. According to one typical system of classification, a cobble is a rock fragment approximately 2.5 to 10 inches in diameter.

Compensatory mitigation. The replacement or provision of substitute resources or environments to offset an adverse impact on the environment.

Criteria pollutant. A pollutant for which the U.S. Environmental Protection Agency has established a national ambient air quality standard under Section 109 of the Clean Air Act. Current criteria pollutants are carbon monoxide, hydrocarbons, lead, nitrogen dioxide, ozone, sulfur dioxide, and total suspended particulates.

Cumulative impact. The impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of the agency or person undertaking such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

Depressional wetland. A wetland in an enclosed hollow or low area in the terrain, such as a pothole or pond, typically receiving most of its moisture from precipitation.

Design-hour volume. The volume of traffic on a given roadway during the hour of the day selected for the purpose of roadway design. The forecasted highest 1-hour volume during the day, referred to as the peak-hour volume, is typically selected as the design-hour volume.

Direct effects. Direct effects are those that are caused by the action and occur at the same place and time (40 CFR 1508.8). Direct effects are further defined as, those impacts that are actually caused by project activities (FHWA 2003).

Drift. A geologic term for rock material picked up and transported by a glacier and deposited elsewhere.

Easement. A right held by one person to use another person's property for a limited purpose.

Emergent vegetation. Plants that have their roots in shallow water, with stems and leaves above the water surface.

Endangered species. As defined by the Endangered Species Act, any species that is in danger of extinction throughout all or a significant portion of its range.

Equivalent sound level (L_{eq}). The equivalent steady-state sound level that in a stated period of time contains the same acoustic energy as the actual measured time-varying sound level during the same time period.

Fee land. Land in private ownership.

Forb. An herbaceous plant with broad leaves, excluding grasses and grasslike plants.

Fugitive emissions. Airborne emissions of pollutants that are not caught by a capture system.

Gradient, or grade. The slope of a land area (or streambed) in degrees or percentage, calculated as the rate of elevation change per unit of length.

Ground water. Water below the ground surface, which may move underground by streams and seepage. Ground water is stored in aquifers, and the boundary between aquifers and overlying unsaturated soils is the water table.

Hazardous substance. Any material that poses a threat to human health or the environment, typically having one or more of the following characteristics: toxicity, corrosivity, ignitability, explosivity, or chemical reactivity.

Hazardous waste. Byproducts that can pose a substantial or potential hazard to human health or the environment when improperly managed, having at least one of four characteristics: toxicity, corrosivity, ignitability, or chemical reactivity.

Herbaceous. Related to vegetation that is usually forbs, grasses, or leafy plants.

Horizontal curve. The flat component of a roadway curve.

Human environment. Those attributes, including but not limited to biological, physical, social, economic, cultural, and aesthetic factors, that interrelate to form the environment.

Hydric soils. Soils that are wet, saturated, or ponded long enough during the growing season to develop conditions in which there is a lack of oxygen.

Hydrology. The movement of water over and beneath land surfaces; wetland hydrology is indicated by flowing water, standing water, and saturated soils.

Hydrophytic vegetation. Plants characterized by an ability to grow in water, typically found in wetlands.

Indirect effects. Indirect effects, also called secondary impacts, are caused by the action but occur later in time or are farther removed in distance (40 CFR 1508.8). Indirect impacts are further defined as, those [effects] caused by another action or actions that have an established relationship or connection to the project. These induced actions are those that would not or could not occur except for the implementation of a project. These actions are often referred to as 'but for' actions and generally occur at a later time or some distance removed from the original action (FHWA 2003).

Large woody debris. Logs, stumps, or large branches that have fallen or been cut and left in place.

Lead agency. The agency that is designated to supervise the preparation of environmental documentation for a proposed action.

Level of service (LOS). A qualitative measure describing operational conditions along a roadway or at an intersection based on measures such as speed and travel time, freedom to maneuver, traffic interruptions, comfort, convenience, and safety. Rankings range from LOS A (indicating free flow), to LOS E (indicating full capacity), to LOS F (indicating forced flow).

Liquefaction. Transformation of soil or sediment into a liquid state.

Listed species. Plant and animal species, subspecies, and distinct population segments designated as threatened or endangered under the Endangered Species Act.

Lithic. Consisting of or relating to stone or rock.

Migration. The regular seasonal movement of bird and animal populations to and from different areas.

Mitigation measure. Action taken to reduce impacts on resources in the environment.

National ambient air quality standards (NAAQS). Air quality standards established by the U.S. Environmental Protection Agency that apply to outside air.

No-build alternative. An alternative that includes no project construction, but would include short-term minor maintenance activities (for example, safety and roadway surface improvements) that maintain continuing operation of the existing roadway.

No-build alternative. See no-action alternative.

Nonattainment area. Any geographic region of the United States that the U.S. Environmental Protection Agency has designated as not attaining the federal air quality standards for one or more air pollutants, such as ozone and carbon monoxide.

Noxious weed. A plant that is undesirable, troublesome, and difficult to control or eradicate.

Palustrine wetland. A wetland system dominated by trees, shrubs, persistent emergent plants, and emergent mosses or lichens, traditionally called by names such as marsh, swamp, bog, and fen.

Particulate matter. Fine liquid droplets or solid particles, such as dust, smoke, mist, fumes, or smog, in the air. The sources of particulates are many, including windblown dust and sand from roadways, fields, and construction; and automobile exhaust. Two categories of particulate matter are monitored and regulated by the U.S. Environmental Protection Agency: total suspended particulates, having a diameter of less than 10 micrometers (abbreviated as PM_{10}), and fine particulate matter, having a diameter of less than 2.5 micrometers (abbreviated as $PM_{2.5}$).

Parameter. One of a set of measurable factors, such as temperature and oxygen content, that define a system and determine its condition or behavior.

Permeability. The ease with which water or air can pass through the soil, determined by the size, arrangement, composition, and degree of compaction of soil particles.

Point source. An identifiable, confined location from which a pollutant is discharged.

Pothole. A round depression in the land, often filled with water.

Project area. The areas immediately adjacent to the project corridor that have the potential to be affected by actions within the project corridor.

Project corridor. The area to be directly disturbed by the project reconstruction.

Project vicinity. The regional area, which influences the conditions within the project area.

Reach. A specified section of a stream.

Right-of-way. Public land acquired for or devoted to the passage of people or goods, including freeways, roadways, bicycle paths, alleys, trails, and walkways.

Riparian area. The area connected with or immediately adjacent to the banks of a stream or other body of water.

Riparian lands. Includes all lands above the mean average high water mark that are adjacent to Blackfeet Reservation waters where terrestrial vegetation is present and would be influenced by the presence of water or is critical for groundwater recharge or as habitat for wildlife.

Riverine. Related to all wetlands and deepwater habitats contained within a natural or artificial channel that periodically or continuously contains moving water or that forms a link between two bodies of standing water.

Riverine lower perennial system. A wetland in which there is no tidal influence, and some water flows throughout the year at a low gradient and slow velocity.

Riverine nonperennial system. A wetland consisting of intermittent channels in which water flows for only part of the year. Water may remain in isolated pools, or surface water may be absent when water is not flowing.

Riverine upper perennial system. A wetland in which there is no tidal influence, and some water flows throughout the year at a high gradient and fast velocity.

Scoping. The process for determining the scope of issues and alternatives to be addressed in the environmental impact statement and for identifying the significant issues related to a proposed action.

Section 4(f) evaluation. An assessment of the effects of transportation projects on recreational and historical resources, as required by Section 4(f) of the federal Department of Transportation Act during project evaluation. Section 4(f) recreational and historic resources include significant publicly owned parks, recreation areas, and wildlife or waterfowl refuge areas, and significant archaeological and historic sites that are eligible for listing on the National Register of Historic Places.

Stakeholder. A person or group with a direct interest, involvement, or investment in an issue or action.

Substrate. The nonliving material forming the bed of a stream, lake, or ocean, with particles described in terms of size as boulders, cobbles, gravel, sand, silt, or clay.

Superelevation. The tilt of a curved roadway where the roadway edge at the outside of the curve is high, with a downward slope toward the inside of the curve.

Suspended particulates. Fine liquid droplets or solid particles that range in diameter from 0.1 to 45 micrometers and that do not settle out of the air.

Take. As defined by the Endangered Species Act, to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct. The U.S. Fish and Wildlife Service further defines *harass* as actions that contribute to the likelihood of injury to threatened and endangered species to such an extent as to significantly disrupt normal behavior patterns, which include, but are not limited to, breeding, feeding, or sheltering; and *harm* to include significant habitat modification or degradation that results in death or injury to threatened or endangered species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering.

Thalweg. The longitudinal profile of a stream or river, i.e., a line connecting the deepest points along the streambed.

Threatened species. As defined by the Endangered Species Act, any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

Toxic substance. A chemical or mixture that may present an unreasonable risk of injury to human health or the environment.

Trust land. Land to which the federal government holds title as a trustee for the landowner.

Unconsolidated deposits. Relatively young sediments that have not turned into rock.

Ungulate. Any animal in the group *Ungulata*, which includes hoofed, grazing mammals, many of which have horns (e.g., deer).

Uniform crown. As used in this document for a two-lane rural roadway, a raised roadway profile where the highest part of the profile (the crown) extends along the roadway centerline and both lanes slope down from the centerline at equal inclinations—typically a 1.5 to 2 percent slope. The 1.5 to 2 percent cross slope is constructed to provide roadway drainage.

Upland. General term used for land areas that do not meet the criteria for classification as wetlands.

Vertical curve. The up and down component of a roadway curve.

Visually sensitive resource areas. Areas with special visual characteristics identified on the basis of Federal Highway Administration *Visual Impact Assessments for Highway Projects* (Publication FHWA-HI-88-054).

Watershed. The total area of land between hilltops or mountain ridges draining into a water system.

Wetland. A general term used to describe areas of land that are inundated by surface water or groundwater.

Wisconsin. A geologic name for the most recent major glacial period in North America that began about 85,000 years ago and ended about 15,000 years ago.

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