Jackson South

Final Environmental Impact Statement

FHWA Project Number:
FHWA-DEIS-08-01

Prepared for:
Federal Highway Administration
Wyoming Department of Transportation

August 2010

FHWA Project Number: FHWA-FEIS-08-01
Wyoming Project Nos. 104066/104083

US 26/89/189/191 South of Jackson, Wyoming
Teton County

Final Environmental Impact Statement

Submitted Pursuant to 42 USC 4332(2)(c)

Prepared for:
Wyoming Department of Transportation
U.S. Department of Transportation
Federal Highway Administration

Cooperating Agencies:
U.S. Army Corps of Engineers
U.S. Fish and Wildlife Service
U.S. Forest Service

Approved:

Timothy L. Stark
Timothy L. Stark, P.E.
Environmental Services Engineer
Wyoming Department of Transportation

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Date of Approval

Joseph Dailey
Division Administrator
Wyoming Division
Federal Highway Administration

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Date of Approval

The Wyoming Department of Transportation (WYDOT) proposes to improve US 26/89/189/191 south of Jackson in Teton County, Wyoming. This Final Environmental Impact Statement (FEIS) provides a detailed evaluation of proposed improvements, including an examination of the purpose and need for the proposed action, alternatives considered, the affected environment, environmental consequences, impacts to Section 4(f) properties, and mitigation measures. Three alternatives, including the No-Action Alternative, are considered for implementation in the project area.

Comments on this Final EIS are due by 10/18/10 and should be sent to Mr. Lee Potter. For additional information concerning the document, contact: Mr. Lee Potter, Federal Highway Administration, 2617 E. Lincoln Way, Suite D, Cheyenne, Wyoming 82001-5662.

Jackson South

Teton County

Final Environmental Impact Statement

Prepared for:

Prepared by:

August 2010

Information Availability

The following individuals may be contacted for further information regarding the proposed project and the Environmental Impact Statement.

- **Mr. Timothy Stark**
  Wyoming Department of Transportation
  Environmental Services
  P.O. Box 1708
  Cheyenne, Wyoming 82003-1708
  Fax: 307-777-4193
  E-mail: jacksonsouth@dot.state.wy.us
- **Mr. Lee Potter, P.E.**
  Federal Highway Administration
  2617 E. Lincoln Way, Suite D
  Cheyenne, Wyoming 82001-5662

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Appendices

List of Technical Reports

Technical reports prepared for this project are listed below. The reports are included on the compact disk (CD) attached inside the back cover of this EIS, except the two cultural resource reports [indicated by an asterisk (*)]; those reports are not published in order to protect the location of the sites.

- Jackson South Alternatives Technical Report, February 2008
- Hoback Junction Environmental Impact Study, Noise Technical Report, January 2007
- Public Involvement Technical Report, prepared for Jackson South EIS, February 2008 (updated May 2009)
- Hoback Junction Hazardous Materials Existing Conditions Report, May 2006
- Preliminary Report, Wetlands and Other Surface Waters, Snake River Bridge/Hoback Junction, October 14, 2005
- Class III Cultural Resource Survey, Hoback Junction Projects, June 2002 *
- Archaeological Testing at 48TE1572 and 48TE1573, Hoback Junction - Jackson, Snake River Section, June 2004 *

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List of Acronyms and Abbreviations

AADT	Average Annual Daily Traffic
AASHTO	American Association of State Highway Transportation Officials
ADT	Average Daily Traffic
APE	Area of Potential Effect
AST	Aboveground Storage Tank
BA	Biological Assessment
BLM	Bureau of Land Management
BMP	Best Management Practice
BTNF	Bridger-Teton National Forest
CFR	Code of Federal Regulations
CO_2	Carbon Dioxide
CWA	Clean Water Act
dBA	A weighted Decibels
DEIS	Draft Environmental Impact Statement
DEQ	Department of Environmental Quality
DFC	Desired Future Condition
DOT	Department of Transportation
EA	Environmental Assessment
EDR	Environmental Data Resources
EIA	Energy Information Administration
EIS	Environmental Impact Statement
EO	Executive Order
EPA	Environmental Protection Agency
ESA	Environmental Site Assessment
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Maps
FTA	Federal Transit Administration
GAP	Gap Analysis Project
GHG	Greenhouse Gas
GIS	Geographic Information System
GYA	Greater Yellowstone Area
HHS	Health and Human Services
HUC	Hydrologic Unit Code
ID Team	Interdisciplinary Team
IGBC	Interagency Grizzly Bear Committee
JHCP	Jackson Hole Community Pathways
JHWF	Jackson Hole Wildlife Foundation
LDR	Land Development Regulations
Leq	The energy equivalent of steady-state sound level, over a period of time (usually an hour)
LOMR	Letter of Map Revision
LOS	Level of Service
LRMP	Land and Resource Management Plan
LVP&L	Lower Valley Power & Light
MDT	Montana Department of Transportation
MIS	Management Indicator Species
MOA	Memorandum of Agreement
MP	Milepost
mph	Miles per Hour

List of Acronyms and Abbreviations

MSAT	Mobile Source Air Toxics
MVM	Million Vehicle Miles
NAAQS	National Ambient Air Quality Standards
NAC	Noise Abatement Criteria
NEPA	National Environmental Policy Act
NHS	National Highway System
NO_2	Nitrogen Dioxide
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRCS	National Resource Conservation Service
NRHP	National Register of Historic Places
NRI	Nationwide Rivers Inventory
NRO	Natural Resources Overlay
ORV	Outstandingly Remarkable Value
PM10	Particulate matter less than ten microns in diameter
PM2.5	Particulate matter less than 2.5 microns in diameter
PTF	Pathways Task Force
PUD	Planned Unit Development
RMP	Resource Management Plan
RV	Recreational Vehicle
SHPO	State Historic Preservation Officer
SO_2	Sulfur Dioxide
SPWMA	South Park Wildlife Habitat Management Area
SRO	Scenic Resources Overlay
START	Southern Teton Area Rapid Transit
STIP	State Transportation Improvement Program
SWMP	Stormwater Management Plan
SWPPP	Stormwater Pollution Prevention Plan
TMDL	Total Maximum Daily Load
TNM	Traffic Noise Model
ULI	Urban Land Institute
USACE	United State Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geologic Survey
USTs	Underground Storage Tanks
VMT	Vehicle Miles Traveled
VQO	Visual Quality Objectives
WCSB	Wyoming Centennial Scenic Byway Management Plan
WDEQ-AQD	Wyoming Department of Environmental Quality- Air Quality Division
WGFD	Wyoming Game and Fish Department
WOS	Wildlife Observation System
WSGS	Wyoming State Geologic Survey
WSR	Wild and Scenic Rivers
WYDOT	Wyoming Department of Transportation
WYNDD	Wyoming Natural Diversity Database
WYPDES	Wyoming Pollutant Discharge Elimination System
YNP	Yellowstone National Park

Executive Summary

ES1. Introduction

The Wyoming Department of Transportation (WYDOT), in cooperation with the Federal Highway Administration (FHWA), proposes to improve U.S. 26/89/189/191 in Teton County, Wyoming. The seven-mile Study Corridor is located south of the Town of Jackson, from milepost (MP) 148.6 in the north to MP 141.4 to the south. The Snake River parallels the highway through much of the southern portion of the Study Corridor. The Study Corridor travels through privately-owned residential and commercial land, as well as public lands.

This highway section is a critical travel link within the region. Commuters from Pinedale and Bondurant (via U.S. Highway 189/191) and Alpine (via U.S. Highway 26/89) use U.S. 26/89/189/191 to commute to and from Jackson. The highway is heavily used by commercial vehicles, as well as winter and summer seasonal traffic. The Study Corridor is shown on **Figure ES-1**.

ES2. Study Background

WYDOT and FHWA initiated an Environmental Impact Statement (EIS) in 2000 that studied portions of the three highway segments that meet at Hoback Junction: U.S. Highway 26/89/189/191 from MP 148.6 south to the Junction, U.S. Highway 26/89 from MP 140.7, and U.S. Highway 189/191 to MP 160.8. In 2007, WYDOT and FHWA separated these three segments into three distinct NEPA studies based on their independent utility and distinctive attributes. This led to the initiation of the Jackson South EIS.

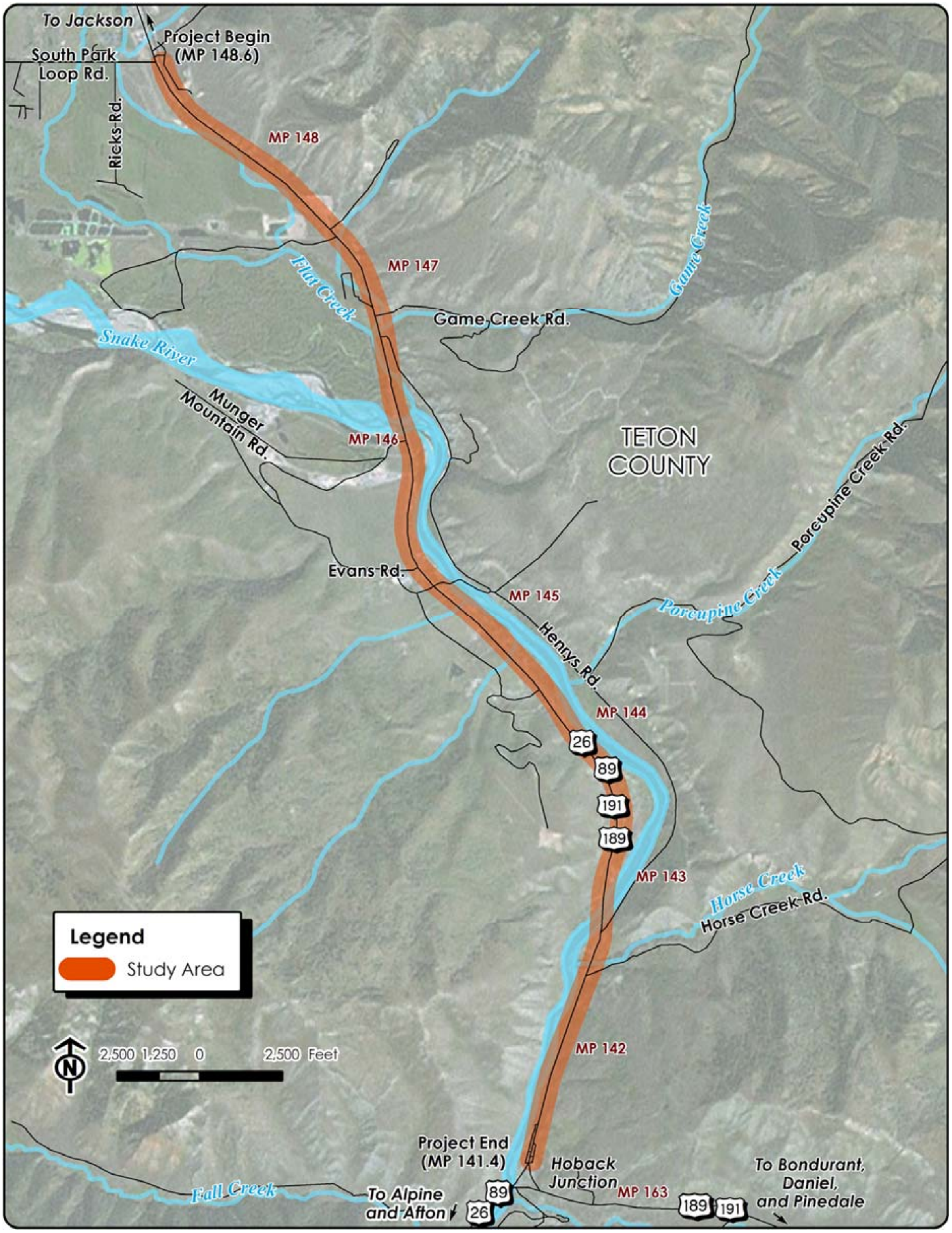
During project scoping and through public meetings, it became clear that the three segments have differing needs and result in significantly different alternatives. In addition, the level of controversy for the solutions differs among the segments due to their impacts to resources. One other contributing factor in deciding to separate the three distinct segments was the time frames proposed for construction (see Section 1.3 for more information).

ES3. Transportation Needs

The purpose of this project is to resolve existing roadway deficiencies while safely and efficiently accommodating current and future traffic volumes and improving system linkage. Primary transportation needs for the Study Corridor, described in more detail in Section 1.4, include:

- **Improve system linkage**: The Study Corridor serves as an important link in the regional transportation system and has become increasingly important for commercial, tourism, and increasing commuter traffic, which require uninterrupted routes into and out of Jackson.

Figure ES-1 Study Corridor



- Provide system continuity: The highway has varying widths throughout the Study Corridor. The highway design should provide improved transitions for differing road widths and a more continuous appearance to assure that driver expectations for safe speed and safe operations are met.
- Accommodate travel demand: The Study Corridor is used daily for multiple trip purposes resulting in a wide variety of vehicle types and travel speeds. Also, population forecasts for Jackson and Teton County indicate substantial growth within the area, which would add to the increased travel demand for the Study Corridor. The highway needs to accommodate these trip purposes, traffic volumes, and vehicle classifications for both current and future conditions. Current highway deficiencies include inadequate shoulder width, inadequate clear recovery area width, steep roadway grades, numerous local access points, inadequate passing and turning lanes, substandard roadway alignment, deficient pavement, and deficient bridges.
- Improve traffic safety: The highway's average crash rate is above the statewide rate. Most of the crashes in the Study Corridor can be attributed to roadway deficiencies. As traffic volumes continue to increase as projected, the number of crashes likely will increase as well.
- Maintain consistency with land use planning: To the extent possible, any proposed improvements to address the transportation needs identified in this EIS should be consistent with area land use planning goals and objectives.
- Accommodate alternative transportation modes: In general, the Study Corridor lacks a connecting network of bicycle and pedestrian amenities.

ES4. Alternatives

The alternatives presented in this EIS were developed through an extensive public and agency coordination process combined with thorough environmental and engineering analysis. A detailed description of the alternative screening process can be found in Chapter 2.0.

Six alternatives were initially identified to potentially meet the transportation needs of the Study Corridor. Those alternatives were evaluated based on feasibility and their ability to meet the transportation needs of the Study Corridor. The six initial alternatives underwent an initial and secondary screening process, which lead to the identification of two build alternatives: the 5-Lane Rural Alternative and the Combination Alternative.

The two build alternatives, as well as the No-Action Alternative, are fully evaluated in this EIS and are described below.

No-Action Alternative

No-Action Alternative: The No-Action Alternative includes only those projects that have funds committed for improvements. These improvements would be made regardless of whether a build alternative is implemented. The No-Action Alternative would include standard maintenance activities on the surfacing, structures, and other roadway appurtenances within the Study Corridor, as well as projects contained in WYDOT's 2009 *State Transportation Improvement Program* (STIP). This alternative was retained for further study to serve as a baseline for comparison.

Build Alternatives

5-Lane Rural Alternative: The 5-Lane Rural Alternative consists of four 12-foot through lanes with one continuous two-way 12-foot left-turn lane with 8-foot shoulders. This alternative would be a multilane section designed to meet access requirements and accommodate left turns.

Combination Alternative: This alternative consists of a 3-lane rural cross-section from approximately MP 141.4 to MP 142.0 and a 4-lane undivided cross-section from approximately MP 142.0 to MP 142.5. The longest segment of this alternative (from approximately MP 142.5 to MP 148.6) would consist of a 5-lane rural cross-section.

Both build alternatives also include a design element for construction of a separate pedestrian and bicycle pathway. This design element is not a stand-alone alternative, but a component of each build alternative. Two pathway options were considered (see "Proposed Trails" on **Figure 3-13)**:

- **Pathway Option 1**: Pathway would parallel the highway on the west side.
- **Pathway Option 2**: Pathway would follow the same alignment as Pathway Option 1 from the northern Study Corridor terminus to Henry's Road south of Game Creek. From there, it would travel along Henry's Road to where Henry's Road intersects the highway near Horse Creek; from that point south it would again share the same alignment as Pathway Option 1. A pathway would not be constructed on Henry's Road; existing Henry's Road would serve as the path.

The pathway for each of the above options would be ten feet wide, but the width could be reduced to eight feet in certain locations to minimize impacts to sensitive environmental resources.

ES5. Summary of Impacts

The existing social, economic, environmental, and transportation conditions within the project area are described in Chapter 3.0 of this EIS. Chapter 4.0 presents a thorough discussion of potential consequences, both adverse and beneficial, that could reasonably be expected to result from each of the alternatives considered. Chapter 4.0 also discusses potential mitigation measures to offset impacts that could occur with the build alternatives.

Impacts associated with the build alternatives and the No-Action Alternative are summarized in **Table ES-1.**

Table ES-1
Summary of Impacts

Resource	Impacts		
	No-Action Alternative	5-Lane Rural Alternative	Combination Alternative (Preferred Alternative)
Landslides	Would not alter the potential for landslides in the study area.	Would include slope stabilization measures that would reduce the potential for landslides in the study area.	Same as 5-Lane Alternative, but would have less encroachment on landslide area located north of Hoback Junction.
Land Use and Zoning	Would have no effect on existing zoning designations, zoning overlays, land preserved through land trusts, or U.S. Forest Service Desired Future Conditions. Any effect on current growth trends and development patterns would be negligible. Is inconsistent with Goal Nos. 1 and 3 in the *Jackson/Teton County Comprehensive Plan.* Note: As of this writing, the *Jackson/Teton County Comprehensive Plan* is undergoing revision.	Would provide additional capacity. Would have a negligible effect on current growth trends and development patterns. Would accommodate travel demand from anticipated developments. Is consistent with Forest Plan standards for visual quality. Would improve safety and efficiency of highway and would be consistent with Goal Nos. 1 and 3 in the *Jackson/Teton County Comprehensive Plan.* Would require 17.3 acres of right-of-way which would displace small amount of existing land uses and land currently within the Natural Resources Zoning Overlay District. Would impact two Teton County Scenic Preserve Trust parcels.	Would have same land use impacts as the 5-Lane Rural Alternative, except would be partially consistent with Goal No. 3 in the Jackson/Teton County Comprehensive Plan. Would require 15.8 acres of right-of-way.
Farmland	No impacts to Prime, Unique, or farmland areas of Statewide Importance because none are located in the Study Corridor. No impacts to unprotected farmland.	Would impact approximately 1.91 acres of unprotected farmland, consisting of irrigated cropland, hayfields, and non-irrigated pastureland.	Same as 5-Lane Rural Alternative.
Social Conditions	Would result in increased traffic, time delays and safety concerns. Emergency response time would increase. Increased traffic would make travel and access to property more difficult.	Would improve access for the growing populations of surrounding communities. Reduced traffic congestion, improved accessibility, safety, and system linkage. Would result in better emergency response time. Would have short-term impacts during construction, including air pollution, noise, and limited accessibility. One residence relocation would be required for right-of-way; no businesses would be relocated. Pathway would improve network connectivity for non-motorist commuters and a safer route for pedestrians and bicyclists.	Similar to 5-Lane Rural Alternative. Accommodation for increased travel demand and accessibility would not be as great for the three- and four-lane portions of this alternative.
Environmental Justice	Would not result in disproportionately high and adverse impacts.	Would not result in disproportionately high and adverse impacts. No displacement of minority or low-income residents and no businesses would be displaced.	Same as 5-Lane Rural Alternative.

Table ES-1
Summary of Impacts

Resource	Impacts		
	No-Action Alternative	**5-Lane Rural Alternative**	**Combination Alternative (Preferred Alternative)**
Right-of-Way	No impacts.	One residence relocation. Would require 17.3 acres of additional right-of-way, including 3 acres of land within the Teton County Scenic Preserve Trust. The Lower Valley Energy pipeline crosses the highway at MP 148.72 (South Park Loop Road) and MP 146.73 (Game Creek).	Same as 5-Lane Rural Alternative, except would require 15.8 acres of additional right-of-way.
Economic	Would not directly affect regional or local economic conditions or development patterns. Would not meet existing or future transportation needs, worsening safety and traffic conditions and hinder access to businesses and local services. Could detract from tourist's enjoyment of area and may discourage some recreational pursuits, although overall tourism business would continue to increase at slightly reduced levels compared to build alternatives. Increased traffic congestion and travel times would burden commuting workers. The number of accidents would continue to increase.	Would improve traffic flow, safety, and access to commercial, recreational, and employment locations, which would be beneficial to study corridor businesses and tourism.	Same as 5-Lane Rural Alternative, although improvements along the three- and four-lane sections would be more modest.

Table ES-1
Summary of Impacts

Resource	Impacts		
	No-Action Alternative	**5-Lane Rural Alternative**	**Combination Alternative (Preferred Alternative)**
Parks and Recreation Resources	No impact.	Would not impact established river access points and therefore would not affect activities such as camping, cross-country skiing, horseback riding, and hunting. Would improve access to recreational facilities in and near the Study Corridor by addressing transportation needs discussed in Chapter 1.0 of this EIS. Will improve air quality over No-Action conditions. The reconfigured access to the South Park boat launch area being developed by Teton County on land acquired from BLM will enhance safe ingress and egress. Access to the parcel would be provided as currently shown on the draft site plan depicted in the *Recreation Project Plan South Park River Access*, September 2004. Site access would be coordinated with the Snake River Fund and the Snake River Taskforce during final design. No impacts to that parcel would occur. Pathway included with project would enhance recreational opportunities for pedestrians and bicyclists. During construction, temporary increases in turbidity and sediment may impact fishing opportunities in certain sections of the river.	Similar to 5-Lane Rural Alternative. Narrower pavement in the three- and four-lane sections would reduce adverse visual effects in those sections, thereby minimizing impacts for scenic driving.
Transportation	Would not meet several goals in the *Jackson/Teton County Comprehensive Plan*. Highway would operate at Level of Service (LOS) D and E by 2026. Bridge deficiencies would not be addressed.	Would improve efficiency of transportation system and improve safety. Would meet goals in the Jackson/Teton County Comprehensive Plan. Would not adversely affect transit operations. Would operate at LOS A in 2026. Bridge deficiencies would be addressed.	Same as 5-Lane Rural Alternative, but would not accommodate turning movements in the three- and four-lane segments to the same extent. Would operate at LOS A-C in 2026.

Table ES-1
Summary of Impacts

Resource	Impacts		
	No-Action Alternative	5-Lane Rural Alternative	Combination Alternative (Preferred Alternative)
Bicycle and Pedestrian Facilities	Continued lack of safe, connecting bicycle and pedestrian facility network, inconsistent with area plans. No impacts to existing trails or pathways would occur.	Improved accommodations for bicyclists and pedestrians through provision of pathway connections. Would widen existing highway footprint. Construction would temporarily impact existing trails where they are located within existing WYDOT right-of-way, but use of the trails would be protected and they would remain open during construction. No impacts would occur to trails located outside existing WYDOT right-of-way and within County-owned easements. Also refer to Section 4(f) at end of this table.	Same as 5-Lane Rural Alternative.
Air Quality	Increased future emissions due to congestion and idling vehicles.	Would provide higher level of service, resulting in less congestion. Would not result in exceedances of the NAAQS.	Same as 5-Lane Rural Alternative.
Noise	Noise impacts to 43 receivers in the Evans Mobile Home Park and two isolated residential receivers. No increases of 15 or more decibels above existing noise levels would occur.	Near the Evans Mobile Home Park, roadway design was shifted slightly to the west and included a four-foot-high earthen berm. These changes eliminated noise impacts to the mobile home park. Nine other residential receivers would exceed the NAC.	Same as 5-Lane Rural Alternative.
Water Resources	No new direct impacts. Indirect impacts over time as traffic and roadway-related pollutants increase. Would provide no improvements, protection measures, or best management practices (BMPs) to reduce direct or indirect impacts.	Direct impacts would result from bridge and culvert reconstruction and encroachments due to highway widening. Would increase impervious surface from existing 31.4 acres to 71.4 acres, which would increase stormwater runoff. Changes to channel form and function are anticipated to be minor relative to changes that occur during Spring runoff.	Same as 5-Lane Rural Alternative, but would have less increase in impervious surface from existing 31.4 acres to 68.8 acres due to reduced width in the three- and four-lane sections, resulting in reduced stormwater runoff.
Water Quality	No new impacts.	Would increase impervious surface from existing 31.4 acres to 71.4 acres, which would increase stormwater runoff. Amount of runoff from the highway reaching the streams or river is subject to the effectiveness of BMPs, the amount and intensity of rain events, the proximity of water bodies, topography, and vegetative features. Would result in the introduction of certain pollutants normally associated with vehicular traffic.	Same as 5-Lane Rural Alternative, but would have less increase in impervious surface from existing 31.4 acres to 68.8 acres due to reduced width in the three- and four-lane sections.

Table ES-1
Summary of Impacts

Resource	Impacts		
	No-Action Alternative	**5-Lane Rural Alternative**	**Combination Alternative (Preferred Alternative)**
Waters of the U.S., including Wetlands	No new impacts.	Would impact 13 wetlands and result in approximately 0.94 acre of permanent wetland impact, including 0.42 acres of shrub swamp, 0.18 acre of shallow marsh, and 0.34 acre of wet meadow. The impacts would result from the unavoidable filling of wetland areas during construction. Would result in loss of 8.272 wetland functional units. Also would result in 0.07 acre of temporary impact to Wetland #15. Would impact approximately 1,200 linear feet of waters of the U.S., including 26 linear feet of Game Creek, 76 linear feet of Flat Creek, and 76 linear feet of the Snake River. Bridge and culvert construction would require work within the channel, including excavation, pile driving, and bank stabilization. WYDOT would attempt to minimize impacts by keeping bridge piers outside of waterways if bridges are replaced.	Same as 5-Lane Rural Alternative.
Floodplains	No new impacts.	Would require either bridge replacement or widening at floodplain crossings. Bridge piers may be placed within ordinary high water limits and 100-year floodplain. New bridges would be above the 100-year floodplain elevation. Bridge design would result in no net increase in water surface elevation or decrease in conveyance. Would not appreciably change or modify floodplain hydraulics or increase flooding risks. Would not result in significant floodplain encroachment.	Same as 5-Lane Rural Alternative.
Wild and Scenic Rivers	No impacts.	Effect to free-flowing character of Snake River if mid-stream piers are replaced or supplemented with larger piers that create hydraulic eddies. Pier design could mitigate this effect. No adverse effect on scenic ORV for Snake River. Elimination of some existing recreation access points along highway. Potential impacts to species of concern, including fine-spotted Snake River cutthroat trout, blue headed sucker, trumpeter swan, and bald eagle. Wider pavement would impact wildlife crossing highway. Would have effect on several ORVs and	Similar to 5-Lane Rural Alternative, except there would be fewer effects where the highway transitions to four lanes and three lanes because of the reduced road width.

Table ES-1
Summary of Impacts

Resource	Impacts		
	No-Action Alternative	**5-Lane Rural Alternative**	**Combination Alternative (Preferred Alternative)**
		resource values that could be partially mitigated following certain design criteria and mitigation strategies. The U.S. Forest Service (USFS) determined that this alternative would not affect the classification of the Snake River if mitigation measures listed in Section 4.22.4 are employed. FHWA and WYDOT will employ those mitigation measures. Inclusion of pathway would enhance variety of recreation opportunities.	
Roadless Areas	No impact.	No effect to Munger Mountain Roadless Area or Roadless Area characteristics.	Same as 5-Lane Rural Alternative.
Wildlife and Fisheries	Existing wildlife impacts would remain and potentially increase as traffic volumes increase. Any future construction or maintenance activities would not cause substantial wildlife displacement or vegetation removal.	Loss of habitat/vegetation to wider roadway and clear zones. Potential mortality from improved roadway. Would affect/disturb movement/distribution patterns and behavior due to new roadway and associated infrastructure. Reduction in habitat connectivity due to difficulties crossing wider roadway. Risk of wildlife-vehicle collisions is expected to decrease near the five wildlife crossings included with this alternative. The USFWS determined that the project will have no effect on Canada lynx or critical lynx habitat, will not jeopardize the continued existence of the gray wolf, and is not likely to adversely affect the grizzly bear. Bald eagles occur in the project area and could be subject to impacts. Potential adverse impacts on nesting bald eagles without appropriate mitigation. Large impacts to migratory birds not anticipated. Potential adverse effect to fisheries without appropriate mitigation.	Same as 5-Lane Rural Alternative.
Vegetation	Existing conditions would remain.	Would impact 63.2 acres of Mountain Big Sagebrush, 41.7 acres of Riparian Forest, and 1.6 acres of Douglas Fir. No impacts to Ute ladies'-tresses orchid or USFS sensitive species. Noxious plant species and seeds may need to be mitigated in areas being reclaimed.	Same as 5-Lane Rural Alternative, but would results in four fewer acres of Mountain Big Sagebrush impacts.
Cultural Resources	No additional impacts to Game Creek site. Existing road currently bisects the site.	Would have an adverse effect to the Game Creek site.	Same as 5-Lane Rural Alternative.

Table ES-1
Summary of Impacts

Resource	Impacts		
	No-Action Alternative	**5-Lane Rural Alternative**	**Combination Alternative (Preferred Alternative)**
Hazardous Waste	No impact.	There is believed to be little or no potential of encountering contaminated soil and groundwater within the Study Corridor. The Lower Valley Energy pipeline is not considered a hazardous materials threat to this project.	Same as 5-Lane Rural Alternative.
Visual Character	No impact.	Visual impacts associated with pavement widening, expansion of clear zone width and associated vegetation clearing, cut and fill slopes, and retaining walls. Retaining walls as proposed would be consistent with USFS' scenic quality standards of *retention* if mitigation techniques in Section 4.22.4 are employed. If more retaining walls are added during final design, they may not meet the current Forest Plan scenic quality standards.	Same as 5-Lane Rural Alternative between MP 142.5 to 148.6. The four-lane section (MP 142.0 to MP 142.5) would have visual impacts but to a lesser degree than the 5-Lane Rural Alternative. The three-lane segment would more easily blend into the existing infrastructure than the 5-Lane Rural Alternative.
Construction	No construction impacts beyond what is currently planned for the Study Corridor.	Would result in short-term construction impacts throughout construction period. This would include impacts to travel mobility, increased traffic congestion, temporary access restriction to residences and businesses, vibration caused by construction activities, increased dust, noise, runoff, and visual impacts. Temporary increases in turbidity and sediment may impact fishing opportunities in certain sections of the river. Construction would present potential for exposure to, or accidental spill of, hazardous materials. The construction period would likely extend over several years. The project would provide employment for construction workers, resulting in economic benefit to communities where those workers reside, and greater retail sales within the Study Corridor from construction workers.	Same as 5-Lane Rural Alternative.

Table ES-1
Summary of Impacts

Resource	Impacts		
	No-Action Alternative	5-Lane Rural Alternative	Combination Alternative (Preferred Alternative)
Energy	Vehicular fuel consumption would continue to increase as traffic congestion increases. This alternative would result in ongoing and increased maintenance, thus increasing maintenance energy consumption.	Fuel consumption for long-term maintenance would increase due to greater area of roadway surface to clear, de-ice, and otherwise maintain. Construction would result in energy consumed for construction vehicle operation and production of construction materials. This alternative would improve LOS, which would decrease vehicular fuel consumption due to decreased traffic congestion.	Same as 5-Lane Rural Alternative.
Cumulative	No impacts.	Would not result in significant cumulative impacts.	Same as 5-Lane Rural Alternative.
Section 4(f)		Would temporarily impact the existing Paul Merritt and Von Gontard trails where they are located within the existing WYDOT right-of-way. Both trails would be relocated and opened to recreational use before the existing trails are impacted so that recreational activities are not interrupted and use of the trails would be protected. No impacts would occur to trails located outside existing WYDOT right-of-way and within County-owned easements. However, across from Little Horsethief Lane, 0.05 acre of the Von Gontard Trail easement would be encroached upon and converted to transportation use, but not the trail itself because it is located outside of its intended easement at that location. Also, 0.5 mile south of Little Horsethief Lane, temporary impacts would occur to the existing trail but not to the pathway easement because the trail is located outside of its intended easement at that location; however, since the easement would not be impacted, Section 4(f) would not apply. WYDOT would reconstruct and reroute the trail to eliminate the conflict. If practicable, WYDOT would reroute the trail onto the easement. FHWA has concluded that either build alternative would have *de minimis* impacts to the Von Gontard Trail and that an analysis of feasible and prudent avoidance alternatives under Section 4(f) is not required.	Same as 5-Lane Rural Alternative.

ES6. Summary of Mitigation

Mitigation measures associated with the build alternatives are summarized in **Table ES-2**.

ES7. Identification of the Preferred Alternative

FHWA and WYDOT have identified the Combination Alternative as the Preferred Alternative because it meets the purpose and need for the project while minimizing environmental impacts relative to the 5-Lane Rural Alternative, as documented in Chapter 4.0 of this EIS. Please refer to Chapter 2.0 for a detailed discussion of the range of alternatives developed and evaluated, and results of the evaluation.

FHWA and WYDOT weighed many factors in identifying the Preferred Alternative, including input received from the Interdisciplinary Team (see Section 6.3.1) and members of the public. As is the case with many major highway studies, a certain level of differing and often competing interests exists within the community. These differing opinions are reflected in comments received on the Draft Environmental Impact Statement (DEIS) (please refer to Section 6.6). Development of the Preferred Alternative sought to balance concerns regarding highway widening with design elements necessary for the alternative to meet the purpose and need of the project.

Description of the Combination Alternative (Preferred Alternative)

The Combination Alternative (Preferred Alternatives) combines features of the 3-Lane, 4-Lane, and 5-Lane alternatives, as shown on **Figure ES-2**. Refer to Chapter 2.0 for description of those alternatives.

The 3-Lane Rural cross-section portion of the Combination Alternative would tie into the three-lane urban section at MP 141.4 immediately north of Hoback Junction. Vehicles traveling north from Hoback Junction in this three-lane rural section would have a general purpose travel lane and a passing lane to improve traffic flow in this uphill section. The three-lane section would extend roughly 0.6 mile to MP 142.0, where it would transition to a 4-Lane Undivided cross-section. This section then would extend 0.5 mile to MP 142.5 and include two northbound travel lanes, one southbound travel lane, and a center turn lane. Next, it would transition to the 5-Lane Rural cross-section. The 5-Lane Rural cross-section would be the longest segment of the Combination Alternative and would continue for 6.1 miles to MP 148.6.

The five-lane and four-lane portions would include a two-way, left-turn lane to provide and improve access to adjacent properties where it is currently needed. Where the cross-section tapers to three lanes, fewer access points exist, which reduces the need for a center lane to accommodate turning vehicles. Therefore, the roadway width for the Combination Alternative can be narrowed to reduce right-of-way impacts.

Table ES-2
Summary of Mitigation

Resource	Mitigation for 5-Lane Rural Alternative and Combination Alternative (Preferred Alternative)
Landslides	WYDOT has monitored the two active landslide areas in the study area for several years; however, more monitoring and investigation is required to identify mitigation measures specific to each site. At the final design stage, WYDOT will conduct this investigation, incorporate landslide corrections into the design for the Preferred Alternative and determine appropriate mitigation measures.
Land Use and Zoning	Because the build alternatives are generally consistent with future land use plans and would have a negligible effect on current growth trends and development patterns, no mitigation is necessary. Mitigation for property acquisition is discussed under Right-of-Way.
Farmland	Because no Prime, Unique, or farmland areas of Statewide Importance are located in the Study Corridor, no mitigation is required. Acquisition of unprotected farmland would comply with procedures and policies contained in the Uniform Relocation Assistance and Real Property Acquisitions Policies Act of 1970, as amended.
Social Conditions	Short-term construction impacts will be mitigated by good communication with communities, residents, emergency service providers, and river outfitters regarding road delays, access, and special construction activities.
Environmental Justice	Noise impacts to Evans Mobile Home Park were avoided and minimized by shifting proposed highway alignment slightly to the west and including a four-foot-high earthen berm. Otherwise, no mitigation measures will be required.
Right-of-Way	Right-of-way acquisitions will comply with the Uniform Relocation Assistance and Real Property Acquisitions Policies Act of 1970, as amended. WYDOT will coordinate with Lower Valley Energy regarding the recently constructed natural gas pipeline to try to avoid relocation of the pipeline during construction of the Preferred Alternative.
Economic	No mitigation is necessary.
Parks and Recreation	Since this alternative would not directly impact recreation resources, mitigation is not required. Existing pathway will remain open for recreational use until new pathway construction is completed, at which time use would shift to the new pathway. Pathway use will not be interrupted during construction. WYDOT and FHWA will review informal recreation access points during final design and identify opportunities to improve safety, circulation, and coordinate recreation access. Parking needs at Flat Creek/dike access area will be considered, as well as signage for trailheads and the South Park boat access area. Access to the BLM parcel at South Park will be provided as currently shown on the draft site plan depicted in the *Recreation Project Plan South Park River Access*, September 2004. WYDOT will coordinate with the Snake River Fund and Snake River Task Force regarding site access during final design. WYDOT will require contractor to provide one-day notice for channel disturbing activities to allow anglers to avoid turbid sections of the river.
Transportation	No mitigation is necessary.
Bicycle and Pedestrian Facilities	Von Gontard Trail will be replaced with new pathway in certain areas. The existing pathway will remain open for recreational use until the new pathway construction is completed, at which time use would shift to the new pathway. Pathway use will not be interrupted during construction. Teton County representatives have stated that they are agreeable to closing either pathway option during periods of high wildlife migration/presence to minimize wildlife disturbance. Pathway/trail system closures to protect wildlife are common in the Jackson area. Temporary pathway closures to protect migrating wildlife would not be extraordinary. No additional mitigation is necessary. Also refer to Section 4(f) mitigation at end of this table.
Air Quality	No mitigation is necessary.

Table ES-2
Summary of Mitigation

Resource	Mitigation for 5-Lane Rural Alternative and Combination Alternative (Preferred Alternative)
Noise	No mitigation was determined to be reasonable, beyond the four-foot-berm at mobile home park included in proposed roadway design.
Water Resources	Wyoming Department of Transportation (WYDOT) has attempted to avoid and minimize impacts to water resources during preliminary design, and will continue to do so during final design. Final design will incorporate BMPs to mitigate unavoidable adverse effects to water resources, as described under Water Quality below. WYDOT will prepare a hydrology report during final design that evaluates the character of each channel affected, and will address effects to channels in the detailed design of the drainage structures.
Water Quality	WYDOT has attempted to avoid and minimize impacts to water resources during preliminary design, and will continue to do so during final design. WYDOT will prepare a Stormwater Management Plan that includes best management practices (BMPs) to meet the following goals: • Control and minimize erosion and sedimentation during and after the construction phase of a project. • Minimize the potential for contaminants entering stormwater and receiving waters during construction activities. • Reduce pollutants in post-construction stormwater runoff (stormwater quality management). • Implement permanent erosion control and stormwater measures to address cut and fill slope erosion and highway runoff. • Continue BMPs during maintenance. • Develop a spill prevention and emergency response plan for use during construction concerning the storage, handling, and use of chemicals and other such products. WYDOT and its contractors will adhere to criteria in WYDOT's Standard Specifications for Road and Bridge Construction, 2003. WYDOT will incorporate BMPs into a Stormwater Pollution Prevention Plan to minimize runoff to the Snake River and tributaries during bridge and highways construction. The plan will include inspection requirements to maintain compliance pursuant to state and Teton County stormwater regulations and ensure performance and adequate maintenance of water quality BMPs. BMPs common to WYDOT roadway projects include: • Limiting land disturbance and preserving existing vegetation • Vegetative stabilization through seeding and mulching • Periodic monitoring of revegetation efforts for two years after land disturbance • Silt fence • Erosion bales • Rock berms, channels, diversion or check dams • Inlet and outlet protection • Erosion control blankets Additional BMPs will be identified during project design and will be based upon site-specific characteristics, such as adjacent vegetation type and density, proximity to waterways, topography, and physical constraints. These BMPs could include, but are not limited to:

Table ES-2
Summary of Mitigation

Resource	Mitigation for 5-Lane Rural Alternative and Combination Alternative (Preferred Alternative)
	• Compost berms • Slope drains • Ditch checks • Geotextiles • Sediment traps • Basins • Bituminous and burlap bag curbs Following are average efficiency rates of a few common BMPs. Efficiency rate of sediment removal is affected by proper installation and maintenance of BMPs. Therefore, higher or lower efficiency rates are possible based on site-specific conditions (Urban Erosion and Sediment Control Best Management Practice, Definition and Nutrient and Sediment Reduction Efficiencies, Andrew H. Baldwin). • Silt fence – 70 percent • Straw bale – 70 percent • Basins – 70 percent • Vegetative filter strip – 70 percent • Temporary mulching – 87 percent Actual effectiveness of BMPs will also depend on site conditions (steeper slopes and higher silt content lead to lower effectiveness). Related research indicates the need to install protection measures as soon as possible after construction since most material is eroded in the first few years after construction. Therefore, WYDOT will implement erosion and sediment BMPs as soon after ground disturbance as practical. Also, monitoring of revegetated areas will occur as specified in the revegetation plan that will be developed through coordination with the USFS, WGFD, USACE, and BTNF (see Section 4.19.4). State-of-the-art erosion and sediment control BMPs will also be considered as they become available. When the WDEQ proposes a total maximum daily load (TMDL) for Flat Creek, maintenance requirements for the improved highway will support the waste load allocated to stormwater flow off the highway and into Flat Creek.
Waters of the U.S., Including Wetlands	WYDOT has attempted to avoid and minimize impacts to waters of the U.S. and wetlands during the preliminary design stage. WYDOT will continue to seek opportunities to avoid and minimize impacts to waters of the U.S. and wetlands during final design of the Combination Alternative (Preferred Alternative). A permit from the U.S. Army Corps of Engineers (USACE) will be required for all project-related wetland and waters of the U.S. impacts. Wetland mitigation will include creation or restoration of 1.41 to 1.88 acres (1.5:1 to 2:1 mitigation ratio) of wetland. Mitigation wetlands will be designed such that the total functional units lost will also be replaced at a 1.5:1 to 2:1 ratio. Mitigation wetlands will include the same types of wetlands impacted by the project and will be located near the highway corridor, therefore mitigation wetlands will be considered on-site and in-kind. Based on the above information, the requirements under EO 11990 have been met.

Table ES-2
Summary of Mitigation

Resource	Mitigation for 5-Lane Rural Alternative and Combination Alternative (Preferred Alternative)
Floodplains	WYDOT will coordinate with Teton County Floodplain Administrator to ensure compliance with local regulations and inclusion of appropriate mitigation measures in construction plans. Designs and recommendations will comply with 23 CFR 650 A and EO 11988. WYDOT will attempt to minimize impacts to 100-year floodplain and any regulatory floodways. Specific avoidance, minimization and mitigation measures will be determined during final design.
Wild and Scenic Rivers	**Free-flowing character of Snake River**: To avoid and mitigate potential effects to the free-flowing characteristics of the Snake River, WYDOT will attempt to locate piers outside of the stream bed where practical if bridges are replaced (for bridge widening, pier locations would not change). If intermediate supports or piers are required, WYDOT will design the piers such that hydraulic eddies are not created. **Scenic Outstandingly Remarkable Value (ORV)**: Because of the developed nature of adjacent private lands, the USFS has determined that this retaining wall would not have an adverse effect on the Scenic Quality ORV for the Snake River if mitigation techniques discussed in Section 4.22.4 are employed. **Recreation ORV**: WYDOT will coordinate with Teton County, Snake River Fund, and Snake River Taskforce on access management for the South Park area. WYDOT also will coordinate with Bridger-Teton National Forest (BTNF) during the design stage to manage access points immediately north of Hoback Junction. This plan will include eliminating informal access roads and seasonally gating formal access roads to prevent resource degradation and protect wildlife. **Fish and Wildlife Resources ORV**: WYDOT will provide fish passage structures where highway crosses Horse Creek, Flat Creek, and Game Creek. WYDOT will provide wildlife crossings at five locations: Game Creek, Flat Creek, South Park Bridge over the Snake River in the north and Snake River Bridge, and Horse Creek. Also, a wildlife crossing will be considered in the area south of Horse Creek. Wildlife fencing will be used to guide animals to these crossings. Exact design of wildlife crossing structures, wildlife fencing, and game trail benches adjacent to bridge abutments will be determined during final design.
Roadless Areas	No mitigation is necessary.
Wildlife and Fisheries	A USACE Section 404 permit will be required. Measures to compensate for unavoidable loss of riparian areas will be addressed during final design. **Bald Eagle:** Because of the potential for adverse impacts from the project on nesting bald eagles, FHWA has conducted informal consultation with the USFWS, and will comply with USFWS's *National Bald Eagle Management Guidelines*, May 2007. In January 2010, the USFWS issued Wyoming Guidelines for Bald eagles. The guidelines refer to the *Bald Eagle Working Group Guideline for the Yellowstone Ecosystem*, 1982. FHWA and WYDOT will comply with the Wyoming Guidelines for the two bald eagle nests located over 0.5 mile outside the Study Corridor (the Munger Mountain 1 and Munger Mountain 2 nests). Two other bald eagle nests (the Porcupine nest and the Hoback nest) are located within 0.5 mile of the Study Corridor. Because of the potential for adverse impacts from the project on the Porcupine and Hoback nests, project-specific conservation measures were developed based on informal consultation with the USFWS, in lieu of mitigation measures outlined in the Wyoming Guidelines for Bald Eagles (see April 9, 2010 letter in Appendix A). FHWA and WYDOT will employ these measures, which include: • Removal of vegetation within 0.5 mile of nests, including all tree cutting, will be conducted outside of the entire nesting season (approximately February 15th through July 15th). • After the first season of project implementation, WYDOT, FHWA, and the USFWS will review the Jackson South project reconstruction activities and the status of the bald eagle's nests to discuss whether any project modifications might be necessary to reduce impacts to the eagles. **Migratory Birds**: Large trees near the roadway will be preserved where feasible. A qualified biologist will conduct a survey for active migratory bird nests prior to construction activities (including clearing and grubbing). If no active nests are found, construction

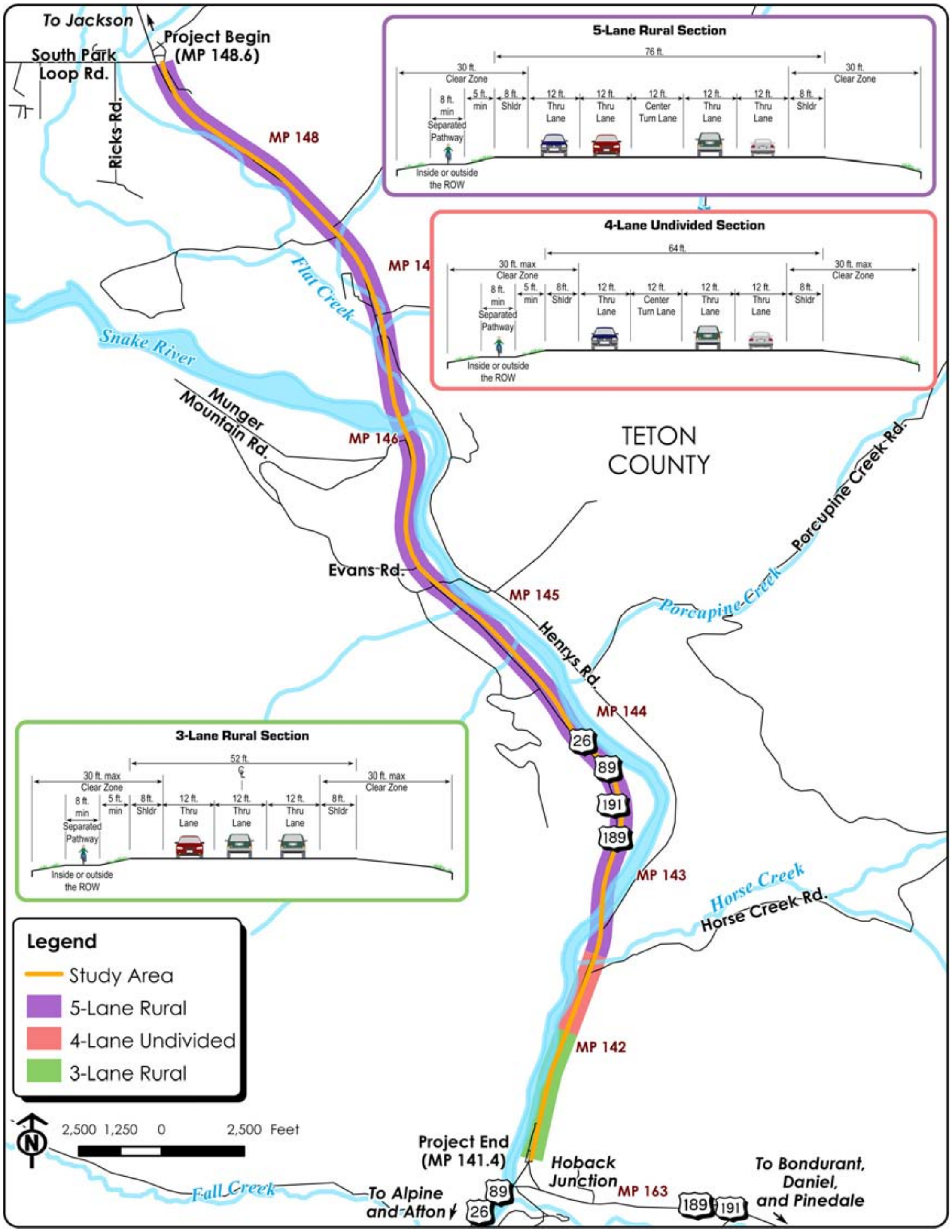
Table ES-2
Summary of Mitigation

Resource	Mitigation for 5-Lane Rural Alternative and Combination Alternative (Preferred Alternative)
	activities can proceed. If active nests are found, coordination with USFWS will determine an appropriate course of action, which may include, but is not limited to, a delay in construction to avoid the breeding season. Active nests found during construction will also require coordination with the USFWS. **Wildlife**: Wildlife crossings will be provided at five locations: Game Creek, Flat Creek, South Park Bridge over the Snake River in the north and Snake River Bridge, and Horse Creek. Also, a wildlife crossing will be considered in the area south of Horse Creek. Wildlife fencing will be used to guide animals to these crossings. Fish passage structures for Horse Creek and Game Creek will be provided where the highway crosses these waterways. The exact design of wildlife crossing structures, wildlife fencing, and game trail benches adjacent to bridge abutments will be determined during final design. WYDOT's standard box-beam or W-beam guardrail will be used at bridge ends and at isolated steep fill areas. In general, WYDOT will attempt to minimize guardrail use in the Study Corridor. FHWA and WYDOT will continue to work with the ID Team members, Wyoming Game and Fish Department, Bridger-Teton National Forest, and other interested parties to find ways to minimize wildlife-vehicle collisions. Options include use of retaining walls to help funnel wildlife to crossing locations, increasing visibility of wildlife to drivers by maintaining 30-foot clear zone and moderating steep side slopes, and posting advisory signs to warn drivers of high wildlife use periods. Teton County representatives have stated that they are agreeable to closing either pathway option during periods of high wildlife migration/presence to minimize wildlife disturbance. Pathway/trail system closures to protect wildlife are common in the Jackson area. Temporary pathway closures to protect migrating wildlife would not be extraordinary. **Fisheries**: WYDOT will coordinate with the Wyoming Game and Fish Department (WGFD) and incorporate BMPs in the project design to mitigate fishery impacts. WYDOT will perform an amphibian survey prior to construction at all wetlands adjacent to the roadway that will be impacted by construction and coordinate with WGFD on their concerns.
Vegetation	Revegetation plan will be developed through coordination with the USFS, WGFD, USACE, and BTNF.
Cultural Resources	FHWA, WYDOT, and the State Historic Preservation Officer (SHPO) signed a Memorandum of Agreement (MOA) in May/June 2005, to mitigate adverse effects to the Game Creek Site. The MOA includes a Data Recovery Plan and procedures required to minimize disturbance of the site and procedures to follow if intact cultural remains are discovered during construction.
Hazardous Waste	WYDOT will include containment and mitigation measures for hazardous materials. If lead-based paint is found on bridges or other structures on the project that require demolition or renovation, measures will be taken to prevent release of lead-based paint to the environment. WYDOT will coordinate with Lower Valley Energy regarding the natural gas pipeline.
Visual Character	WYDOT will revegetate impacted areas with native trees, shrubs and grasses placed in appropriate sun exposure, soil and moisture conditions. Riparian vegetation will be planted at creek and wetland edges. Removal of vegetation from clear zones and replanted vegetation will be done in a random pattern to provide a natural appearance. Cut and fill slopes will be constructed to provide naturally appearing foreground views. Length and use of retaining walls will be minimized and designed to blend into the environment. WYDOT will coordinate the aesthetic treatment of the walls during the final design phase with the design advisory group, which will include USFS representatives. WYDOT will coordinate with Teton County during final design and incorporate measures identified in the *Wyoming Centennial Scenic Byway Plan.*

Table ES-2
Summary of Mitigation

Resource	Mitigation for 5-Lane Rural Alternative and Combination Alternative (Preferred Alternative)
Construction	**Air Quality** WYDOT's Standard Specifications for Road and Bridge Construction (2003), require contractors to provide and use methods to control air pollution (section 111.4 Air Pollution Control). Construction impacts to air quality can be reduced by using dust suppression methods, such as water and/or commercial dust control agents. Particulate emissions in the form of fugitive dust are regulated by the Department of Environmental Quality (DEQ). **Noise/Vibration** Combine noisy operations to occur during the same time period. Conduct pile-driving and other high-noise activities during daytime construction, where possible. These mitigation measures would likely increase the overall duration of construction while limiting the actual timeframe in which construction would occur during the day. **Water Quality** Contractors will be required to adhere to measures outlined in WYDOT's Standard Specifications for Road and Bridge Construction (2003) to protect water quality during construction. These measures require implementation of a Stormwater Pollution Prevention Plan (SWPPP). BMPs will be implemented to control sediment and prevent erosion. Existing vegetation will be maintained and preserved where practical, and all disturbed soils will be seeded and re-vegetated. Silt fences, as well as erosion bales and burlap bag curb, will be used to trap sediments, contain runoff, and protect from erosion. WYDOT will require the contractor to provide at least one day of pre-notification before channel disturbing activities to allow anglers to avoid turbid sections of the river. **Traffic Control** Develop traffic management plans. Maintain traffic flow during peak travel times by minimizing lane closures, if possible. Coordinate with emergency service providers to minimize delays and ensure access to properties. Use signage to announce/advertise timing of road closures. **Visual** Store equipment and materials in designated areas only. Remove any unused detour pavement or signs.
Energy	Procedures available to reduce energy consumption during construction include reducing haul trips, designing to permit re-use of forms, maintaining construction vehicles, developing adequate construction phasing and detour plans, turning off construction equipment when not in use, and designing construction access roads and staging to limit distances traveled.
Cumulative	Although improvements would not result in significant cumulative impacts, mitigation measures will be implemented to reduce the project's contribution to any cumulative impacts to resources of concern.
Section 4(f)	To compensate for impacts to the Von Gontard Trail easement, WYDOT proposes to purchase an easement where the existing bikepath extends outside of the easement for which it was intended and convey the easement to the County. This would enhance the trail facility by ensuring the county retains an easement for that portion of the trail where it currently does not.

Figure ES-2 Preferred Alternative



The Combination Alternative was identified as the Preferred Alternative for the following reasons:

- It would provide a transition from the proposed higher speed, five-lane section in the north part of the Study Corridor to the three-lane section at the Hoback Junction intersection while maintaining adequate LOS. This transition would alert drivers to slow their driving speeds while approaching Hoback Junction.
- It would meet driver expectations by providing road widths consistent with the surrounding topography; five lanes in the wider valley portion to the north transitioning to four lanes then three lanes to the south, where steep landforms surround the existing roadway just north of Hoback Junction.
- It would function at an acceptable LOS and still meet the project Purpose and Need because of the reduced access needs, transitioning to Hoback Junction, and the short length of the three- and four-lane sections. The three- and four-lane sections would operate at LOS C or better during the design year, while the five-lane section would function at LOS A.
- It would improve access to adjacent properties where it is currently needed.
- It would reduce environmental and right-of-way impacts compared to the 5-Lane Alternative because the cross-section tapers to three lanes where fewer access points exist, which reduces the need for a center lane to accommodate turning vehicles. Therefore, the roadway width for this alternative can be narrowed to reduce impacts.

Factors considered in identifying the Preferred Alternative are listed below (please refer to **Table 2-1**, **Table 2-2**, and **Table 2-3** for more detailed information):

- Accommodate transportation needs:
  - Improves roadway capacity to LOS C or higher.
  - Accommodates turning movements (especially left turns) in protected lane.
  - Considers state, federal, and local plans.
  - Accommodates and supports bicycle/pedestrian/transit use.
  - Handles traffic during periodic roadway maintenance.
  - Accommodates all types of vehicles and traffic including commuters, tourists, emergency vehicles, trucks and school or transit buses.

- Minimize long-term and short-term social impacts compared to the 5-Lane Alternative:
  - Minimizes number of properties subjected to significant noise increases (see Section 3.12).
  - Provides or prohibits access (as needed) to recreational resources, including fishing, hunting, river floating, etc.
  - Minimizes number of residential or business relocations required.
  - Improves access for all vehicle types onto and off the highway.
  - Minimizes anticipated time of construction and travel delays.

- Minimize environmental impacts compared to the 5-Lane Alternative:
  - Minimizes adverse effects to wildlife habitat and fisheries.
  - Minimizes short and long-term adverse effects to water quality in rivers and creeks.
  - Minimizes adverse effects to surrounding viewsheds and significant views from the rivers and roadway.
  - Minimizes adverse effects to air quality.

- Improve safety:
  - Minimizes potential for landslides compared to the No-Action Alternative.
  - Potentially reduces crash rate.

Identification of Preferred Pathway Option

Pathway Option 1 was identified as the preferred pathway option based on comments received from Teton County, citizens, and stakeholder groups, who voiced a preference for the pathway to be located adjacent to the highway throughout the Study Corridor. Option 1 would better serve the populations located along the highway and provide a more direct route than Pathway Option 2. As such, it is anticipated that Pathway Option 1 would experience a higher level of use and better serve the community than Pathway Option 2. Pathway Option 1 would also provide access to the South Park boat launch area and the environmental justice community along the Study Corridor. For these reasons, Pathway Option 1 best meets the Purpose and Need of the project.

ES8. Other Major Governmental Actions

There are numerous projects underway or proposed within the project area. These projects are discussed in Section 4.25.4 of this document.

Implementation of a Build Alternative would require the following governmental actions, permits, or approvals. A detailed description of each is provided in Section 4.26.

- Section 401 Water Quality Certificate
- Section 402 Permit
- Section 404 Permit
- Wyoming Pollutant Discharge Elimination System (WYPDES) Permit
- Stormwater Construction Permit
- Floodplain Development Permit
- Conditional Letter of Map Revision

ES9. Major Unresolved Issues

This section of the DEIS stated that during a January 14, 2008 meeting with the Teton County Board of Commissioners and WYDOT, the Board indicated that it would schedule a meeting to provide input to WYDOT regarding the alternatives under consideration. The Board had not yet provided this input to WYDOT when the DEIS was published in January 2009.

On March 4, 2009, Teton County submitted a letter to WYDOT (see Comment #3, **Appendix D**) that provided comments on the DEIS and presented an alternative for consideration. WYDOT's evaluation of the alternative identified a number of safety and travel demand/level of service deficiencies.

WYDOT presented their findings at the August 5, 2009 Interdisciplinary Team meeting, which was attended by Teton County representatives. In addition, FHWA sent a letter to Teton County on August 20, 2009 that provided responses to their March 4, 2009 letter (see **Appendix A**). Further, WYDOT met with Teton County on August 24, 2009 to discuss the results of their evaluation. Although Teton County does not support the Preferred Alternative, the County expressed willingness to coordinate with WYDOT during final design regarding wildlife crossings and pathway locations.

Chapter 1.0: Study Background and Need for Action

1.1 Introduction

The Wyoming Department of Transportation (WYDOT), in cooperation with the Federal Highway Administration (FHWA), has prepared this Environmental Impact Statement (EIS) to study improvements to U.S. 26/89/189/191 in Teton County, Wyoming. The Study Corridor is located south of the Town of Jackson, from milepost (MP) 148.6 in the north to MP 141.4 to the south, as shown in **Figure 1-1** and **Figure 1-2**. The highway is located in a valley in a fairly mountainous area. The Snake River parallels the highway through much of the southern portion of the Study Corridor. The seven-mile Study Corridor travels through privately-owned residential and commercial land as well as public lands. Approximately 1.2 miles of the corridor is managed by the Bridger-Teton National Forest (BTNF), while roughly two miles is managed by the Bureau of Land Management (BLM), the Wyoming Game and Fish Department (WGFD), and Teton County.

This highway section is a critical travel link within the region. Commuters from Pinedale and Bondurant (via U.S. Highway 189/191) and Alpine (via U.S. Highway 26/89) use U.S. 26/89/189/191 to commute to and from Jackson. The highway is heavily used by commercial vehicles, as well as winter and summer seasonal traffic. Due to recreation-oriented tourism, traffic volumes increase considerably during the summer months and also increase to a lesser degree during winter months. The existing highway is generally comprised of two 12-foot lanes with variable shoulder widths. Two short (less than one mile) sections also have a center turn lane. At the north end of the Study Corridor, the highway is a four-lane facility with a center turn lane. Originally, a portion of the highway followed Henry’s Road along the eastern edge of the Snake River. In the late 1960s, a landslide forced the realignment of 4.2 miles of the highway, from MP 142.2 to MP 146.7, to its current location on the west side of the river.

1.2 Corridor History

U.S. 26/89/189/191 in the study area was originally constructed in the 1920s and 1930s. It is designated by WYDOT and the U.S. Department of Transportation as part of the National Highway System (NHS) and the Wyoming State Highway System. The NHS includes the Interstate Highway System, as well as other roads important to the nation's economy, defense, and mobility. The NHS was developed by the U.S. Department of Transportation in cooperation with the states, local officials, and metropolitan planning organizations.

The Study Corridor is mainly a two-lane section with inadequate shoulders. Short sections from MP 145.3 to MP 145.9 and MP 147.6 to MP 147.9 were widened to a three-lane section in 1992. A section of U.S. Highway 26/89/189/191, from South Park Loop Road to High School Road (located north of the study area), was reconstructed in the late 1990s and upgraded to a five-lane section with 12-foot lanes and 8-foot shoulders.

Figure 1-1
Regional Map

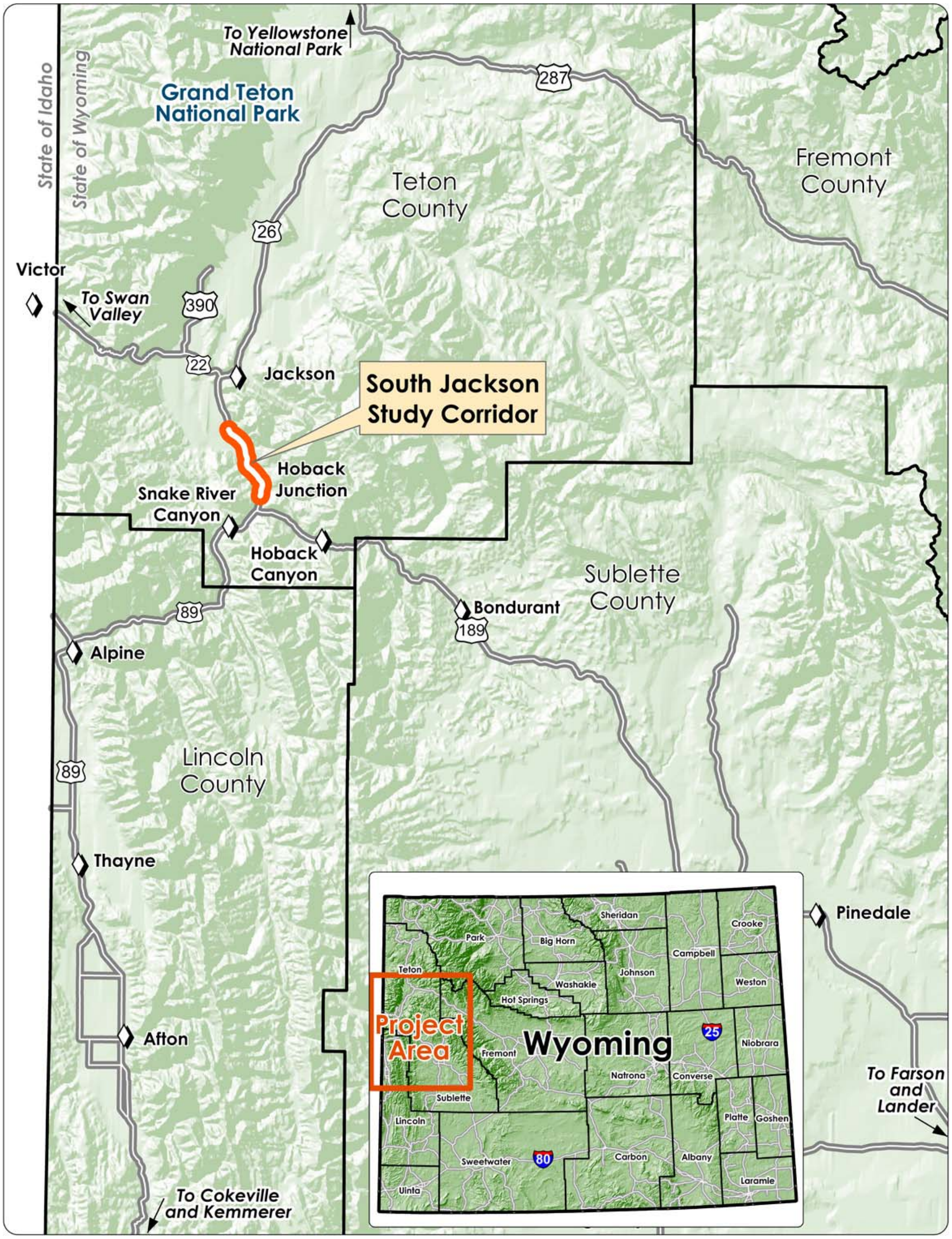
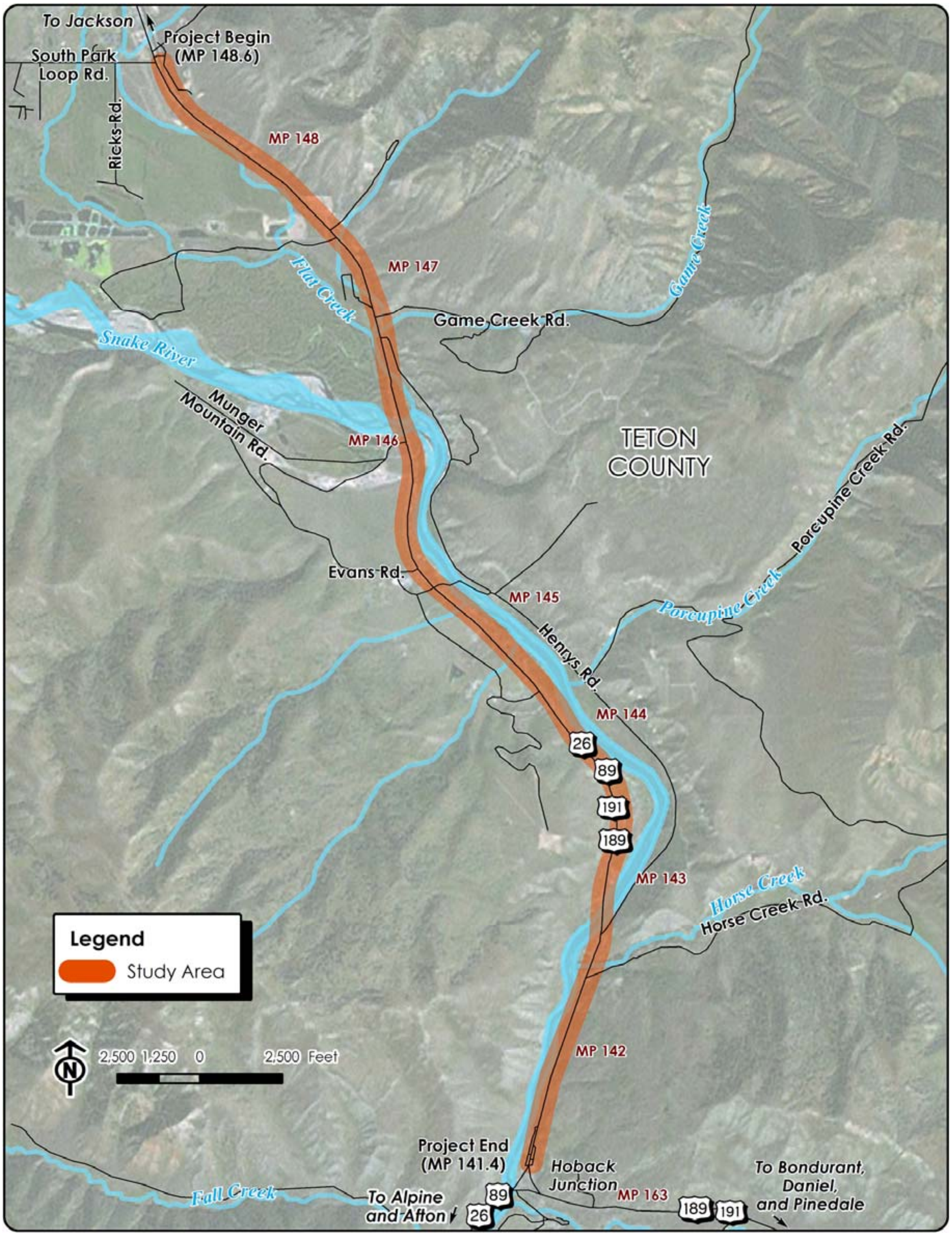


Figure 1-2
Study Corridor



To the southwest of the Study Corridor, reconstruction of U.S. Highway 26/89 in the Snake River Canyon was completed in 2005. The Snake River Canyon reconstruction includes nearly 23 miles of roadway from Alpine Junction to a quarter mile from Hoback Junction. The roadway has two 12-foot lanes and 8-foot shoulders, with areas of passing lanes and 4-foot shoulders. Turn lanes were added where needed.

To the southeast of the Study Corridor, U.S. Highway 189/191 through the Hoback Canyon was constructed in 1953 with two travel lanes and varying shoulder widths of zero to eight feet. There are no immediate plans for reconstruction or improvements to this section of roadway.

The Study Corridor and surrounding areas have had emergency road closures of various lengths of time due to landslide activities. The most notable landslide is the Squaw Creek Slide that closed the highway at MP 146 and forced an emergency contract and rerouting of 4.2 miles of highway from 1966 to 1968. There have been several smaller events that have not forced any prolonged closures, including a slide repair project just north of Hoback Junction at MP 141.7 in 1987.

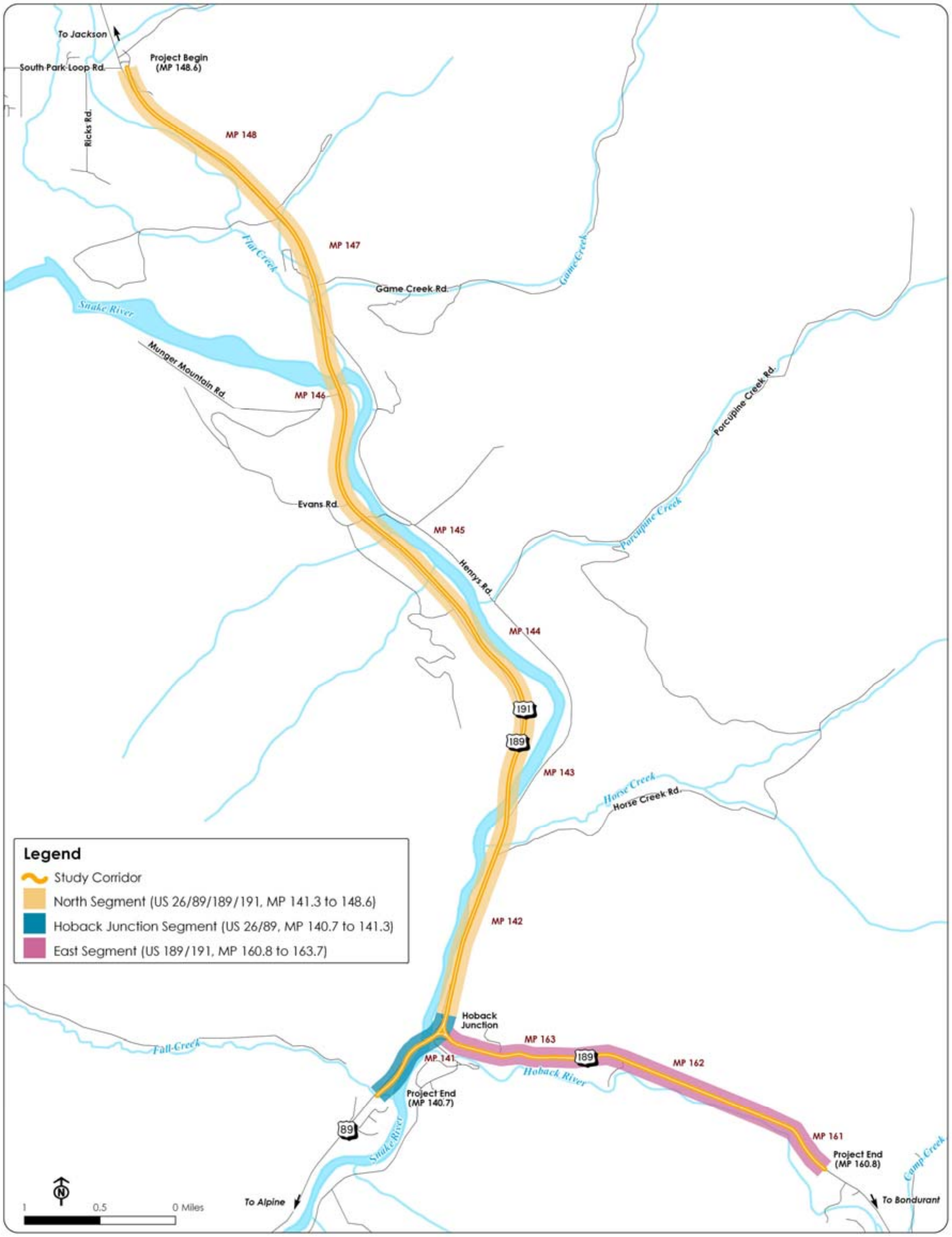
1.3 Study Background and Regional Setting

WYDOT and FHWA initiated an EIS in 2000 that included study of portions of the three highway segments that meet at Hoback Junction: U.S. Highway 26/89/189/191 from MP 148.6 south to the Junction, U.S. Highway 26/89 from MP 140.7, and U.S. Highway 189/191 to MP 160.8 (see **Figure 1-3**). In 2007, WYDOT and FHWA decided to separate these three segments into three distinct NEPA studies based on their independent utility and distinctive attributes. This lead to the initiation of the Jackson South EIS.

During project scoping and through public meetings, it became clear that the three segments have differing needs and result in significantly different alternatives. In addition, the level of controversy for the solutions differs among the segments due to their impacts to resources. One other contributing factor in deciding to separate the three distinct segments was the time frames proposed for construction. The FHWA has determined each of the three highway segments has logical termini and independent utility, and may therefore proceed as separate NEPA documents (see FHWA letter dated August 9, 2007 in **Appendix A**). Distinctive needs of the three segments are:

- **Hoback North** (which is evaluated in this Jackson South EIS) primarily addresses highway capacity needs and includes proposed alternatives for capacity improvements. Alternatives under consideration for Hoback North are consistent with the selected alternative presented in the *Hoback Junction Environmental Assessment*, 2007 (see below). Also, the alternatives for Hoback North would not restrict consideration of alternatives for Hoback East because alternatives for the latter are intended to address an existing landslide issue that is unrelated to Hoback North.

Figure 1-3
Hoback Junction EIS Project Segments



- **Hoback Junction** is a 'Y' intersection where the higher traffic volumes from Hoback North split onto U.S. Highway 26/89 and U.S. Highway 189/191. Hoback Junction has two primary needs: replacement of the deficient bridge over the Snake River and modification of the U.S. 26/89, U.S. 189/191, and U.S. 26/89/189/191 intersection. The Hoback Junction project termini are MP141.4 to the north, MP 140.7 to the south, and MP 163.7 to the east. FHWA and WYDOT prepared a separate Environmental Assessment for Hoback Junction that was completed in September 2007. In December 2007, FHWA issued the *Hoback Junction Finding of No Significant Impact*. The proposed improvements in the Environmental Assessment include addition of a center turn lane, but do not increase the number of through travel lanes, and therefore would not increase capacity.

  Improving capacity on Hoback North would not result in a traffic "bottleneck" at Hoback Junction because of the traffic splits at the "Y" intersection. Also, lower-speed urbanized areas like Hoback Junction can accommodate higher volumes with fewer through lanes.

- **Hoback East** has one primary need, to correct or avoid a landslide area. The Hoback East project termini are MP 163.7 to the west and MP 160.8 to the east.

1.4 Purpose and Need

The purpose of this project is to resolve existing roadway deficiencies while safely and efficiently accommodating current and future traffic volumes and improving system linkage. Primary transportation needs for the Study Corridor, described in more detail in the following sections, include:

- Improve system linkage
- Provide system continuity
- Accommodate travel demand
- Correct roadway and bridge deficiencies
- Improve traffic safety
- Reduce geologic hazard potential
- Accommodate non-motorized transportation modes

The *Jackson/Teton County Comprehensive Plan* (Teton County, 2002) states that development trends are moving southward with decreased residential density, in addition to an auto-dependent pattern, with people and services becoming further separated. Goals cited in the plan include:

- To plan for future mobility that meets the needs of residents and tourists within the context of community character.
- To improve the safety and efficiency of the transportation system in Jackson and Teton County.

It should be noted that updates to the comprehensive plan include strategies to manage growth responsibly, such as changes in development patterns and strategies to provide community mobility through alternate transportation modes, such as transit, walking, carpooling, and bicycling.

1.4.1 Improve System Linkage

System linkage refers to how a transportation facility fits into the greater transportation system. **Figure 1-1** shows the existing state highway system, which works with the local road system to provide mobility throughout the Jackson Hole regional area. The Study Corridor serves as an important link in this regional transportation system and has become increasingly important for commercial, commuter, and tourism traffic. Viable alternative routes to accommodate diverted traffic in times of emergency and/or road closure are circuitous or nonexistent.

The economy in the Jackson Hole area is based on several industries, with tourism and agriculture being the two main industries. Both tourism and agriculture require the routes into and out of Jackson to remain open at all times without interruption. The route from Hoback Junction to Jackson is also the main route for all commercial goods into the valley, and is therefore of primary concern to remain open. The roadways are also used for other commercial operations and recreational users accessing the Snake River Canyon and the Hoback Canyon, and by visitors to Yellowstone and Grand Teton National Parks.

In addition to commercial use of the highway, commuter use of the highway has increased dramatically. The workforce for the Jackson area has moved away from Jackson and into surrounding communities because of the substantial increase in cost of living, particularly housing costs. Areas such as Daniel, Bondurant, and Pinedale in Sublette County have received part of the commuter workforce, while the area from Alpine to Afton in Lincoln County have received a larger portion (see Section 3.8 for population and commuting data). Commuter bus service now exists between Alpine and Jackson. In addition to commuter traffic from Sublette and Lincoln counties, commuters from Teton County, Idaho, are forced to use this route when Wyoming Highway 22 over Teton Pass is closed because of avalanches and hazardous winter conditions. Commuter travel is expected to continue increasing.

The ability for alternate routes to accommodate diverted traffic in times of emergency and/or road closure is extremely limited. These alternate routes include routing through Farson to Lander and over Togwotee Pass; through Kemmerer, Cokeville and Afton; or into Idaho through Swan Valley and Victor (see **Figure 1-1**). Weight restrictions and roadway closures to trailer traffic limit use of these alternate routes for commercial traffic. Road closures due to major weather or landslide events, failures, and crashes result in long distance rerouting.

1.4.2 Provide System Continuity

In addition to system linkage, the highway design should provide improved transitions for differing road widths and a more continuous appearance to assure that driver expectations for safe speed and safe operations are met. Highway 26/89/189/191 intersects two different roadway segments:

- Hoback Junction: Highway 26/89 through Snake River Canyon has a typical cross-section of two lanes, with passing lanes and eight-foot shoulders. The *Hoback Junction Environmental Assessment* preferred alternative includes a three-lane cross-section from Hoback Junction north to MP 141.4.
- Highway 189/191 through Hoback Canyon has a typical cross-section of two lanes with variable shoulder widths up to four feet.

Highway 26/89/189/191 has varying widths in the Study Corridor. The highway generally consists of two lanes with no center turn lane through most of the Study Corridor. There are two short sections (less than one mile) that consist of two lanes with a center turn lane. South of Jackson to South Park Road, it is a five-lane facility with eight-foot shoulders.

Inconsistent roadway segments can affect driver expectation and pose a safety hazard for motorists. When a driver encounters an improved section of roadway, as currently exists in the northern part of the Study Corridor, there is an expectation that the roadway improvements are continuous. The typical driver would not expect the surface and configuration of the road to change sporadically for short distances between improved sections. More specifically, a driver traveling on either side of this section with widened shoulders, standard design speeds, adequate clear recovery areas and standard roadway features, would reasonably expect that these conditions continue without an abrupt change. As discussed in Section 1.6, existing roadway deficiencies result in a driving situation that defies driver expectancy and presents unpredictable conditions for drivers, a situation that is exacerbated under winter driving conditions. **Figure 1-4** shows the existing roadway laneage in the Study Corridor.

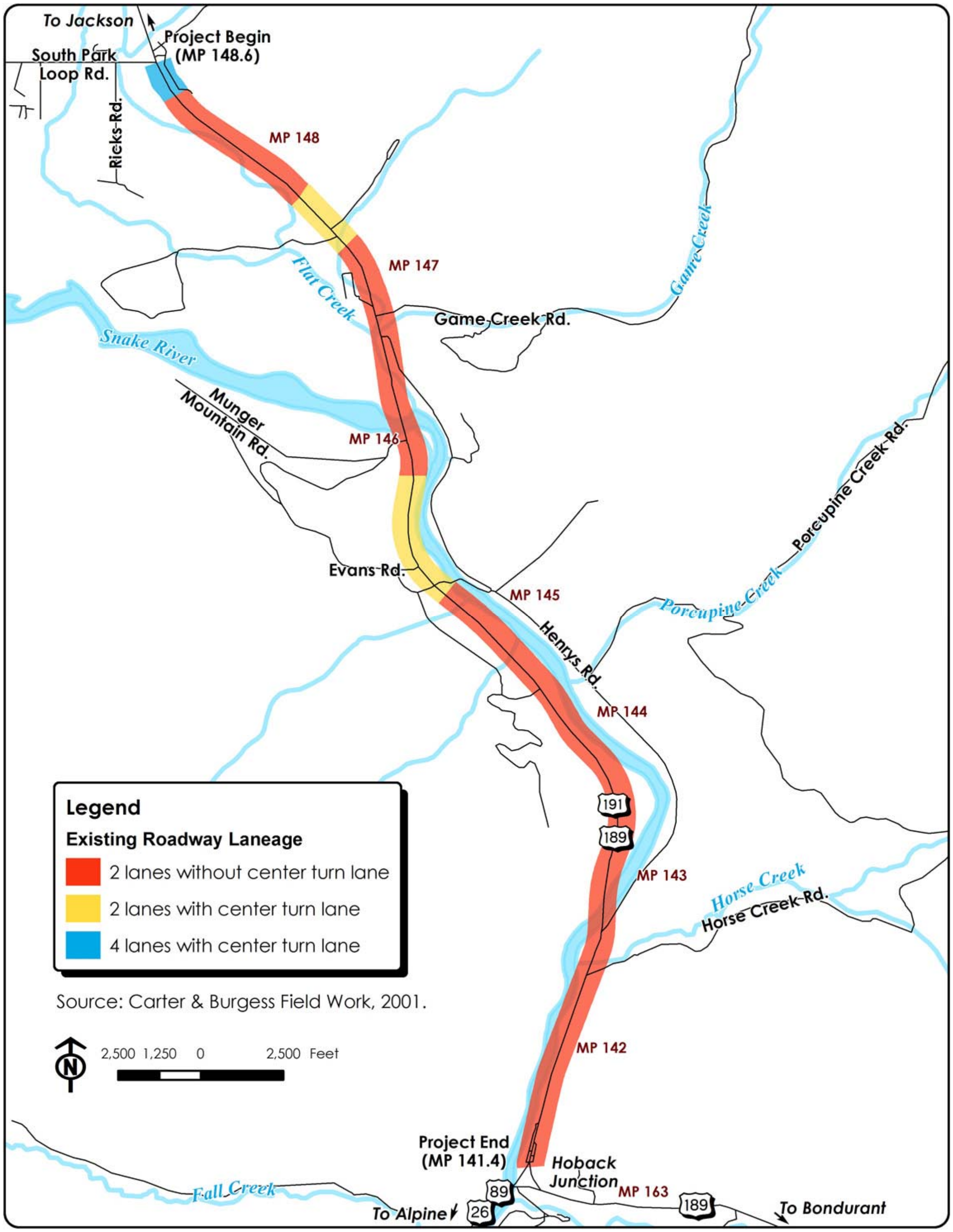
1.5 Accommodate Travel Demand

A wide variety of vehicle types use the Study Corridor daily for multiple trip purposes. Types of trip purposes include personal and job-related business trips, commercial transport of goods, and recreational travel. The unique travel characteristics of trips along the roadway result in a wide variety of vehicle types and travel speeds. The Study Corridor was evaluated based on its ability to accommodate these trip purposes, traffic volumes, and vehicle classifications for both current and future conditions.

1.5.1 Traffic Forecasts

Assessing future conditions requires traffic forecasting. These forecasts are developed by assessing anticipated growth based on local land use plans, U.S. Census Bureau population forecasts, and other socioeconomic data (see Section 3.8). Population forecasts for both Jackson and Teton County indicate substantial growth within the area. This growth would add to the increased travel demand that currently exists on the Study

Figure 1-4
Existing Roadway Laneage



Corridor. Based on U.S. Census Bureau data for 2000, population increased over the last decade by 62 percent in Teton County, 14.7 percent in Lincoln County, and 21.3 percent in Sublette County. High housing and land costs in Jackson have led to increased commuting from these neighboring counties into Jackson. Section 3.3 discusses population data for Jackson, Teton County, and surrounding areas.

The traffic forecasts were based on available socioeconomic and demographic information. Teton County planning documents provided population, employment, and traffic projections, which factor in the use of alternate modes of transportation. WYDOT traffic data and U.S. Census information also were used in preparing the forecasts.

To help determine the traffic growth rate to the year 2026, historical traffic data were analyzed for the years 1985 to 2006. Historic annual Average Daily Traffic (ADT) indicates that traffic volumes in the Study Corridor continue to grow rapidly, increasing approximately 179 percent over the 22-year period. Future traffic volumes were forecasted by the WYDOT Planning Division. The 2006 and 2026 models differ only with shoulder widths; the 2006 volumes assume a four-foot shoulder and the 2026 volumes assume an eight-foot shoulder (see Section 1.6 for an explanation of the relationship between traffic volumes and shoulder widths).

Table 1-1 shows 2006 and projected year 2026 traffic volumes for the Study Corridor. **Figure 1-5** shows historic and forecasted traffic volumes. Year 2026 traffic projections indicate traffic on the highway would continue to grow, with traffic volumes projected to increase by an average of approximately 37 percent over the next 20 years. Also, traffic volumes increase considerably during the peak summer season (June to August), with ADT during those months nearly double that of off-season ADT (see Section 3.8.2).

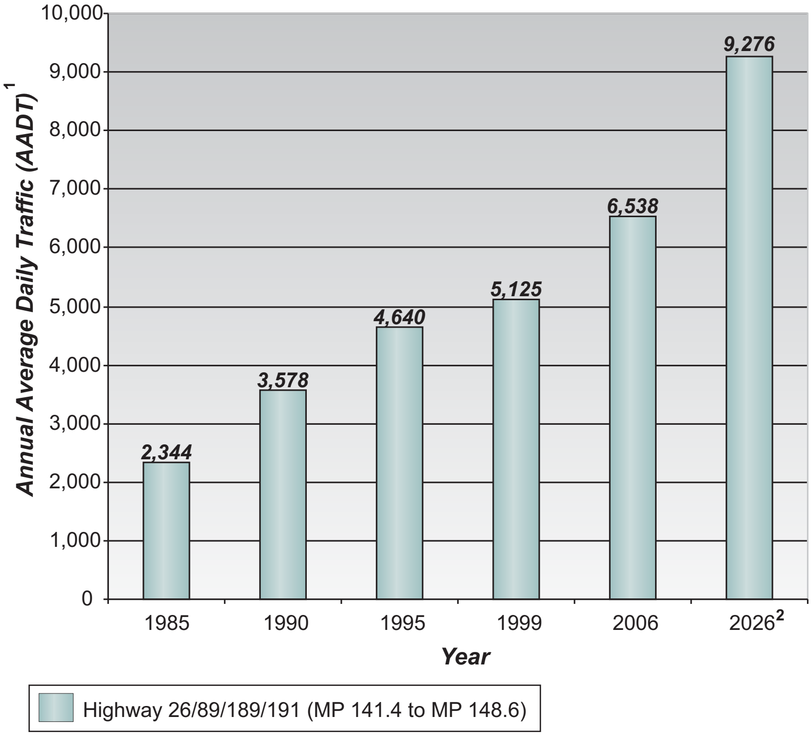
Table 1-1
Existing and Forecasted Annual Average Daily Traffic (AADT) Volumes

Milepost (From-To)	2006	2026	Percent Change: 1999-2026
141.3-145.64	5,690	8,820	+55.0 percent
145.64-147.23	7,500	9,620	+28.2 percent
147.23-147.30	8,110	10,180	+25.5 percent
147.30-148.60	8,110	11,470	+41.4 percent

Source: WYDOT
Trucks = 7.6 percent of AADT

WYDOT reassessed its Study Corridor traffic forecasts in 2003 based on updated traffic data and the *Teton County Travel Study* (see Section 3.8.3). In a letter to the Teton County Planning Director, WYDOT stated that WYDOT's traffic forecasts "were quite conservative and on the low end of the reasonable range of future scenarios" (WYDOT, 2003).

Figure 1-5
Historic and Future Annual Average Daily Traffic (AADT) Volumes



Source: WYDOT

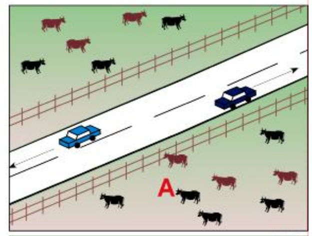
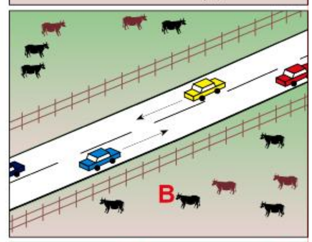
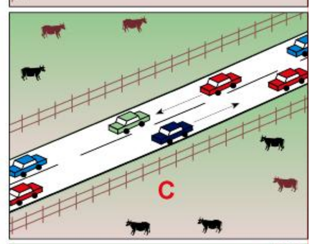
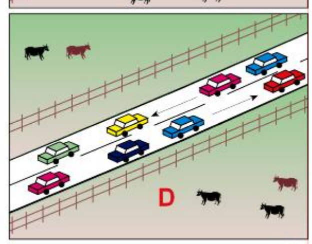
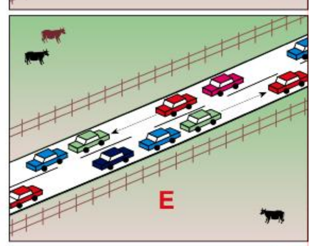
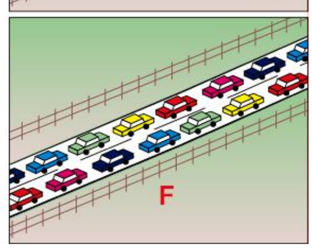
Notes: [1] AADT volume is an average of multiple segments
[2] Year 2026 totals are estimated future volumes

1.5.2 Level of Service Analysis

Level of Service (LOS) is a rating of traffic operating conditions that is calculated by comparing traffic volumes to available capacity along a roadway segment or intersection. LOS provides a qualitative definition of the extent of congestion with LOS "A" representing minimal delay and congestion and LOS "F" representing substantial delay. **Figure 1-6** describes and illustrates the range of LOS ratings.

WYDOT forecasted LOS for the Design Year 2026 using Highway Capacity Software (HCS+) and through consideration of past trends, future land use, shoulder widths, and access points. The analysis assumed that traffic would consist of 7.6 percent trucks, and the Study Corridor would have 50 percent no passing zones and four-foot shoulders.

Figure 1-6
Level of Service Definitions

LOS	Roadway Segment Operating Characteristics	
A	Free flow, low traffic density, passing demand well below passing capacity, no platoons of three or more vehicles, drivers delayed less than 30% of time by slow moving vehicles.	
B	Minimum delay, stable traffic flow, passing demand equals passing capacity, drivers delayed up to 45% of time by slow moving vehicles.	
C	Stable condition, movements somewhat restricted due to higher volumes, but not objectionable for motorists, noticeable increases in platoon formation, size, and frequency, percent time delays up to 60%.	
D	Movements more restricted, passing demand is very high while passing capacity approaches zero, platoon sizes of 5 to 10 vehicles are common, turning vehicles cause "shock-waves" in traffic stream, percent time delays approach 75%.	
E	Actual capacity of the roadway, involves delay to over 75% of motorists, passing is virtually impossible, platooning becomes intense.	
F	Forced flow with demand volumes greater than capacity resulting in severe congestion, no passing opportunities and long platoons.	

As shown in **Table 1-2**, year 2006 LOS for the Study Corridor currently ranges from LOS C to LOS D during the peak hour of travel. It was determined that highway operations would deteriorate to LOS E between MP 145.6 and 148.6. During the peak hours, speeds would be low, passing would be virtually nonexistent, and maneuverability would be extremely restricted. Also, driver frustration would increase, which could lead to unsafe, erratic driving and increased crashes. The remainder of the Study Corridor would function at LOS D.

Table 1-2
Existing Level of Service by Milepost

Roadway Segment	2006 LOS	2026 LOS
MP 145.6-148.6	D	E
MP 142.5-145.6	D	D
MP 140.7-142.5	C	D

1.6 Correct Roadway and Bridge Deficiencies

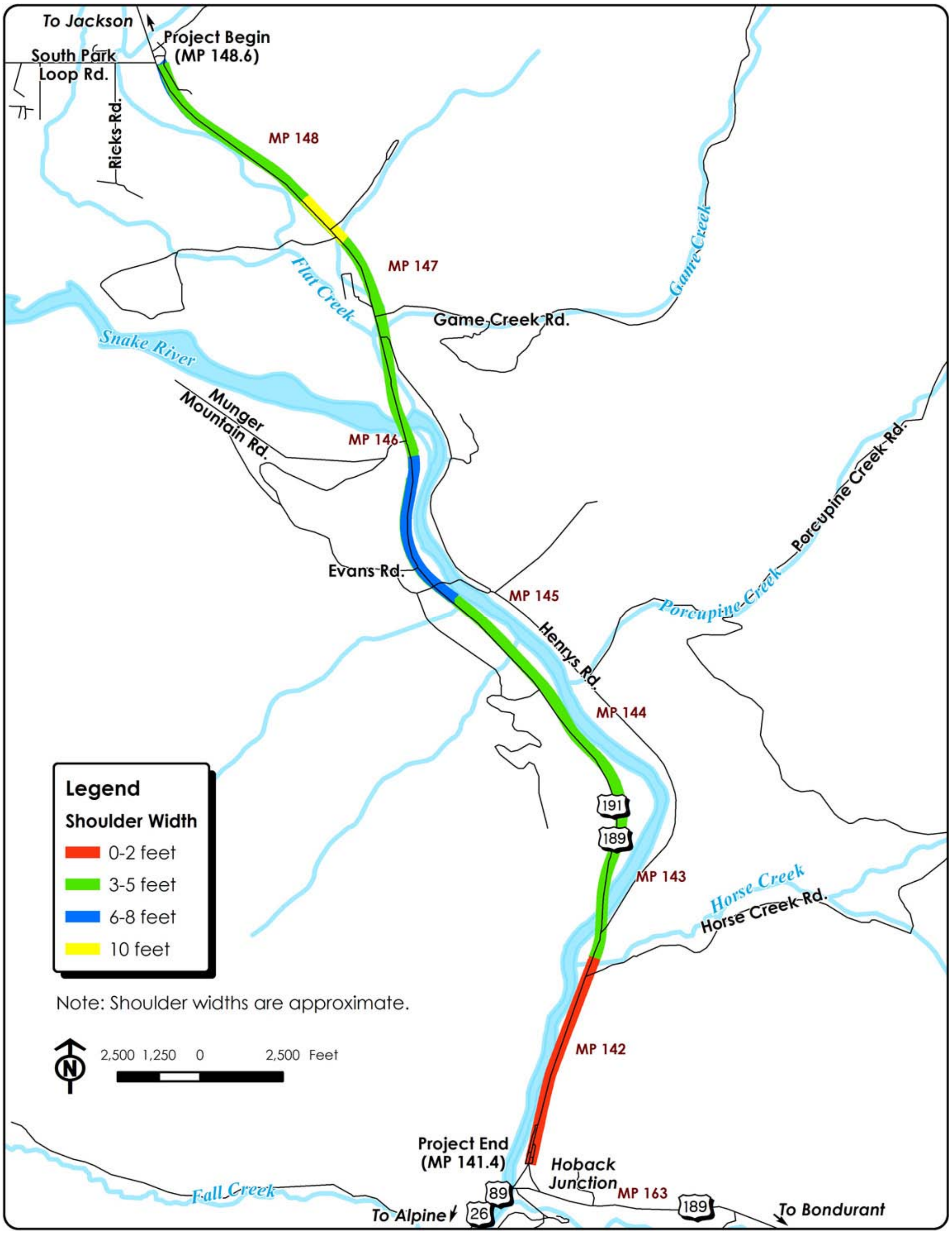
The existing roadway has a number of deficiencies that affect its ability to safely carry a growing number of vehicles:

- **Inadequate Shoulder Width.** Narrow shoulders introduce side friction[1] which in turn reduces capacity and free flow speeds. Free flow speeds are the speeds that unimpeded traffic will travel which, in this case, is at or near the speed limit. The higher the volume of traffic on the roadway, the more that narrower shoulders affect that traffic. As traffic approaches roadway capacity, LOS becomes worse and the smallest occurrences (e.g., breakdowns, crashes, turning vehicles, pedestrians, and cyclists) will interrupt and slow traffic flow. Shoulders also increase safety by serving as emergency lanes and as bike and pedestrian facilities. As shown on **Figure 1-7,** most of the Study Corridor has shoulder widths of three feet or less. In most locations, the existing shoulder lacks a sufficient width to safely accommodate emergency vehicles, stopped vehicles, bicyclists, and roadway maintenance activities.

The American Association of State Highway Transportation Officials (AASHTO) standard shoulder width is eight feet for this type of roadway and traffic volume. According to AASHTO's *A Policy on Geometric Design of Highways and Streets* (2004), a shoulder of this width will accommodate stopped vehicles, emergency use, and bicyclists.

[1] Side friction is created by activities that occur by the side of the road that interfere with traffic flow, such as pedestrians and bicyclists moving along road shoulders, vehicles pulling off on shoulders, etc. Side friction can also be caused by immovable objects located in close proximity to the traveled way, such as trees, boulders, curbs, etc.

Figure 1-7
Shoulder Widths



- **Inadequate Clear Recovery Area Widths.** A clear recovery area is the term used to designate the unobstructed, relatively flat area provided beyond the edge of the traveled way for the recovery of errant vehicles. Clear recovery areas include any shoulders or auxiliary lanes. For rural principal arterials, AASHTO recommends clear recovery areas of 22 to 24 feet for Highway U.S. 26/89/189/191 (these recommended widths can vary depending on physical constraints). It also recommends removal of all trees, large vegetation, boulders, or other fixed objects and maintenance of appropriate (flat) slope grades within the designated clear recovery area for safety purposes. The Study Corridor highway currently does not provide for a consistent clear recovery area.
- **Steep Roadway Grades.** The roadway has steep grades in several locations. These grades can adversely affect travel mobility and safety, especially when traffic consists of larger vehicles such as recreational vehicles (RVs), large trucks or buses. [The effect of steeper grades on truck speeds is much more pronounced than on speeds of passenger cars. For example, with an entering speed of 70 mph, a truck travels approximately 0.5 mile up a six percent grade before its speed is reduced to 35 mph (AASHTO, 2004)]. The problem is compounded on two-lane highways that offer no passing opportunities; motorists create a hazard when passing illegally. A number of crash locations along the Study Corridor coincide with areas identified as having steeper grades. For example, crashes are concentrated at two areas having grades exceeding four percent, located between MP 144 to 145 and from MP 146.9 to 147.9. **Figure 1-8** identifies the roadway grades within the Study Corridor that are over three percent; **Figure 1-9** shows crash locations.
- **Local Access Points.** Access control refers to the regulation of public access rights to and from properties abutting highway facilities. Roadways exercising full access control experience only 25 to 50 percent of the crash rates observed on roadways without access controls (AASHTO, 2004). Many of the crashes associated with uncontrolled access roads result from turning vehicles. The existing roadway has approximately 60 access points in seven miles (see **Figure 1-10**). Numerous local access points to private properties and recreation areas along this corridor are hazardous due to the lack of left-turn lanes. Also, a large number of access points can lead to a low level of service on the roadway. The need for turn lanes at various locations was identified during the scoping process. Many local access roads or turnouts have substandard or inadequate turning and/or stopping distances. Roadways, driveways, and turnouts that do not provide adequate turning and/or stopping distance can create unexpected vehicular movements. Specific local access roads and turnouts for scenic viewing, emergency stopping, and winter road maintenance activities result in unsafe access to private property and recreational areas. Consolidation of accesses, if possible, would help make the road safer and more efficient.

Figure 1-8
Roadway Grades

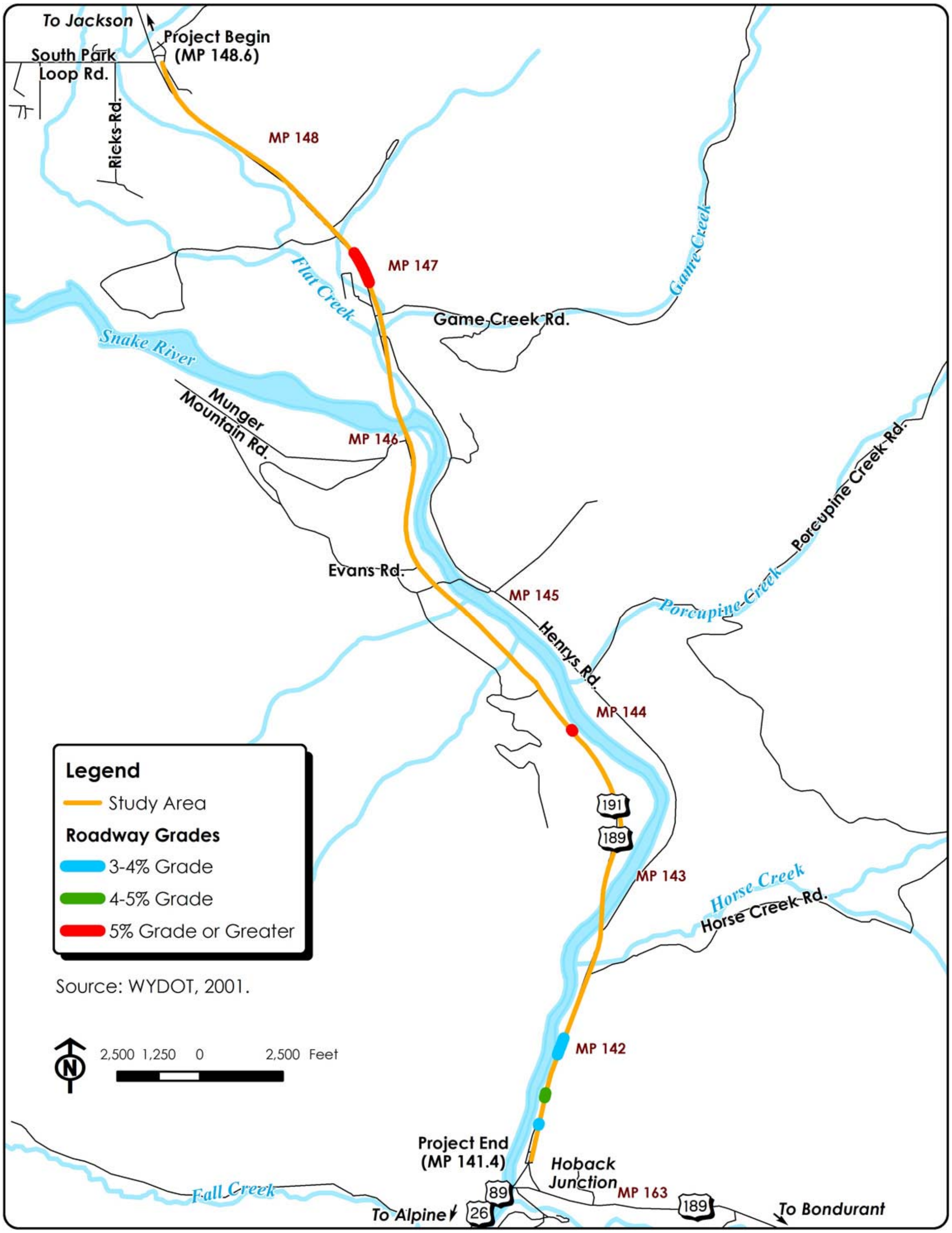


Figure 1-9
Crash Locations

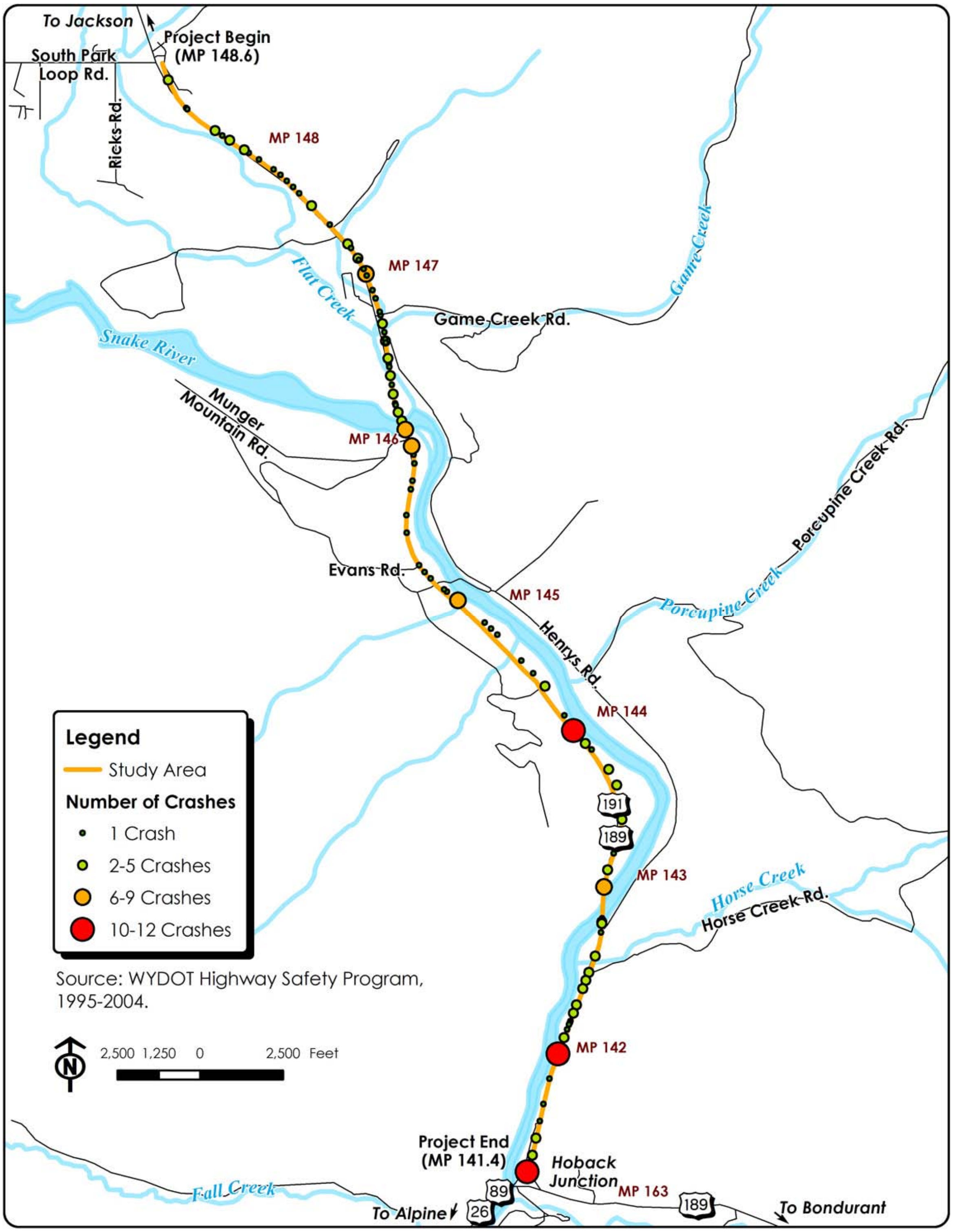
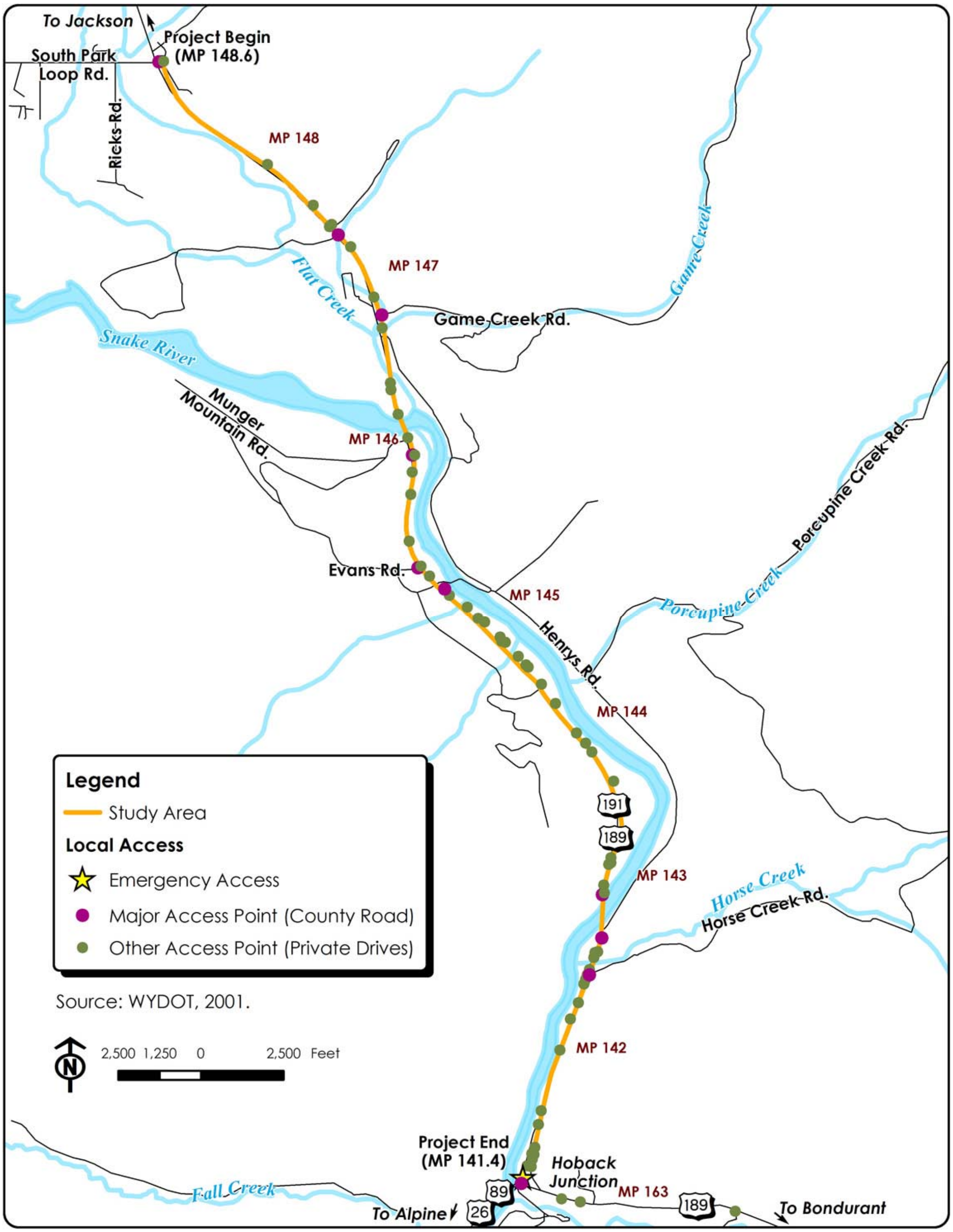


Figure 1-10
Uncontrolled Local Access

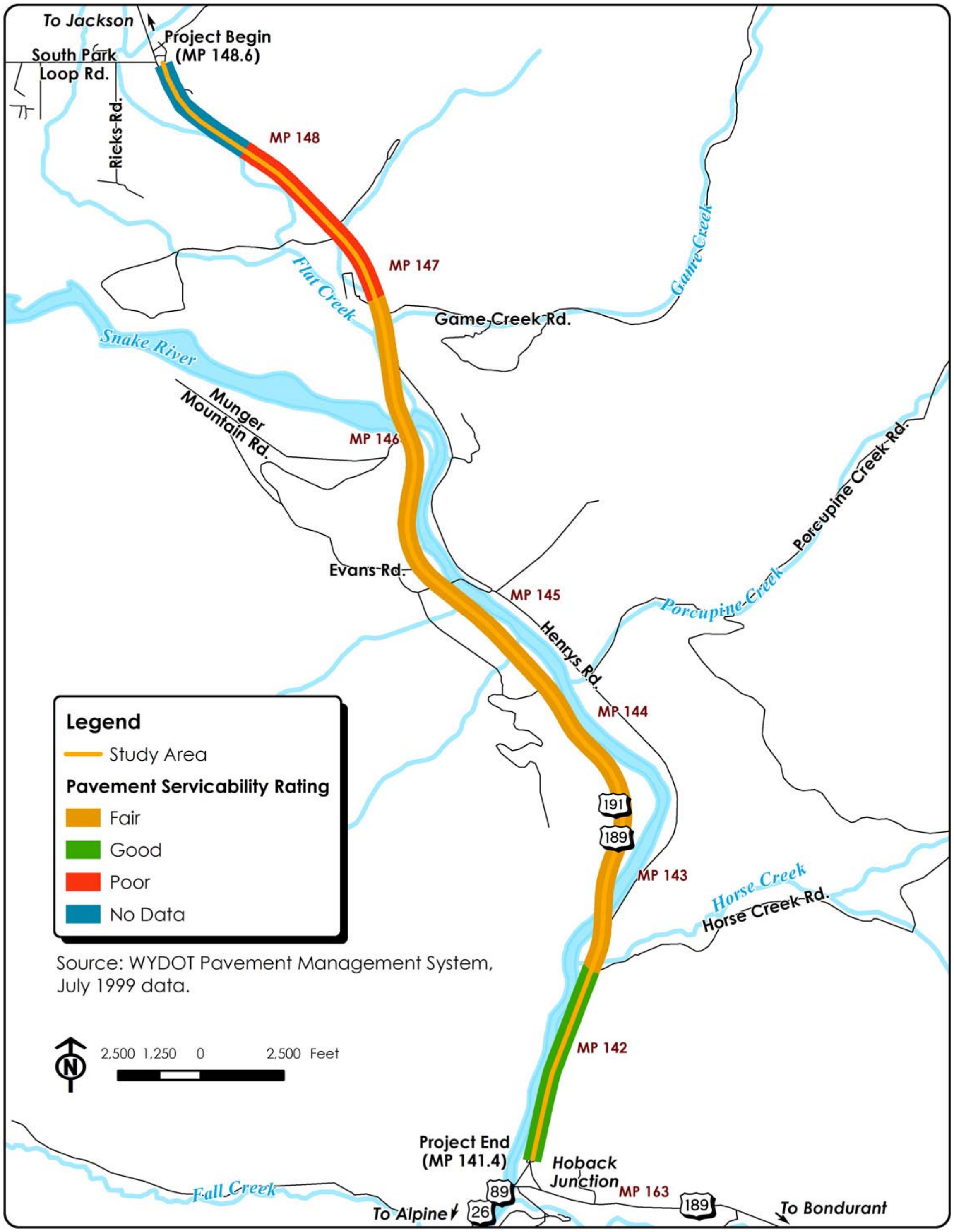


- **Inadequate Passing and Turning Lanes.** As mentioned above, the Study Corridor consists mainly of two lanes, although three-lane sections currently exist from MP 145.3 to MP 145.9 and MP 147.6 to MP 147.9. The Study Corridor provides limited opportunities for passing due to opposing traffic volumes, existing roadway horizontal and vertical alignments, and narrow roadway widths. Also, the two- and three-lane sections do not allow for faster traffic to pass, especially in steep sections and areas where passing is prohibited due to limited sight distance. Also, vehicles turning to access connecting streets and roadside development disrupt traffic flow and create safety problems. Left-turning vehicles worsen this problem (especially under heavy traffic conditions) as traffic often queues while vehicles stop and wait to turn.
- **Substandard Roadway Alignment.** Sharp horizontal and vertical curves along the Study Corridor result in inadequate sight distance, which limits visibility along highways, creates uncertain conditions, and makes it difficult for motorists to reduce speed. Substandard vertical curvature also decreases the maximum speed at which the roadway can be safely negotiated, resulting in a higher accident rate. A number of locations along the existing roadway are identified as having limited sight distance. The accidents in these areas are related to fixed objects, overturning vehicles, or accidents with other vehicles. Objects in the road, such as stalled or parked vehicles, fallen rocks, or wildlife, may be out of view from motorists because of poor or limited sight distance, creating a safety hazard. This would indicate that deficient or substandard roadway alignment is a contributing factor to some accidents.
- **Pavement Deficiencies.** WYDOT has rated the pavement condition along most of the Study Corridor as poor or fair, as identified in **Figure 1-11**. The areas in poorest condition are in the northern portion of the Study Corridor. Poor pavement conditions result from increased traffic wear, snow removal, and ongoing pavement patching. Pavement deficiencies can result in increased crashes caused by unexpected road conditions and potential conflicts with highway maintenance activities.
- **Existing Bridge Deficiencies.** The Study Corridor contains three major bridges. Two of these bridges cross the Snake River at MP 142.79 and MP 146.09. The third bridge crosses Flat Creek at MP 146.39.

  Each of these bridges is approaching its design life and beginning to show signs of aging. All bridges have a narrow roadway width and are located within a high seismic zone. In 2005, WYDOT conducted evaluations and identified specific deficiencies with each bridge as follows:

  - Snake River at MP 142.79:
    - Cracked concrete deck with spalls, extensive delaminations, and pot holes.
    - Minor rust beneath the expansion joints and at bearings.
    - Cracked pier cap.
    - Damaged bridge railing.

Figure 1-11
Pavement Conditions



- Snake River at MP 146.09:
  - Vulnerable rocker bearings.
  - Cracked concrete deck with spalls, extensive delaminations, and pot holes.
  - Damaged bridge railing.
  - Minor girder deterioration.
  - Minor substructure damage.
  - Scour at pier number two and erosion of south bank.
  - Slightly substandard HS 20 inventory rating of 34 tons.
- Flat Creek at Milepost 146.39:
  - Cracked concrete deck with minor spalls and delaminations.
  - Substandard HS 20 inventory rating of 29 tons.

1.7 Improve Traffic Safety

Safety for the roadway users—including drivers, passengers, pedestrians, and cyclists—is of principal importance when analyzing transportation needs and proposing improvements to meet those needs. Analyzing the number and type of crashes provides insight on traffic safety issues and potential solutions.

Analysis of nine years of crash data (1995 to 2004) for the Study Corridor indicates that the conditions described in the previous sections combine to create safety concerns. **Table 1-3** summarizes this crash data, while **Figure 1-9** shows crash locations. As traffic volumes continue to increase as projected, the number of crashes likely will increase.

Table 1-3
Crash Data Summary: Year 1995 to 2004

Location (Milepost)	Road Conditions			Number Persons Injured	Number Persons Killed	PDO Crashes*	Injury Crashes	Fatal Crashes	Total Crashes	Bridge Rail / Bridge Structure	Animal	Other Vehicle	Other
	Wet	Dry	Icy/Snow										
141.3-148.6	14	127	61	92	2	149	52	1	202	8	93	44	57

Source: WYDOT Crash data, 1995-2004.
* PDO = Property damage only; no injuries or fatalities

During the period 1995 to 2004, there were 202 documented crashes in the seven-mile Study Corridor. These crashes resulted in 92 injuries and two fatalities. Forty-four of the

202 crashes involved other vehicles and 93 involved animals. The remaining 65 crashes reflect a variety of accident types such as fencing, berms, ditches, embankments, guardrails, slopes, vegetation (shrubs/trees), boulders, and overturns.

Analysis of the crash data indicate that accidents peak during the summer tourist months of July, August, and September, suggesting these crashes are not related to poor weather conditions. Crash rates peak again in December and January, which could be due to weather conditions and/or an increase in tourist traffic.

One indication of the safety of a roadway is its total crash rate, a measure of the total crashes per million vehicle miles of travel (MVM). For the period 2001 to 2005, the Study Corridor had an average crash rate of 1.64 per MVM, which is above the statewide rate of 1.28 for rural principal arterials.

The one-mile segment with the largest number of crashes is between MP 146 and MP 147, just north and south of Game Creek Road. More than half of the crashes along this stretch of roadway are attributed to collisions with animals.

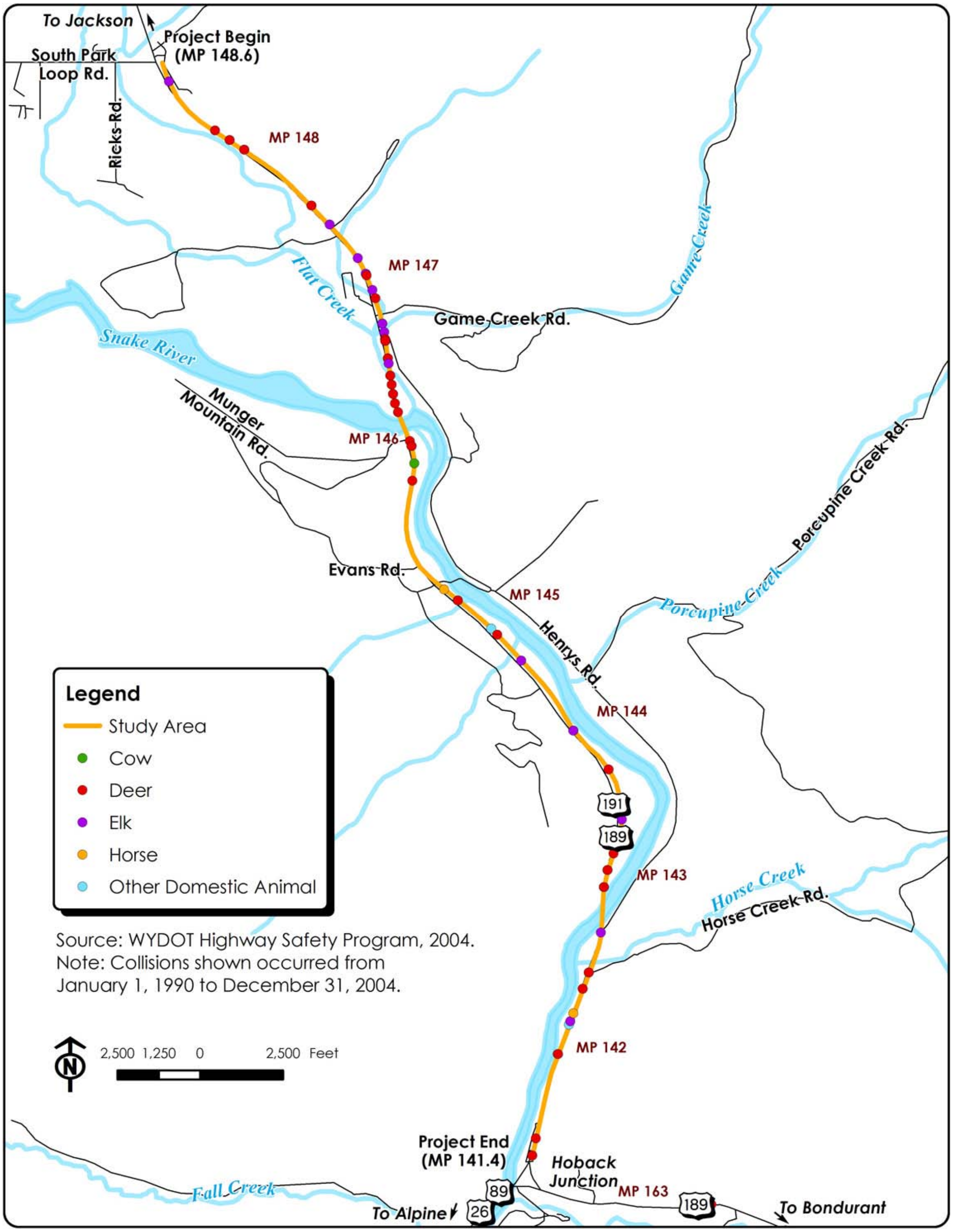
Several wildlife crossings exist along the Study Corridor that contribute to vehicle and animal conflicts (see **Figure 1-12**). Areas frequently used by wildlife for crossings include Horse Creek, Game Creek, and Squaw Creek. The east side of the highway is designated crucial winter-yearlong range for mule deer from the north end of the Study Corridor to approximately MP 144. It then encompasses both sides of the Study Corridor south.

An area of crucial winter-yearlong range for elk occurs west of the highway from Bohnette's Canyon south of the Study Corridor. Another crucial winter-yearlong range for elk occurs east of the highway from approximately MP 143 south. A designated elk feeding ground is located west of the highway at approximately MP 147, along the northern edge of the Snake River. This feeding ground attracts approximately 1,000 elk each winter. Most of these elk come from the west or south across the Snake River and never cross the highway. However, a fair number of elk access the feed ground from the north or east and must cross the highway somewhere between roughly MP 146 and MP 149. Elk that come in from this side are prevented from leaving to the north by one-way gates (or elk jumps) along the north fence of the feeding ground. These elk then must leave either due east or southeasterly. This section of the highway experiences seasonal movement over the highway and under Flat Creek and Snake River bridges.

Analysis of the crash data indicates that most crashes could be attributed to roadway deficiencies, such as:

- Inadequate shoulder width
- Substandard roadway alignment and grades
- Inadequate clear recovery area width
- Geologically unstable areas (prone to landslides)
- Lack of guardrail
- Poor pavement condition
- Wildlife crossings

Figure 1-12
Vehicle/Animal Collisions



1.8 Reduce Geologic Hazard Potential

Landslides have had considerable impacts on the highway. These impacts have ranged from minor roadway distortions that require periodic maintenance to catastrophic failures resulting in the complete loss of the highway.

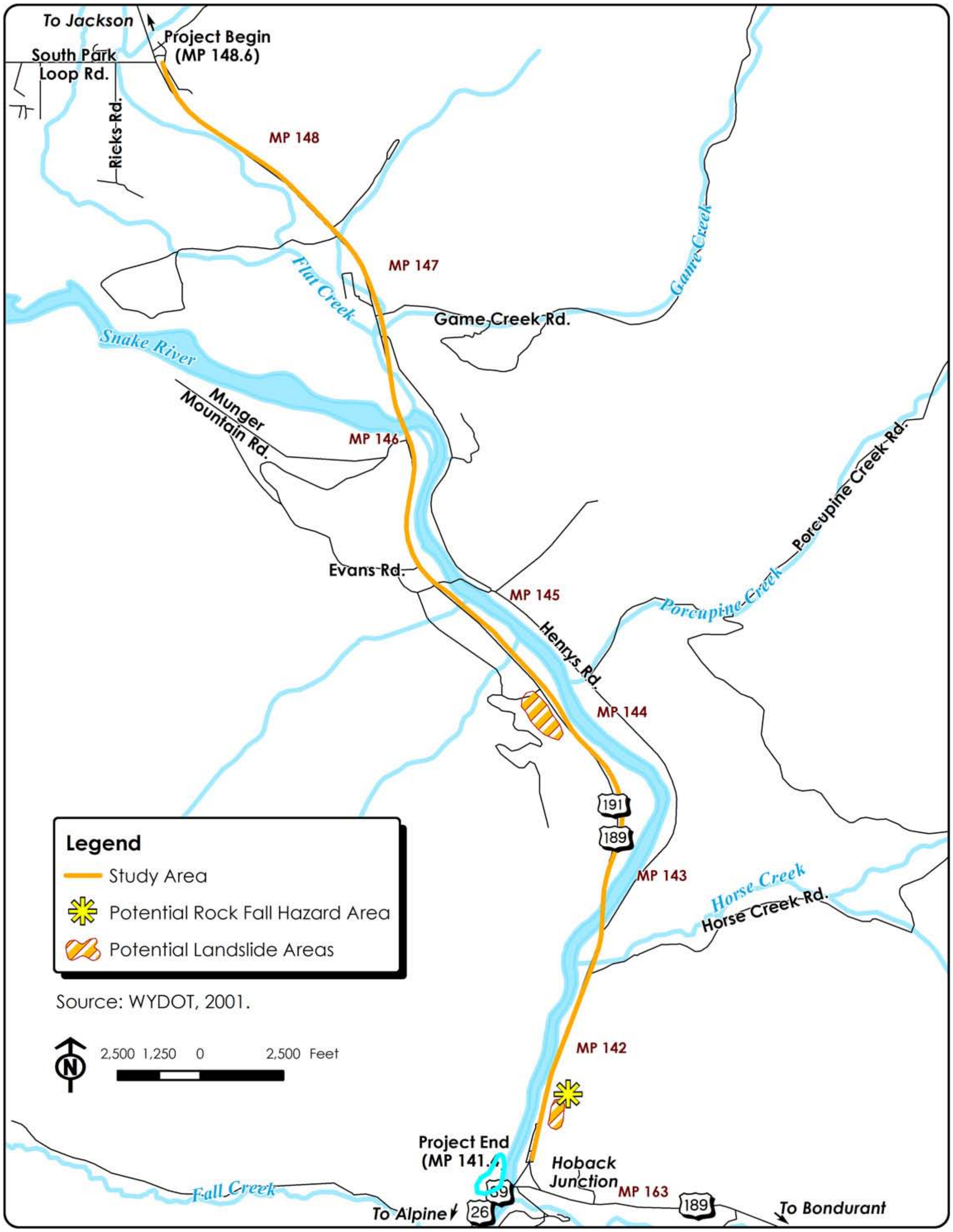
In 1966, a large landslide that occurred near the confluence of Squaw Creek and the Snake River resulted in the realignment of the highway from approximately MP 147 near Flat Creek to the existing intersection with Henry's Road at approximately MP 142.8. Just outside of the Study Corridor, a large debris flow-type landslide in 1997 closed U.S. Highway 26/89 in Snake River Canyon for over a month, resulting in substantial traveler inconvenience and economic losses to the area. The potential for landslides to damage transportation systems and create safety hazards is a major consideration during the planning and design of transportation facilities. **Figure 1-13** identifies the potential landslide areas.

The occurrence of landslides, like many natural events, is very unpredictable. It is possible to identify potential areas that are prone to landslides, but to predict the exact time of a landslide is nearly impossible. The main triggering mechanism in the majority of landslides in mountainous regions is an increase in groundwater levels. These increases are typically seasonal, with the greatest increases occurring during snow melt and spring rain periods. The seasonal groundwater changes can vary greatly from year to year, depending on the overall precipitation received during the year. Record or near record precipitation throughout much of Wyoming in 1997 resulted in approximately 100 landslides that affected the highway system. To mitigate the effects of these landslides, emergency funding was obtained from the FHWA, and 24 of the worst sites were repaired at a cost of approximately $6.6 million.

Another triggering mechanism for landslides is seismic activity. Although the frequency of landslides triggered by earthquakes is lower than landslides triggered by groundwater level increases, the magnitude of earthquake-triggered landslides is often larger because larger areas are subjected to the increased seismic forces. The Study Corridor is located in one of the most highly seismically active areas in Wyoming, because of its proximity to the volcanically active Yellowstone region and the various fault systems that surround Hoback Junction.

Approximately 1,200 feet of the roadway within the Study Corridor traverses or is adjacent to material that is classified as ancient landslide debris. Ancient landslide debris is defined as earth material that at some time in its history has been subject to mass slope movement. Within these large ancient landslide masses, there are two locations where active slide movement is presently affecting the roadway:

Figure 1-13
Potential Landslide Areas



A landslide at MP 141.7 between Hoback Junction and Jackson. This landslide is affecting approximately 400 feet of the roadway, primarily by vertical displacement creating a large dip with pavement distress and some minor horizontal deflection. In 1987, after three years of significant slide movement, subsurface drains were installed to help stabilize the landslide. The landslide then remained relatively stable until 1997, when it became active again and has since required maintenance patching. Inclinometers installed in 2003 indicate that the landslide continues to move.

The Munger Mountain landslide north of Hoback Junction at MP 143.8. This landslide is affecting approximately 800 feet of the roadway primarily through vertical displacement. Throughout the 800-foot length there has also been some horizontal displacement that has affected the roadway alignment. Bumps in the pavement at both ends of the landslide are severe enough that hazard warning signs have been at these locations since 1997. This slide has affected the roadway since 1966 and has become more active since 1997.

Another potential hazard to the traveling public are rocks that fall and/or roll from slopes onto adjacent roadways. Rockfall is a common problem on most roads in mountainous areas. The rocks are loosened by the presence of moisture on slopes due to precipitation, frost action, and differential weathering of the rock. Within the Study Corridor, there is one location where rockfall is a problem. This site is located north of Hoback Junction at MP 141.9. At this site, there is differential weathering taking place between the sandstone and shale layers of rock, resulting in sandstone blocks up to one foot in diameter rolling onto the road. The ditch section at this site is very narrow and shallow and provides very little rock catchment, so most of the rocks that roll off the slope land on the roadway.

1.9 Accommodate Non-Motorized Transportation Modes

Under Section 5304 of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), WYDOT is required through its plans and programs to "...provide for the development and integrated management and operation of transportation systems and facilities (including accessible pedestrian walkways and bicycle transportation facilities) that will function as an intermodal transportation system for the State and an integral part of an intermodal transportation system for the United States." FHWA Policy issued in 1999, *Design Guidance, Accommodating Bicycle and Pedestrian Travel: A Recommended Approach*, "...bicycling and walking facilities will be incorporated into all transportation projects unless exceptional circumstances exist."

Through this EIS process, WYDOT has considered the need for facilities to adequately accommodate bicyclists and pedestrians. Also, WYDOT participated in the development of the *Pathways Master Plan, The Town of Jackson & Teton County, Wyoming* (2007). The Plan identified the need for a pathway to accommodate pedestrians and less experienced bicyclists along the highway from Jackson to Hoback Junction.

Economies of scale in right-of-way acquisition and construction make it much more economically feasible to construct the pathway and highway during highway construction. It would be possible to separate the construction of the two projects, but this would result in more difficult construction, project delay, and higher costs. Safety of construction workers and transportation system users also would be improved by combining the pathway and highway construction projects.

An existing bicycle/pedestrian pathway extends from north of the Study Corridor along the highway to Game Creek Road (see **Figure 3-13**). *Pathways in Jackson Hole: A Conceptual Plan* (Teton County, 1992) outlines the following goals:

- Use pathways to reduce the number of vehicle and bicycle/pedestrian accidents
- Provide access for close-to-home recreation without use of automobiles
- The U.S. Highway 26/89/189/191 corridor was identified as a roadway in need of an adjacent multiuse pathway to extend from the Town of Jackson to Hoback Junction. The *Pathways Master Plan, The Town of Jackson & Teton County, Wyoming* (2007) identifies the following Study Corridor trails as project priorities:
    - Classified as "Closing Gaps in the System:" U.S. Highway 26/89/189/191 corridor from Game Creek to Hoback Junction.
    - Classified as "Completion of Loops:" Henry's Trail/Hoback Loop.

Section 3.9 provides more information on existing and planned bicycle and pedestrian facilities.

Chapter 2.0: Alternatives

2.1 Introduction

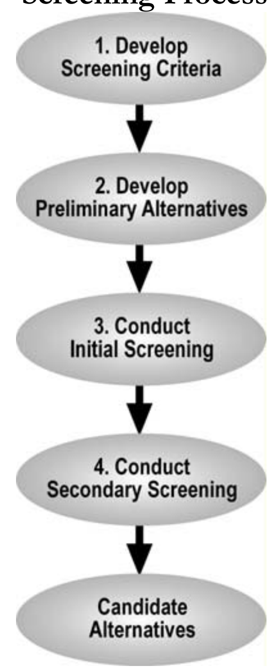
The National Environmental Policy Act (NEPA) requires that the Environmental Impact Statement (EIS) process consider a reasonable range of alternatives, including a No-Action Alternative, and objectively evaluate them at comparable levels. Reasonable alternatives are those that are practical and feasible from a technical and economical standpoint, and achieve the Purpose and Need for the project. This chapter describes the reasonable alternatives considered for the study and the process used to identify and screen these alternatives. For details, please refer to the *Jackson South Alternatives Technical Report* (WYDOT, 2008).

2.2 Alternatives Development and Screening Process

A four-step alternatives development and screening process was used to identify the candidate alternatives to be studied in detail in this EIS (see **Figure 2-1)**. The following sections address each of these four steps, which include:

1. Develop screening criteria
2. Develop preliminary alternatives
3. Conduct initial screening
4. Conduct secondary screening

Figure 2-1
Alternatives Screening Process



The process was inclusive, with input provided by an interdisciplinary (ID) Team formed to provide advice throughout the study. The ID Team consisted of 15 members from a range of organizations and agencies to represent a variety of goals and interests. Also, the public provided comments on alternatives via the extensive public involvement program (see Chapter 6.0). The Core Team, comprised of WYDOT and FHWA staff, used this input to develop screening criteria, develop alternatives, and screen alternatives.

2.2.1 Develop Screening Criteria

Screening criteria were developed to provide a means to compare alternatives and decide which alternatives should be dismissed or advanced to the next step. Developing the screening criteria included consideration of the project Purpose and Need, results of the scoping process (see Chapter 6.0), and the project team's general analysis of the Study Corridor issues and constraints.

The Core Team identified four criteria: *Accommodate Transportation Needs, Minimize Long- and Short-Term Impacts (Social), Minimize Impacts (Environmental),* and *Improve Safety*. At different points of the alternatives analysis, 18 related indicators were used to measure how well each of the alternatives met the screening criteria. The Core Team, with input from the ID Team, chose the indicators based on their ability to:

- Represent the screening criteria
- Be quantified
- Differentiate the alternatives
- Reflect community interest

Table 2-1 shows the screening criteria and each criterion's corresponding indicators.

Table 2-1
Screening Criteria and Indicators

Screening Criteria	Related Indicators	Indicator Definition
Accommodate Transportation Needs	Level of Service (LOS)	Improves roadway capacity to LOS C or higher.
	Turning Movements	Accommodates turning movements (especially left turns) in protected lane.
	Plan Compatibility	Maintains compatibility with state, federal, and local plans (see Section 3.1).
	Bike/Ped and Transit	Accommodates and supports bike/ped/transit use.
	Traffic Maintenance	Handles traffic during periodic roadway maintenance.
	Vehicle Type Accommodation	Accommodates all types of vehicles and traffic including commuters, tourists, emergency vehicles, trucks and school or transit buses.
Minimize Long- and Short-Term Social Impacts	Noise	Minimizes number of properties subjected to significant noise increases (see Section 3.12).
	Recreation	Provides or prohibits access (as needed) to recreational resources, including fishing, hunting, river floating, etc.
	Relocations	Minimizes number of residential or business relocations required.
	Access	Improves access for all vehicle types onto and off the highway.
	Construction	Minimizes anticipated time of construction and travel delays.
Minimize Environmental Impacts	Wildlife/Fisheries	Minimizes adverse effects to wildlife habitat and fisheries.
	Water Quality	Minimizes short and long-term adverse effects to water quality in rivers and creeks.
	Wetlands	Minimizes wetland impacts.
	Visual Resources	Minimizes adverse effects to surrounding viewsheds and significant views from the rivers and roadway.
	Air Quality	Minimizes adverse effects to air quality.
	Cultural Resources	Minimizes effects to archaeological/historic properties.
Improve Safety	Landslide Hazards	Minimizes potential for landslides.
	Crashes	Potentially reduces crash rate.

In screening the alternatives, the Core Team used the indicators that would help differentiate the alternatives. Not all indicators were used for each screening.

2.2.2 Develop Preliminary Alternatives

After selecting screening criteria, the Core Team, with assistance from the ID Team, identified six Preliminary Alternatives based on their ability to meet the transportation needs outlined in Chapter 1.0. They included the No-Action (Do Nothing), 2-Lane Rural, 3-Lane Rural, 4-Lane Divided, 4-Lane Undivided, and the 5-Lane Rural. The following sections describe these alternatives and **Table 2-2** shows the results of the initial screening.

In considering preliminary alternatives, the Core Team determined that any off-alignment alternative would result in considerable environmental impacts, and therefore would not be reasonable. The Study Corridor contains a host of environmental resources that off-alignment alternatives could impact, including:

- the Snake River, which parallels the highway from MP 146 south into Hoback Junction,
- landslide hazards,
- steep slopes,
- land protected through land trusts (see Section 3.1.3),
- Bridger-Teton National Forest and Wyoming Game and Fish Department land,
- sagebrush habitat,
- elk feeding grounds, and
- scenic easements.

Further, an off-alignment alternative would complicate access to the Von Gontard's Landing boat launch and other recreational facilities, making compliance with the Bridger-Teton National Forest river recreation management prescription difficult. (see Section 3.1.5).

2.2.3 Screen Preliminary Alternatives

Next, the Core Team analyzed the Preliminary Alternatives using the screening criteria and indicators. The alternatives underwent an initial screening that was conducted in 2002 and 2003. The results of this initial screening, provided in the tables later in this chapter, are based on and reflect information available at that time. In years 2004 and 2005, the alternatives were refined as necessary and then underwent a secondary screening. The Core Team, with input from the ID Team, advanced the Preliminary Alternatives that scored the highest and dismissed those that did not compare favorably. The advanced Preliminary Alternatives (referred to simply as Alternatives) are analyzed in detail in this EIS.

Several Preliminary Alternatives were dismissed immediately for reasons discussed below. The No-Action Alternative was advanced throughout the process as a baseline for environmental analysis. The following sections describe the Preliminary Alternatives and results of the screening processes.

2.3 Preliminary Alternatives

2.3.1 Initial Screening

The initial screening was conducted in July 2002 and evaluated the six Preliminary Alternatives. The following sections describe these alternatives and **Table 2-2** shows the results of the initial screening.

Widening for all build alternatives would occur equally on both sides of the existing highway centerline to minimize impacts, except in areas where physical or environmental constraints warrant shifting the alignment to one side. The need for such alignment shifts would be determined during final design. However, the alignment was shifted west near Evans Mobile Home Park as part of the preliminary engineering to avoid noise impacts.

Each of the Preliminary Alternative concepts includes a design element for construction of a separate pedestrian/bicycle pathway (reasons that a pathway is included with the project are presented in Section 1.9). This design element is not a stand-alone alternative, but a component of the larger Preliminary Alternatives. Two pathway options are being considered: Option 1 would parallel the highway on the west side through the Study Corridor. This would include use of the existing Von Gontard Trail, which would be relocated slightly to the west to accommodate a wider roadway cross-section. Option 2 would follow the same alignment as Option 1 from the northern Study Corridor terminus to Henry's Road south of Game Creek. From there, it would travel along Henry's Road to where Henry's Road intersects the highway near Horse Creek, at which point it would again share the same alignment as Pathway Option 1. A pathway would not be constructed on Henry's Road; existing Henry's Road would serve as the path. Each pathway would be ten feet wide, but could be reduced to eight feet in certain locations to minimize impacts to sensitive environmental resources (per the 1999 AASHTO 1999 *Guide for the Development of bicycle Facilities* and through coordination with Teton County). The path location does not factor into the alternative screening process.

The initial screening resulted in the early dismissal of the 2-Lane Rural and 4-Lane Divided Preliminary Alternatives. Four Preliminary Alternatives—No Action, 3-Lane Rural, 4-Lane Undivided, and 5-Lane Rural—were carried forward to the secondary screening. Refer to **Table 2-2** and the *Jackson South Alternatives Technical Report* (WYDOT, 2008) for details.

No-Action Alternative

The No-Action Alternative includes only those projects that have funds committed for improvements. These improvements would be made regardless of whether a build alternative is implemented. The No-Action Alternative would include standard maintenance activities on the surfacing, structures and other roadway appurtenances within the Study Corridor, as well as projects contained in WYDOT's *2009 State Transportation Improvement Program* (STIP). Although it does not meet Purpose and Need, this alternative was retained for further study to serve as a baseline for comparison.

2-Lane Rural Alternative: Dismissed

This alternative would consist of improvements to bring the roadway to current design standards, including construction of eight-foot shoulders and clear zones (see **Figure 2-2**). The Core Team, with input from the ID team, dismissed this alternative because the traffic analysis showed that without additional travel lanes, the Level of Service (LOS) would degrade and operate at a LOS E in 2026 (same as the No-Action Alternative). Also, the 2-Lane Rural Alternative would not address safety problems caused by turning vehicles, and the lack of passing opportunities could induce drivers to make unsafe passing maneuvers. As a result, this alternative would not adequately reduce the crash rate. For these reasons, it was determined that this alternative did not meet the Purpose and Need and was dismissed from further evaluation.

Figure 2-2
2-Lane Rural Alternative

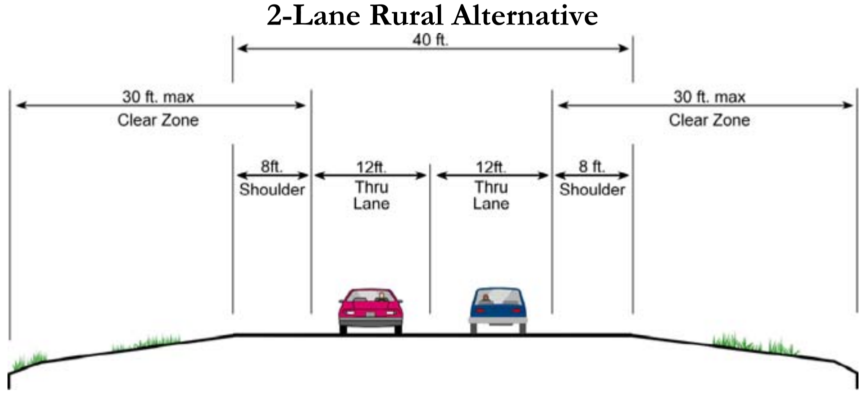


Table 2-2
Initial Screening Results

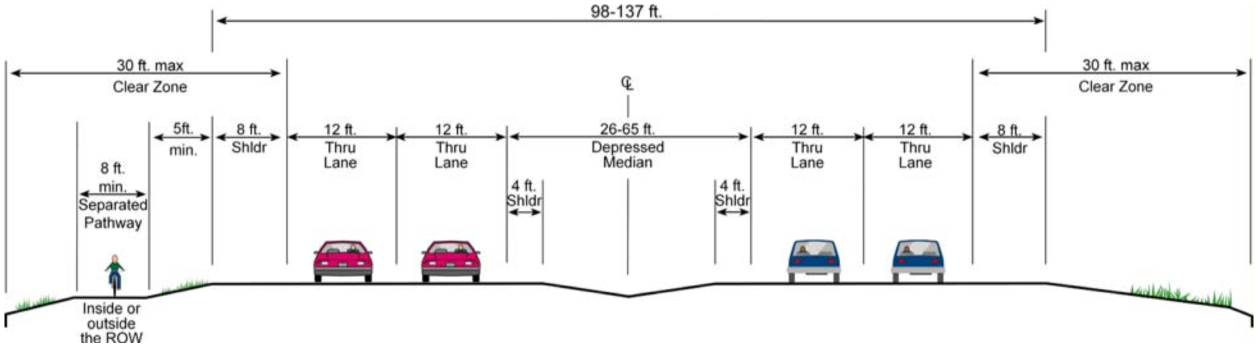
	Screening Criteria	Alternatives					
		No-Action	2-Lane Rural	3-Lane Rural	4-Lane Undivided	5-Lane Rural	4-Lane Divided
Accommodate Transportation Needs							
Indicator	Improves LOS	E	E	D	A	A	A
Indicator	Compatible with Plans*	No	No	Does not meet mobility goal (see LOS above); partially meets safety and efficiency goal	Meets mobility goal; partially meets safety/ efficiency goal (addition of lanes which will serve to allow passing and thus reduce driver frustration. Not having a center left-turn lane will create the potential to increase crashes by forcing drivers to turn out of the passing lane.	Yes	Yes
Minimize Long- and Short-term Social Impacts							
Indicator	Relocations	0	1	2	3	3	36
Minimize Environmental Impacts							
Indicator	Natural Environment disturbed (acres)**	0	20	40	60	80	160
Indicator	Improve Safety: Potential to Reduce Crashes	No	Shoulder improvements would reduce crash potential slightly.	Insufficient through lanes. Passing opportunities available but would not meet traffic demands. Left-turn movements present safety hazard—rear-end crash potential.	Passing and capacity are accommodated, but left-turn move-ments present serious safety hazard.	Yes—Passing, capacity, and left-turn movements are accommo-dated.	Yes—Passing, capacity, and left-turn move-ments are accom-modated.

*See Section 1.4.
**Early in the process, the Core and ID Teams agreed to use the amount of land disturbance as a surrogate measure for indicators under the Minimize Impacts criterion (see the *Jackson South Alternatives Technical Report*).

4-Lane Divided Alternative: Dismissed

This alternative would add lanes and a depressed median ranging in width from 26 to 65 feet (see **Figure 2-3**). It would require 36 relocations—the highest number of all alternatives. Also, it would not minimize impacts to the natural environment; long-term impacts total 160 additional acres of disturbance. While it would meet the Purpose and Need, other alternatives would meet these needs with much fewer environmental, relocation, and right-of-way impacts. Therefore, this alternative was dismissed from further evaluation.

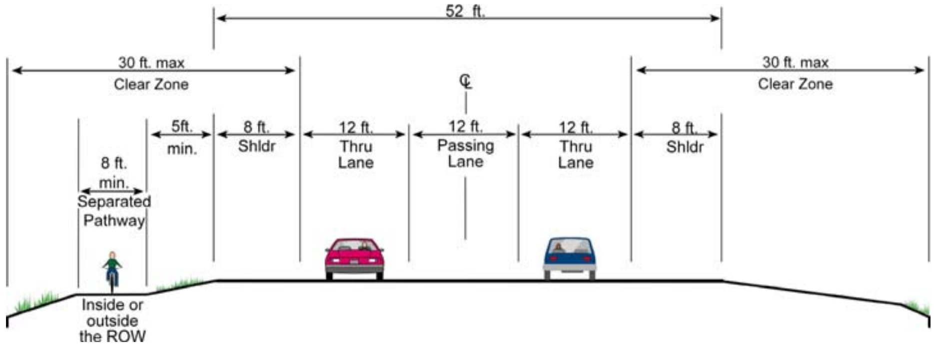
Figure 2-3
4-Lane Divided Alternative



3-Lane Rural: Advanced to Secondary Screening

The 3-Lane Rural Alternative consists of two 12-foot through lanes, a 12-foot passing lane, and 8-foot shoulders (see **Figure 2-4**). A passing lane system consists of a mile-long passing lane every three to four miles to allow passing maneuvers that are unrestricted by opposing traffic. Despite issues with this alternative that are discussed below in Section 2.4, this alternative was retained for further analysis in the secondary screening at the request of the ID Team. It should be noted that a three-lane option consisting of two through lanes plus a center turn lane was not considered reasonable from both a LOS and safety standpoint. The center turn lane would not allow any passing, which in turn would result in LOS E/F (using 2026 volumes). Also, this configuration would be unsafe because slower drivers would frustrate faster drivers, and illegal passing maneuvers in the center turn lane would likely occur. Any driver attempting to turn left from the turn lane could be exposed to either a head-on or rear-end crash.

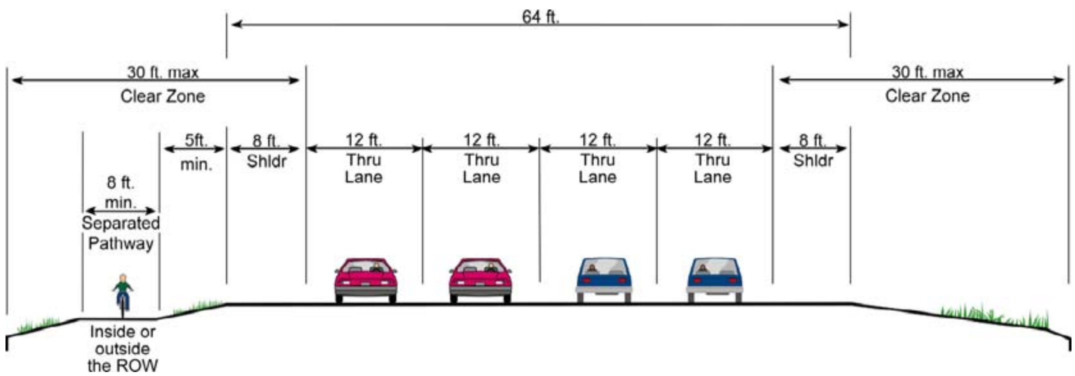
Figure 2-4
3-Lane Rural Alternative



4-Lane Undivided: Advanced to Secondary Screening

The 4-Lane Undivided Alternative consists of four 12-foot through lanes with 8-foot shoulders (see **Figure 2-5**). This alternative would not provide median separation or left-turn lanes. If a center lane were included with this alternative, it would effectively result in a 5-lane cross-section, which is assessed under the 5-Lane Rural Alternative. At the request of the ID Team, this alternative was retained for further analysis in the secondary screening.

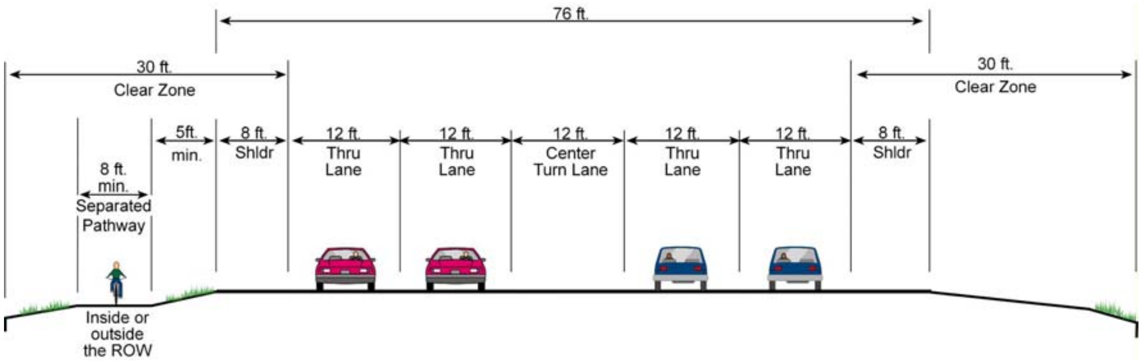
Figure 2-5
4-Lane Undivided Alternative



5-Lane Rural: Advanced to Secondary Screening

The 5-Lane Rural Alternative consists of four 12-foot through lanes with one continuous two-way 12-foot left-turn lane with 8-foot shoulders (see **Figure 2-6**). This alternative would be a multilane section designed to meet access requirements and accommodate left turns. This alternative would also include replacement of the bridge over Flat Creek (MP 146.39), widening or replacing the bridge over the Snake River (MP142.79 and MP 146.09), and culvert reconstruction at Game Creek (146.4) and Horse Creek (MP 142.22). This alternative met the purpose and need with fewer impacts than the 4-Lane Divided Alternative. Therefore, it was retained for further analysis.

Figure 2-6
5-Lane Rural Alternative



2.3.2 Secondary Screening

The secondary screening evaluated the remaining four Preliminary Alternatives plus a new Combination Alternative.

Combination Alternative

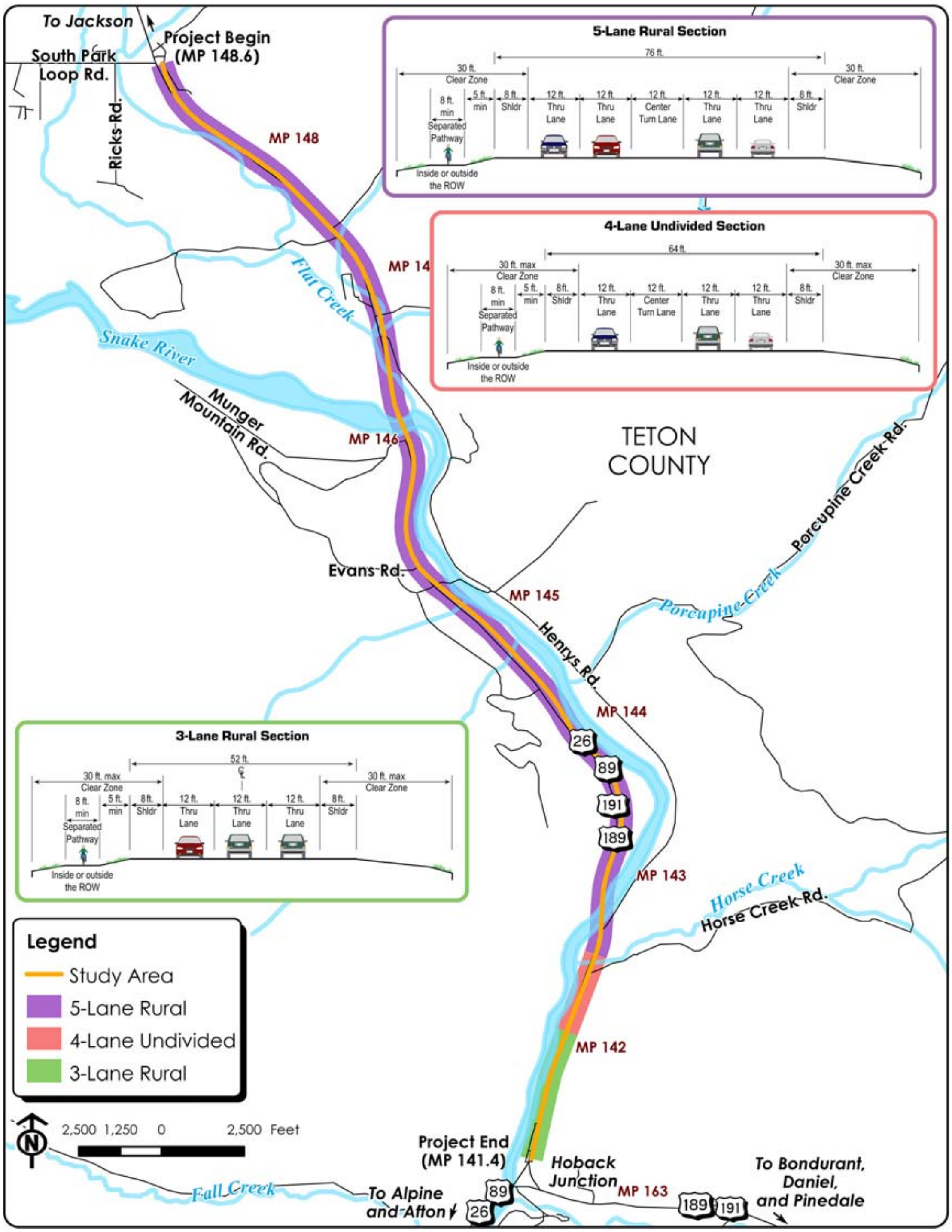
Based on input received at the November 4, 2004 ID Team meeting, and in an effort to reduce the width of the proposed highway improvements, the Combination Alternative was developed that combines features of the 3-Lane, 4-Lane, and 5-Lane alternatives (see **Figure 2-7**).

The 3-Lane Rural cross-section portion of the Combination Alternative would tie into the three-lane urban section at MP 141.4 immediately north of Hoback Junction. Vehicles traveling north from Hoback Junction in this three-lane rural section would have a general purpose travel lane and a passing lane to improve traffic flow in this uphill section. The three-lane section would extend roughly 0.6 mile to MP 142.0, where it would transition to a 4-Lane Undivided cross-section. This section then would extend 0.5 mile to MP 142.5 and include two northbound travel lanes, one southbound travel lane, and a center turn lane. Next, it would transition to the 5-Lane Rural cross-section. The 5-Lane Rural cross-section would be the longest segment of the Combination Alternative and would continue for 6.1 miles to MP 148.6.

The five-lane and four-lane portions would include a two-way, left-turn lane to provide and improve access to adjacent properties where it is currently needed. Where the cross-section tapers to three lanes, fewer access points exist, which reduces the need for a center lane to accommodate turning vehicles. Therefore, the roadway width for the Combination Alternative can be narrowed to reduce right-of-way impacts.

The Combination Alternative also was deemed reasonable because it would provide a transition from the proposed higher speed, five-lane section in the north part of the Study Corridor to the three-lane section at the Hoback Junction intersection while maintaining adequate LOS. This transition would alert drivers to slow their driving speeds while

Figure 2-7
Combination Alternative



approaching Hoback Junction. The Combination Alternative also would meet driver expectations by providing road widths consistent with the surrounding topography; five lanes in the wider valley portion to the north transitioning to four lanes then three lanes to the south, where steep landforms surround the existing roadway just north of Hoback Junction.

Because of the reduced access needs, transitioning to Hoback Junction, and the short length of the three- and four-lane sections, the Combination Alternative would function at an acceptable LOS and still meet the project Purpose and Need. The three- and four-lane sections would operate at LOS C or better during the design year, while the five-lane section would function at LOS A.

The Combination Alternative would also include replacement of the bridge over Flat Creek (MP 146.39), widening or replacing the bridge over the Snake River (MP142.79 and MP 146.09), and culvert reconstruction at Game Creek (146.4) and Horse Creek (MP 142.22).

Secondary Screening Results

Table 2-3 summarizes the secondary screening results; reasons for alternatives being dismissed or advanced are provided after the table.

Table 2-3
Secondary Screening

	Screening Criteria	Alternatives				
		No-Action	3-Lane Rural	4-Lane Undivided	5-Lane Undivided	Combination
Accommodate Transportation Needs						
Indicator	Improves LOS to C or higher	No (LOS E)	No (LOS D)	Yes (LOS A)	Yes (LOS A)	Yes (LOS A-C)
Indicator	Turns from a protected lane	No	No	No	Yes	Yes
Indicator	Compatible with local plans	No	No	Partially	Partially	Partially
Indicator	Space for bike/ped/transit	No	Yes	Yes	Yes	Yes
Indicator	Traffic Maintenance	No	Partially	Yes	Yes	Yes
Minimize Long- and Short-Term Impacts						
Indicator	Noise impacts	Increases	Increases	Increases	Increases	Increases
Indicator	Access to recreational resources	No change	Increases	Decreases	Increases	Both
Indicator	Number of relocations required	0	2	3	3	3
Indicator	Improves access for all vehicle types onto and off the highway	No	No	No	Yes	Yes
Indicator	Anticipated time of construction and resulting delays	None	Low travel speeds	Higher travel speeds	Higher travel speeds	Higher travel speeds

Table 2-3
Secondary Screening

Screening Criteria		Alternatives				
		No-Action	3-Lane Rural	4-Lane Undivided	5-Lane Undivided	Combination
Minimize Environmental Impacts						
Indicator	Habitat loss (acres)	No	mule deer (13.6); moose (12.8)	mule deer (18.7); moose (17.6)	mule deer (23.8); moose (22.4)	mule deer (18.7); moose (22.4)
	Minimizes impacts to water quality	Yes	Increases drainage over No-Action. 15-acre increase in impervious surface.	Increases drainage and winter deicers over 3-Lane Rural. 24-acre increase in impervious surface.	Greatest increase in drainage and winter deicers. 35-acre increase in impervious surface.	Slight increase in drainage and winter deicers over 4-Lane Undivided. 27-acre increase in impervious surface.
	Impacts to wetlands	0	0.4 acres	0.55 acres	0.94 acres	0.94 acres
	Impact to visual resources	None	Minimal	More	More	Minimal
	Impact to historic site (48TE1573)	None	0.46 acres	0.83 acres	1.43 acres	1.43 acres
Improve Safety						
Indicator	Minimizes landslides	No	Yes	Yes	Yes	Yes
	Potential to Reduce Crashes	No	Insufficient through lanes. Passing oppor-tunities available but would not meet traffic demands. Left-turn movements would require left-turn lane.	Passing and capacity are accommodated, but left-turn movements present serious safety hazard	Yes—Passing, capacity, and left-turn move-ments are accommo-dated.	Yes—Passing, capacity, and left-turn move-ments are accommo-dated.
Summary: EIS Alternatives		**Advanced**	**Dismissed**	**Dismissed**	**Advanced**	**Advanced**

The acreage of impacts to the Study Corridor's only eligible historic site is included (see Section 4.20).

2.4 Dismissed Alternatives

The following alternatives were dismissed because they would not meet the Purpose and Need.

- **3-Lane Rural Alternative**: The LOS analysis indicated that the 3-Lane Rural Alternative would operate at a LOS D in 2026, and therefore would not accommodate growing travel demand. The third lane included with this alternative is a passing lane. No turning movements would be allowed from the passing lane. This alternative would not safely accommodate turning movements, especially at major access points such as Horse Creek Road, Henry's Road, South Park Boat Launch, WYO 391, Game Creek Road, Evans Construction, and the transfer station. However, if this alternative included left-turn lanes at all access points, it would result in a continuous left-turn lane and essentially become a four-lane highway. Left turns out of the inside (passing) lane violate driver expectancy and create unsafe conditions. Vehicles passing from both directions could cause conflicts from opposing traffic. This lack of separation between oncoming traffic could result in head-on collisions. Therefore, the alternative would not meet the need to provide access and through turning movements to and from land uses along the roadway, and would not adequately reduce the number of crashes that currently occur on the roadway.

- **4-Lane Undivided Alternative**: This alternative was dismissed largely because it did not meet safety needs. Specifically, it would have the same turning movement hazards as the 3-Lane Rural Alternative discussed above, except in both directions. Therefore, this alternative would not meet the need to provide access, through turning movements, to adjacent land uses currently accessing the roadway. Also, this alternative does not meet the need to improve traffic safety; research has documented that a four-lane facility without separation between opposing directions of travel experiences increased head-on collisions and more severe crashes. While four lanes would improve traffic operations to LOS A, this would create a safety hazard because left-turn movements would have to be made from the inside/fast lane. If a center lane were included with this alternative, the number of access points would effectively require a continuous center turn lane and result in a 5-lane cross-section.

Although the 3-Lane Rural Alternative and the 4-Lane Undivided Alternative were dismissed because they did not meet the Purpose and Need as stand-alone alternatives, it was determined that combined features of both those alternatives and the 5-lane Rural alternative, as included in the Combination Alternative, would meet the Purpose and Need.

2.5 Advanced Alternatives

The Core Team, with input from the ID Team, advanced the following Preliminary Alternatives for detailed analysis in the EIS, hereafter referred to as Alternatives. These alternatives are fully evaluated in Chapter 4.0 of this EIS.

- **No-Action Alternative**: Advanced to provide a baseline for comparison.
- **5-Lane Rural Alternative**: Advanced because it would meet the project Purpose and Need.
- **Combination Alternative**: Advanced because it would meet the project Purpose and Need.

2.5.1 Design Criteria

All build alternatives would meet certain design criteria appropriate for a rural principal arterial in mountainous conditions. **Table 2-4** shows some of these criteria.

Table 2-4
Proposed Design Criteria

Category	Criteria
Classification	Rural Principal Arterial
Design Year	2026
Terrain	Level
Minimum Anticipated Design Speed	55 (mph)
Maximum Grade	5.3%
Minimum Stopping Sight Distance	495 feet
Anticipated Bridge Clear Roadway Width	76 feet

2.6 Teton County Alternative

In 2006, Teton County hired a consultant to conduct a planning-level analysis of the Study Corridor and develop a new alternative for the project. The Teton County Alternative is summarized in **Table 2-5** and shown on **Figure 2-8** and **Figure 2-9.** Please refer to **Appendix E** for more information.

Table 2-5
Features of Teton County Alternative

Location		Number of Lanes	Configuration
From	To		
End of current five-lane section (MP 148.6)	Game Creek Road (MP 146.6)	Four lanes	One southbound lane, two northbound lanes, plus a center left-turn lane
Game Creek Road (MP 146.6)	South side of first Snake River bridge (MP 146.0)	Four lanes	Two lanes in each direction
South side of first Snake River bridge (MP 146.0)	Just north of Ross Gravel Pit Road (MP 144.1)	Five lanes	Two lanes in each direction plus a center left-turn lane
Just north of Ross Gravel Pit Road (MP 144.1)	Just south of Horse Creek Road (MP 142.0)	Three lanes	One lane in each direction plus a center left-turn lane
Just south of Horse Creek Road (MP 142.0)	Hoback Junction (MP 141.0)	Three lanes	Two northbound lanes and one southbound lane north of Hoback Junction, and one lane in each direction plus a center left-turn lane through Hoback Junction to the intersection with WY 189

Figure 2-8
Teton County Alternative

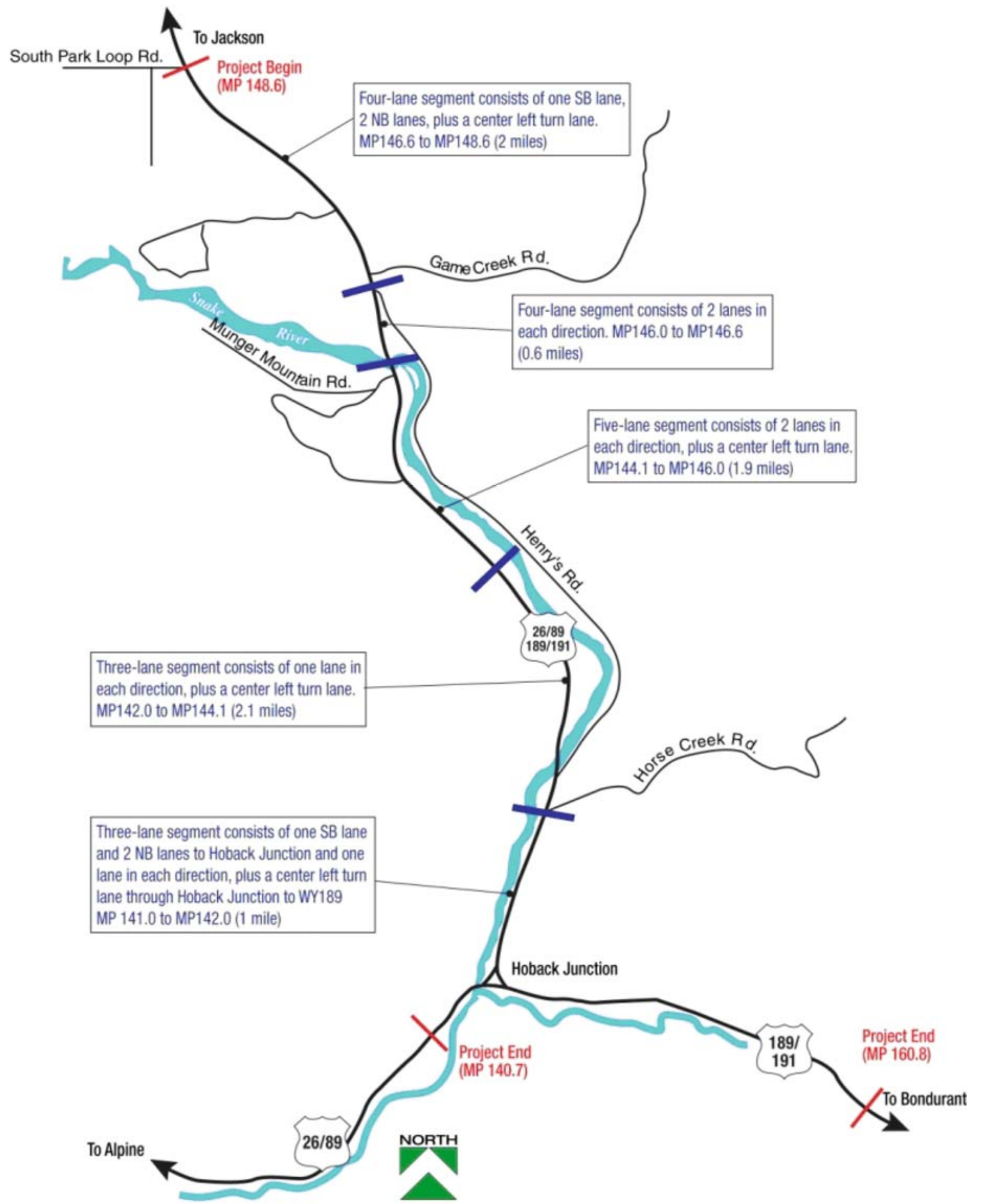
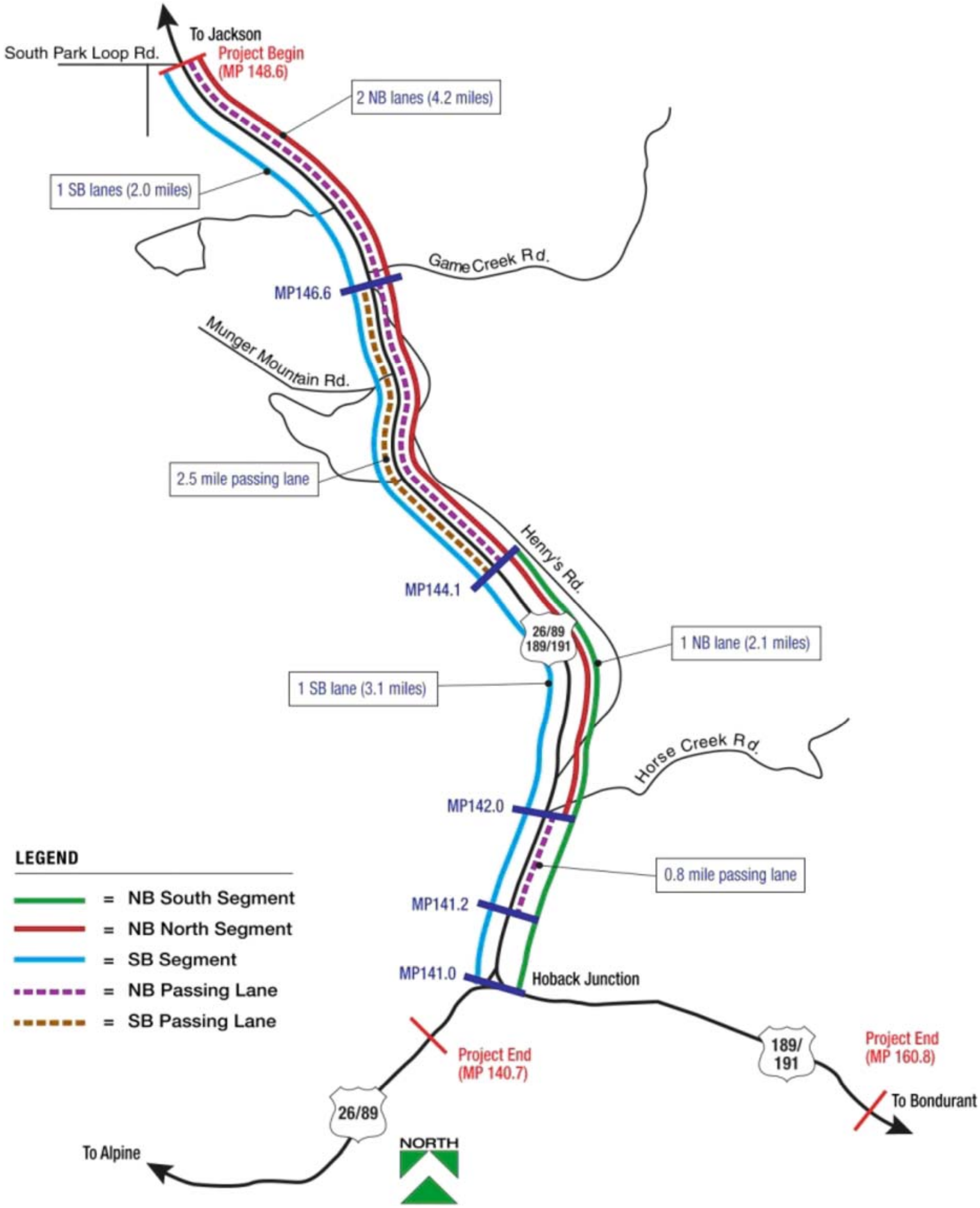


Figure 2-9
Teton County Alternative: Passing Lanes



2.6.1 Analysis Results

WYDOT conducted a design-level analysis of the Teton County Alternative, which provided greater detail than the planning-level analysis performed by Teton County's consultant. WYDOT compared the Teton County Alternative to the Combination Alternative because it is more similar to the County Alternative than the 5-Lane Alternative.

The Teton County Alternative consists of five different cross-section configurations. From north of Hoback Junction, it begins with a three-lane cross-section (two northbound lanes and one southbound lane) for approximately one mile, then transitions to a different three-lane cross-section (one lane in each direction plus a center turn lane) for approximately 2.1 miles. It then changes to a five-lane cross-section (two lanes in each direction plus center left-turn lane) for approximately 1.9 miles, then a four-lane cross-section (two lanes in each direction) for approximately 0.6 mile, and then a different four-lane cross-section (one southbound lane, two northbound lanes, and a center left-turn lane) for approximately 2.0 miles. It transitions to the existing five-lane cross-section south of Jackson.

The Preferred Alternative includes three different cross-sections. It begins north of Hoback Junction with a 3-Lane Rural cross-section (two lanes plus a passing lane) for approximately 0.6 mile, then a 4-Lane Undivided cross-section (two northbound lanes, one southbound lane, and a center turn lane) for approximately 0.5 mile. Next, it transitions to a 5-Lane Rural cross-section (four lanes with one continuous two-way left-turn lane) for the remaining approximate 6.1 miles of the Study Area, and would tie into the existing five-lane cross-section south of Jackson.

Differences between the Teton County Alternative and the Combination Alternative centered around: 1) safety issues; and 2) travel demand, capacity, and level of service (LOS) considerations. The analysis focused on these two elements of the project's Purpose and Need. The analysis results are presented below.

Safety

- A highway's design must include areas between different cross-sections that allow for a gradual transition from one cross-section to another to provide for safe and efficient operation. The different cross-sections included in the Teton County Alternative would result in numerous transition areas, such that the length of a transition area would "eat into" the next cross-section. As a result, a driver would spend almost as much time driving in the transition areas as the different cross-sections themselves. Further, these variable cross-sections and design inconsistencies would violate driver expectations. Drivers would need to constantly maneuver to simply stay in one lane, which would become a safety issue, especially at higher speeds. This problem would worsen in snowy conditions when lane markings are less visible. By comparison, the Preferred Alternative would provide a consistent cross-section for approximately 6.1 miles, from MP 148.6 to MP 142.5, where it would begin transitioning into narrower cross-sections as it approaches Hoback Junction. The fewer transition areas under the Preferred Alternative would provide a consistent highway design that would meet driver expectations and provide a safe and efficient highway operation.

- A well-designed roadway allows drivers of vehicles traveling at higher/lower speeds to instinctively separate (or "sort") themselves from each other, so that slower-moving vehicles do not impede the movement of vehicles moving at a higher speed. The numerous transition areas between the different cross-sections, combined with the reduced laneage compared to the Combination Alternative, would not allow safe "sorting" of vehicles to occur.
- Currently, the highway has 4.0 miles of no passing zones in the southbound direction; the Teton County Alternative would provide 4.6 miles of no passing zones in the southbound direction. The highway has about 4.0 miles of no passing zones in the northbound direction, while the Teton County Alternative would provide 2.6 miles of no passing zones northbound. Lane configurations under the Teton County Alternative would favor northbound movement into Jackson, but would result in delays for the corresponding southbound movement. Two segments of the Teton County Alternative that would not allow for passing are located between MP 141.5 and MP 144.1 and between MP 146.6 and MP 148.6. The limited passing opportunities provided under the Teton County Alternative could induce impatient drivers to attempt unsafe passing maneuvers that would create a potential head-on collision situation. Further, traffic modeling indicates that the Teton County Alternative would operate at LOS D.

Travel Demand/Level of Service

- WYDOT conducted traffic modeling based upon a 55 mph design speed, which is an appropriate design speed for this roadway because it is a principal arterial, has numerous access points, and has areas frequently crossed by wildlife. The traffic modeling indicated that the Teton County Alternative would function at LOS D at best, which does not meet the LOS C standard that WYDOT has established for this National Highway System (NHS) designated principal arterial and state highway.
- The numerous transition areas required between the different cross-section widths would "eat up" the roadway, as described under "Safety," above. This results in a substandard LOS for this alternative.
- As discussed under "Safety" above, the numerous transition areas would not allow "sorting" of vehicles, which reduces the alternative's capacity and results in a substandard LOS D.
- The limited passing opportunities would reduce capacity and result in LOS D (as described under "Safety" above.

Because of the safety and capacity deficiencies outlined above, WYDOT and FHWA determined that the Teton County Alternative would not meet the project's Purpose and Need and was dismissed from further consideration.

For more information, please refer to **Appendix E**.

2.7 Preferred Alternative Identification

FHWA and WYDOT have identified the Combination Alternative as the Preferred Alternative because it meets the purpose and need for the project while minimizing environmental impacts relative to the 5-Lane Rural Alternative, as documented in Chapter 4.0 of this EIS.

Pathway Option 1 was identified as the preferred pathway option based on comments received from Teton County, citizens, and stakeholder groups, who voiced a preference for the pathway to be located adjacent to the highway throughout the Study Corridor. Option 1 would better serve the populations located along the highway and provide a more direct route than Pathway Option 2. As such, it is anticipated that Pathway Option 1 would experience a higher level of use and better serve the community than Pathway Option 2. Pathway Option 1 would also provide access to the South Park boat launch area and the environmental justice community along the Study Corridor. For these reasons, Pathway Option 1 best meets the Purpose and Need of the project.

Chapter 3.0: Affected Environment

This chapter describes the area that may be affected by the alternatives presented in Chapter 2.0 of this EIS. The description includes existing social, economic, and environmental conditions and provides a background for the discussion of environmental consequences in Chapter 4.0 of this EIS.

Area Geology

The geologic features and characteristics of the Yellowstone region in northwestern Wyoming are the result of active volcanic and mountain-building processes that have persisted for several million years. The United States Geologic Survey (USGS), in cooperation with other agencies, is studying past volcanic and seismic activity in Yellowstone and monitoring signs of continued activity. These signs include frequent small earthquakes, rapid uplift and subsidence of the ground surface, and persistent hydrothermal activity. One goal is to provide the scientific basis for timely warnings of any future volcanic and earthquake activities. These types of geologic events can trigger slide events in landslide prone areas of the Study Corridor.

The Study Corridor falls within the Intermountain Seismic Belt. According to the Montana Bureau of Mines and Geology, the belt extends through western Montana, from the state's northwest corner to Yellowstone National Park in southern Montana. The belt then runs southward through Yellowstone, along the Wyoming-Idaho border, through Utah and southern Nevada.

Northwestern Wyoming lies within an active seismic zone. Hundreds of magnitude 2.0 and greater earthquakes have been recorded in Teton County and surrounding areas over the last century. According to the USGS Earthquake Hazards Program, Yellowstone National Park experienced a strong shock on August 30, 1974. Intensity V (on the Modified Mercali scale) effects were reported at Norris, Old Faithful, and West Yellowstone. This increased seismic activity culminated on June 30, 1975, with a magnitude 6.4 (on the Richter scale) earthquake. The shock was felt over approximately 19,306 square miles of Wyoming, Montana, Idaho, and scattered places in Nevada, South Dakota, Utah, and Washington. Still another series of earthquakes originated in the northwestern corner of Yellowstone Park during December 1976.

According to the *Basic Seismological Characterization for Teton County* (December, 2002), numerous earthquakes have occurred near Hoback Junction within the past decade. In August 1991, a magnitude 3.0 earthquake was recorded approximately 4.5 miles northeast of the Junction, and in February 1993, the epicenter of a magnitude 3.0 earthquake was located approximately 5 miles northeast of Hoback Junction. During the spring of 1998 a series of earthquakes with magnitudes greater than 2.0 occurred approximately 3.5 miles southeast of Hoback Junction near Camp Davis. In the same time period, approximately 14 smaller earthquakes preceded a magnitude 4.7 earthquake that was felt by many Junction residents. More recently, the U.S. Bureau of Reclamation has detected numerous smaller 2.0- to 3.0-magnitude earthquakes in southern Teton County and areas north of Jackson.

There are several active fault systems in Teton County that could result in large earthquakes and high levels of horizontal ground acceleration at Hoback Junction. Horizontal ground acceleration is a force which is measured as a percentage of the force of gravity (G). The Teton fault system is a series of northeast/southwest trending faults located on the eastern edge of the Teton Range near Jackson. Researchers have suggested that the Teton fault may be overdue for a 7.5 magnitude earthquake, which could generate 20 percent peak accelerations (20%G) at Hoback Junction. A horizontal ground acceleration of 20%G is likely to result in a Modified Mercali Intensity scale of VII. Other fault systems in Teton County and in northern Lincoln County could produce moderate to high damage at or near the Junction.

According to the Uniform Building Code (UBC) prepared by the International Conference of Building Officials, Teton County is primarily in Seismic Zone 3. Seismic zones are in part defined by the probability of having a certain level of ground shaking (horizontal acceleration) in 50 years. Zone 3 has a probability of 20%G to less than 30%G horizontal acceleration. The UBC has recently been replaced by the International Building Code (IBC), which uses a 2,500-year probability map for the basis of building design. The probabilities are significantly higher for Hoback Junction and certain areas of Jackson, with maps that suggest probability for Intensity IX earthquakes. Intensity IX earthquakes can cause considerable damage in well-designed structures and can shift buildings off of their foundations.

Landslides

The Wyoming State Geological Survey (WSGS) and Teton County Emergency Management examined the potential for landslide hazards by each topographic quadrangle. Four quadrangles cover the Study Corridor and include (Jackson), Munger Mountain, Cache Creek, and Camp Davis. Active landslides surround Hoback Junction and extend north and west of the Snake River in the Munger Mountain and Camp Davis quadrangles. Within the Munger Mountain quadrangle, blockslide/rockslide/flow, rockslide/flow, blockslide/slump, and debris flow/alluvial fan are present near the Snake River in the east-central portion of the quadrangle. **Figure 1-13** identifies potential landslide areas. If these landslides activate and destabilize, damage could occur to U.S. Highway 26/89/189/191, secondary roads, and structures along the highways. Damage could occur by flooding if the landslides dam the river, by slide material impacting the structures, or by the movement of material within or adjacent to a structure.

3.1 Land Use and Zoning

This section describes current land use and zoning conditions in the Study Corridor. The Study Corridor's northern terminus is approximately three miles south of the Town of Jackson, the only incorporated municipality in Teton County. "Jackson Hole," as the town is commonly called, refers to a wider area encompassing a 50-mile-long valley that includes the towns of Jackson, Wilson, Kelly, Moose, Moran, Flagg Ranch, and Hoback Junction. The Study Corridor falls entirely within unincorporated Teton County and traverses lands managed by the Bridger-Teton National Forest (BTNF), Bureau of Land Management (BLM), the Wyoming Game and Fish Department (WGFD), the Wyoming Highway Commission, local land trusts, and private property.

3.1.1 Existing Land Use

Teton County's existing land development pattern can be described as residential development, spread somewhat uniformly over a large area with commercial services concentrated in the Town of Jackson and a few relatively small nodes of commercial development in the County.

Existing land use along the Study Corridor consists of residential, commercial, public, agricultural/ranching, and light industrial uses. There are also a number of isolated residential subdivisions, campgrounds, and a shooting range (Jackson Hole Gun Club). Residential subdivisions include the Melody Ranch, Rafter J Ranch, and Old West Cabins. The Jackson/Hoback Junction KOA Campground is located on the west side of the highway, one mile north of Hoback Junction. Jackson Hole Gun Club is located on approximately five acres of land north of Game Creek Road, on the east side of the highway.

Two gravel extraction sites are located along the Study Corridor. The Snake River Processing Site is located just south of the Snake River and west of the highway at approximately MP 146.0 The second site, the Melody Ranch Extraction Site, is located on the Melody Ranch property just north of Flat Creek and west of the highway at approximately MP 147.7

The majority of the land immediately adjacent to the roadway is privately owned. Within half a mile of the roadway, the majority of land is publicly owned and is managed by the BLM, WGFD, or the BTNF. These lands provide important habitat for elk, mule deer, bald eagles, and other wildlife species native to the area.

Existing land uses in and near the Study Corridor are shown in **Figure 3-1**. Land ownership is shown in **Figure 3-2**.

3.1.2 Existing Zoning

Zoning information for Teton County was obtained from Teton County Geographic Information System Parcel Mapping (2006). The primary zoning classifications adjacent to the Study Corridor include Rural and Single-Family Residential. Other zoning districts include Auto-Urban Commercial, Businesses Conservation, Business Park, Planned Unit Development (PUD), Mobile Home Park, and Suburban. Zoning districts adjacent to the Study Corridor are shown in **Figure 3-3**.

Teton County Zoning District Overlays that guide development along the Study Corridor include the Natural Resources Overlay (NRO) and the Scenic Resources Overlay (SRO). The NRO covers over 100,000 acres adjacent to the Study Corridor and Jackson Hole area. According to Teton County Land Development Regulations, the objective of the NRO District is to protect migration routes and crucial winter ranges of elk, mule deer, moose; the nesting areas and winter habitat of trumpeter swans and bald eagles; and the spawning areas of cutthroat trout. Development is to be kept outside of the NRO as much as possible to protect the areas that wildlife need to survive.

Figure 3-1
Existing Land Use

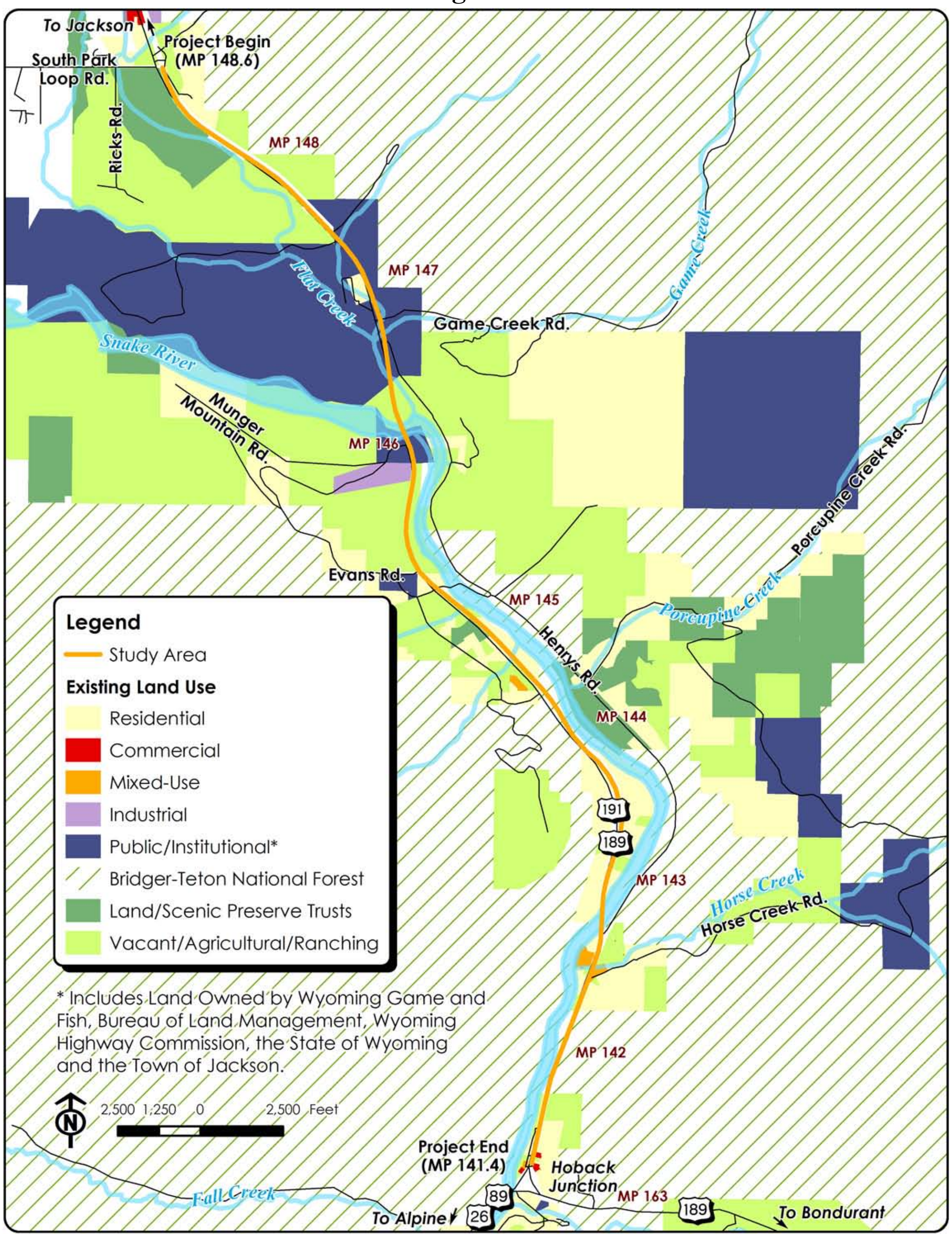


Figure 3-2
Land Ownership

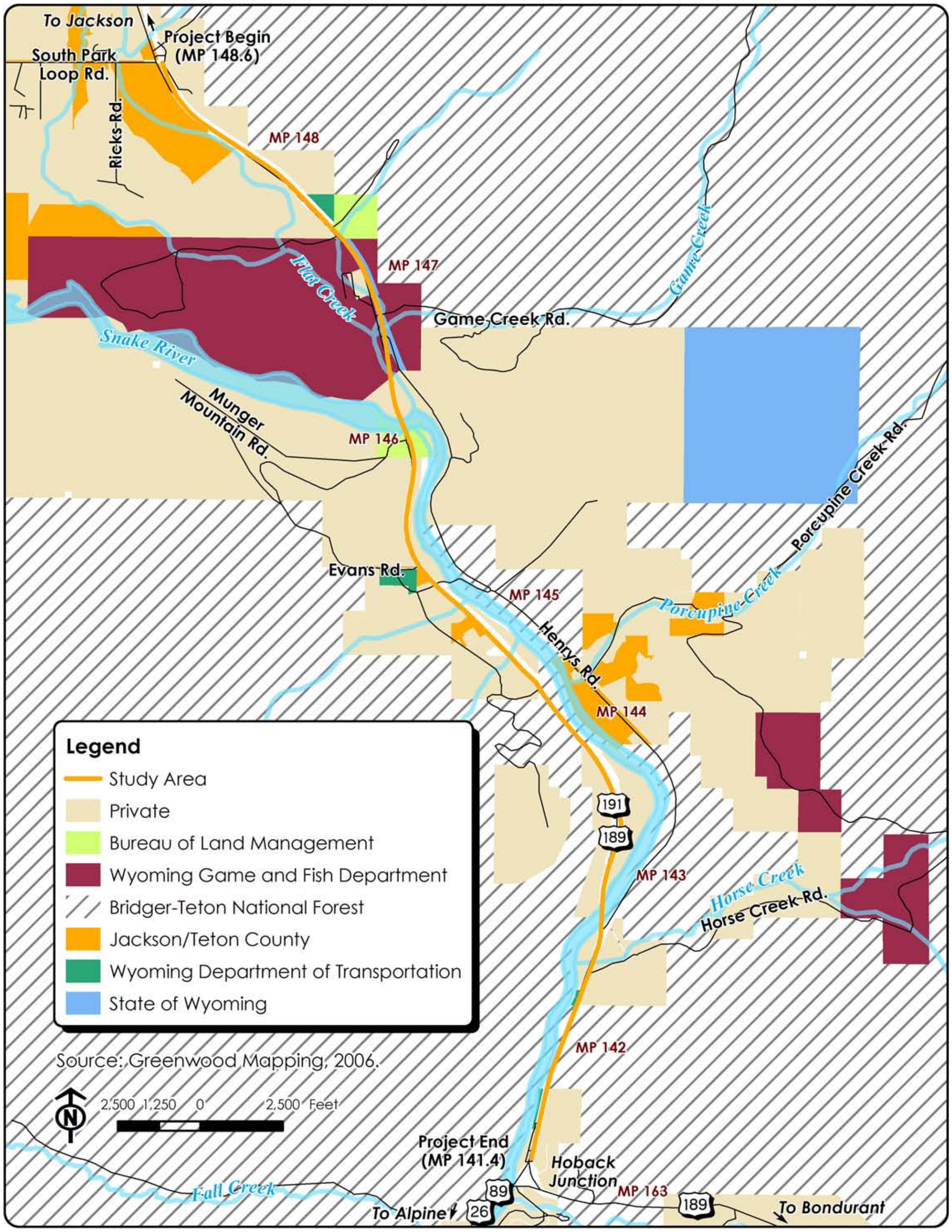
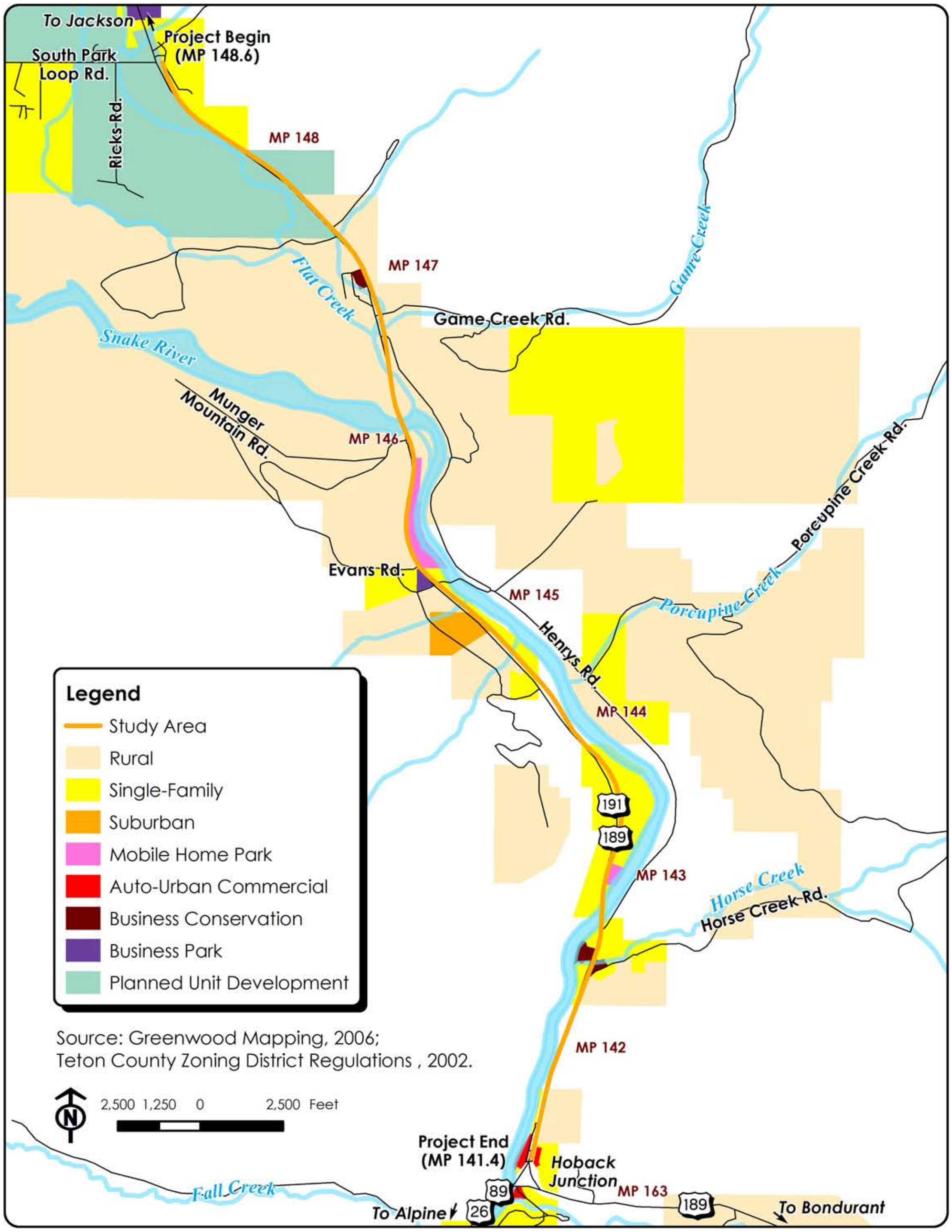


Figure 3-3
Zoning Districts



The purpose of the SRO is to preserve and maintain the county's most frequently viewed scenic resources that are important to both its character and the economy. Two areas adjacent to the Study Corridor are within the SRO. One 0.20-mile stretch covers the west side of the Study Corridor south of Munger Mountain Road. The second area includes the South Park Loop Scenic Area. The Scenic Area extends along the east and west sides of South Park Loop Road, from the north edge of South Park Ranch to High School Road, just outside the Study Corridor. The South Park Loop Road corridor is framed by cottonwood trees that are planted along irrigation ditches that line the road. The scenic quality of the area depends on the preservation of the cottonwood tree corridor, which helps to block views to development.

The boundaries of both the NRO and SRO districts are shown in **Figure 3-4**.

3.1.3 Land Trust and Preservation Areas

In addition to zoned overlay districts, land near the Study Corridor is protected from development through land trusts. The Jackson Hole Land Trust works to permanently protect open space and the scenic, ranching, and wildlife area values of Jackson Hole. Several properties near the highway corridor are owned or managed by the Jackson Hole Land Trust. These properties include:

- Titcomb (24 acres). Protected under easement. Located approximately 1.5 miles west of the highway corridor off Munger Mountain Road.
- Porcupine Creek (302 acres). Consists of five separate properties with 11 structures on site. Located 1.5 to 2.0 miles east of the highway corridor off of Henry's Road.
- Don's Draw/Melbourne Partners (79 acres). Located southwest of Munger Mountain Road.

The Teton County Scenic Preserve Trust has approximately 260 acres of property near or adjacent to the Study Corridor. The majority of the properties are part of the Melody Ranch or Porcupine Creek area. Lands owned by the Scenic Preserve Trust, or on which the Trust owns a scenic easement, may be used for agriculture, grazing, outdoor recreation, and other open space uses, provided that at least 90 percent of the area of the parcel remains undisturbed by clearing, grading, compacting, or construction of buildings, roads, parking areas, or other improvements. Land may be cleared for use in cultivating crops or grazing livestock. Jackson Hole Land Trust and the Teton County Scenic Preserve Trust properties near the Study Corridor are shown in **Figure 3-5**.

Figure 3-4
Zoning Overlays

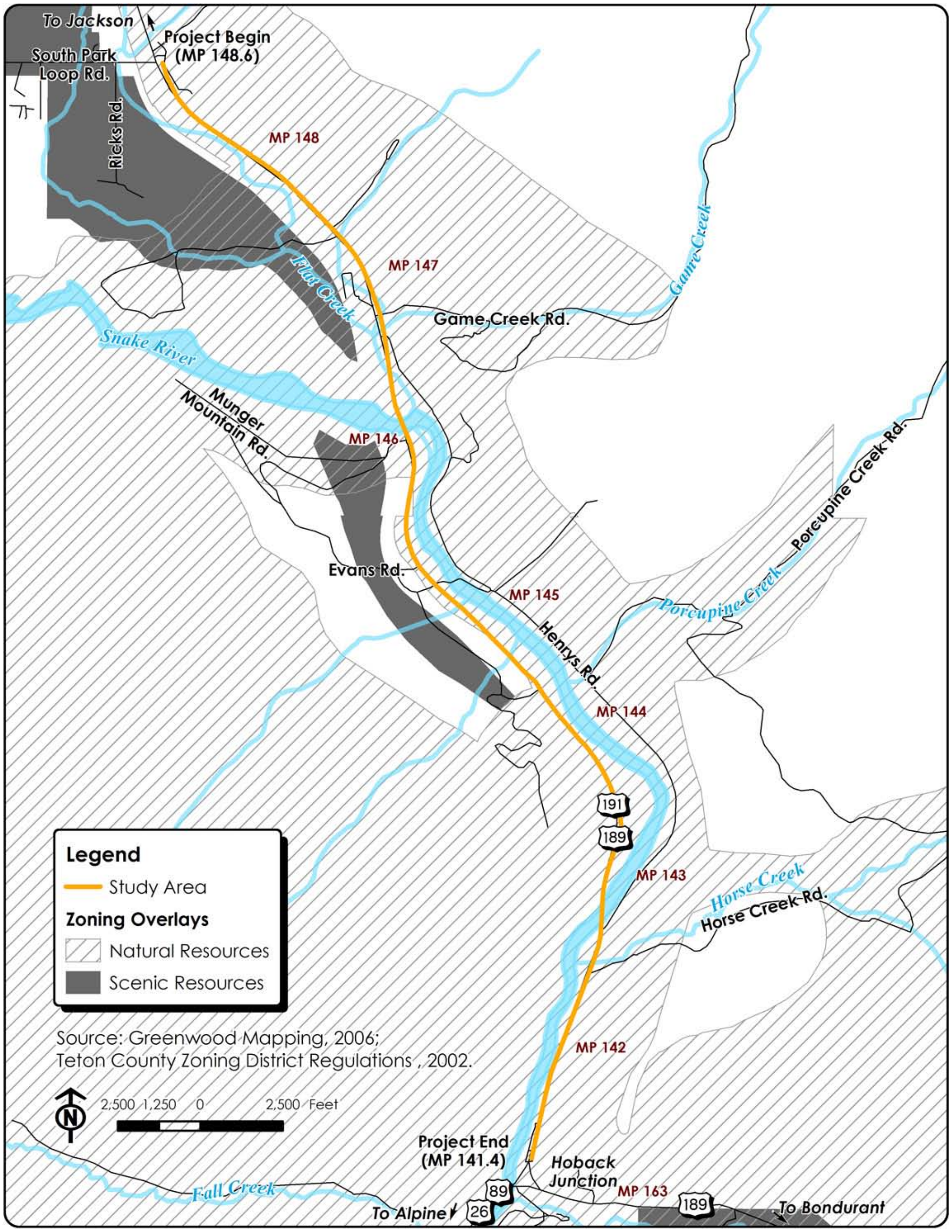
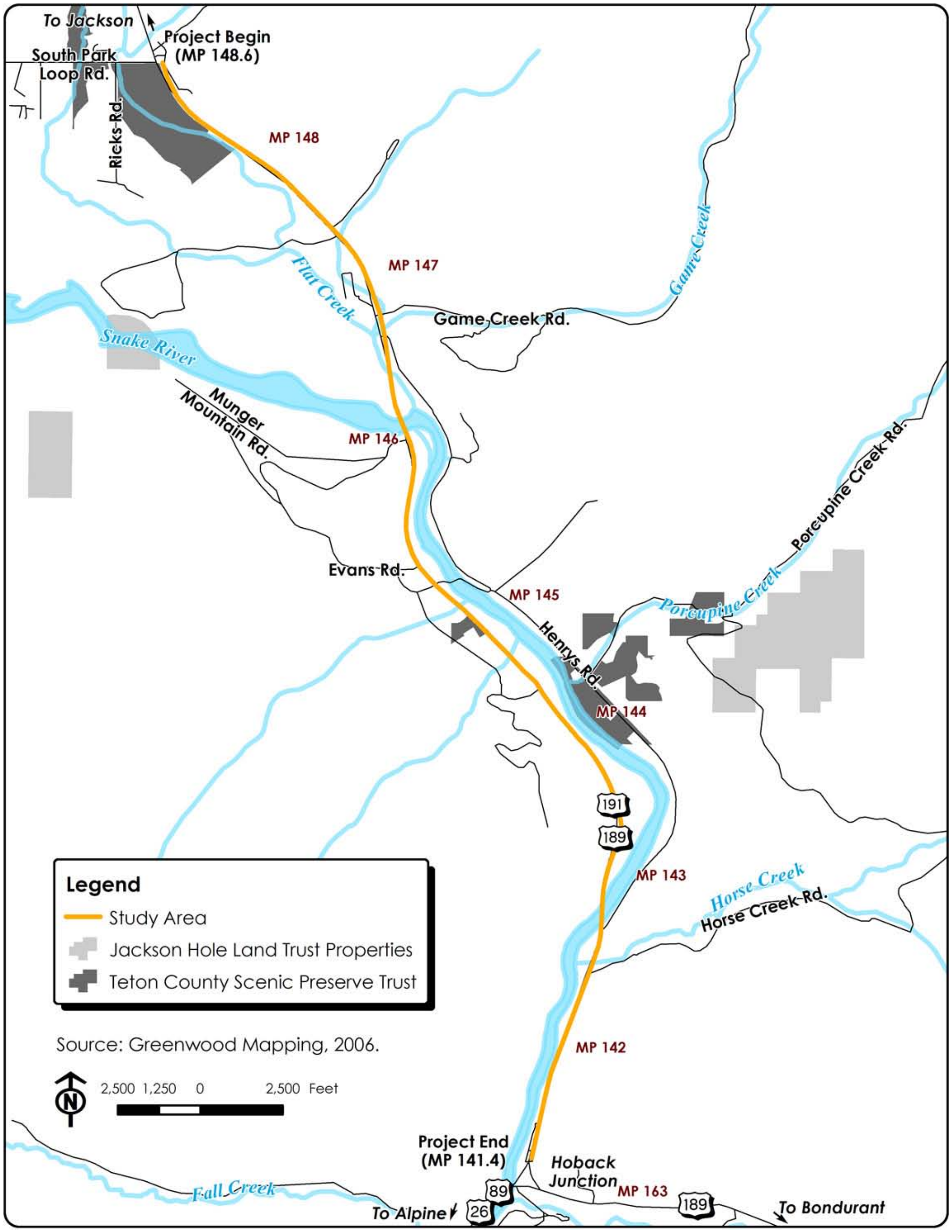


Figure 3-5
Land Trust and Preservation Areas



3.1.4 Future Land Use

According to the *Jackson/Teton County Comprehensive Plan,* 2002, Teton County's existing land development pattern will likely continue, with greater amounts of residential development occurring in the county than in the town over the next 20 years.

According to the plan, if residential development continues at the same rate and geographical preferences as the last 20 years, Teton County will contain approximately 12,489 homes in 2020, 40 percent of which would be located in the Town of Jackson and 60 percent located in the unincorporated areas of the county. This estimate represents approximately 54 percent of the total residential development potential in the unincorporated county according to current zoning. In the Town of Jackson, the remaining residential development potential under current zoning and land development regulations is anticipated to be built out by 2020. Commercial development is highly concentrated in the Town of Jackson. Projections of commercial development in 2020 represent about 87 percent of the total commercial development potential, according to current zoning.

As of this writing, Teton County is in the process of updating its 2002 comprehensive plan. According to plan updates accessed from Teton County's website (www.jacksontetonplan.com), the modified plan discusses policies to promote stewardship and manage growth responsibly and includes guidance for meeting the community's housing needs; providing for a diverse and balanced economy; developing multimodal transportation strategies; and providing quality community services, facilities, and infrastructure (refer to Section 3.1.5 for more information).

Development within Teton County is restricted to the southern Jackson Hole area by Grand Teton National Park to the north, Caribou Targhee National Forest to the west, and the BTNF to the east. According to the Teton County Housing Authority, *Housing Needs Assessment* (2001), conservation easements preclude future development on approximately 13,000 acres of ranchland in the county.

One of the more recent developments in the Study Corridor is the Melody Ranch Planned Unit Development, a mixed-use subdivision of approximately 625 acres just north of Flat Creek and west of U.S. Highway 26/89/189/191. Melody Ranch was approved in the fall of 1995. When completed, the development will contain single-family, multifamily, and deed-restricted affordable housing. Because of the large size of the project, development is occurring in phases. Full build-out of the development is anticipated to occur by 2011.

3.1.5 Land Use Planning

The following documents were referenced regarding land use planning along the Study Corridor:

- *Jackson/Teton County Comprehensive Plan*, October 2002 (and current updates obtained from the Jackson/Teton County website in February 2010.

- *Teton County Strategies for Addressing Future Growth*, October 2000
- *Teton County Land Development Regulations*, August 2002
- *Bridger-Teton Land and Resource Management Plan and Final Environmental Impact Statement (FEIS)*, 1990
- *Snake River Resource Management Plan and Final EIS*, September 2003

The most relevant portions of these plans are discussed below.

Jackson/Teton County Comprehensive Plan, October 2002 (currently being updated)

The *Jackson/Teton County Comprehensive Plan* identifies guiding principles, goals and objectives for the future of the county. Two of the plan's guiding principles that have direct applications within the Study Corridor are the following:

- Teton County's wildlife and scenic resources are a local and national treasure, and, therefore, the community recognizes a stewardship responsibility for their protection. Future development in Teton County will take place in this context.
- The intent of the comprehensive plan is to create conditions for a sustainable visitor-based economy not dependent upon growth, and an economy that reflects the unique, small-town, Western commercial character of Jackson, and the outdoor recreational opportunities of Teton County as key components of the visitor experience.

Goals contained in Chapter 8, Transportation, of the plan also have direct applications within the Study Corridor. These goals are:

- Goal No. 1: To plan for future mobility that meets the needs of residents and tourists within the context of community character.
- Goal No. 3: To improve the safety and efficiency of the transportation system in Jackson and Teton County.

As stated in Chapter 3, *Community Character of the Jackson/Teton County Comprehensive Plan*, "The preservation and enhancement of community character is perhaps the most fundamental and pervasive growth and development issue facing Teton County." The plan defines community character as recognizing the value of areas that have little or no built environment, such as scenic vistas, or critical habitat that supports wildlife. It must also recognize the social and economic diversity of the local population and the types of social interaction that take place in active small town community life as equally important components of character.

The *Jackson/Teton County Comprehensive Plan* is being updated and has been undergoing public review. The plan builds upon the strategies contained in the 2002 plan, but it addresses the need for land use predictability, accountability, and measurability that were lacking in the previous plan. The plan has been reorganized into seven general themes to achieve the plan's vision to "preserve and protect the area's ecosystem and natural resources and meet the community's human needs in a sustainable and predictable manner." The following themes are applicable within the Study Corridor:

- Theme 1: Promote Stewardship of Wildlife and Natural Resources – Includes strategies to preserve the quality of natural resources, and maintain the scenic resources of the area.
- Theme 2: Manage Growth Responsibly – Includes strategies for development patterns that provide for community needs while minimizing impacts to the local and regional ecosystem. This theme includes the policy to establish a rate of growth/redevelopment mechanism to regulate the annual rate of growth/redevelopment in Jackson and Teton County – if monitoring indicates that growth rate management is needed.
- Theme 6: Develop a Multi-Modal Transportation Strategy – Includes strategies to provide community mobility through alternate transportation modes, such as transit, walking, carpooling, and bicycling.

It should be noted that the transportation goals contained in Chapter 8 of the 2002 plan remain valid, as that chapter is included as an appendix to the updated plan.

The Future Land Use Plan update represents the biggest change from the 2002 plan. The primary critique of the 2002 plan was its inability to predict land use in particular areas. The updated plan provides general guidance regarding appropriate locations for open space, housing, office, retail, industry, and lodging. The plan created 12 districts in the county and 13 districts in Jackson to provide prioritization and predictability to land owners, developers, planners and elected officials regarding site specific land uses.

Teton County Strategies for Addressing Future Growth, October 2000

Teton County and the Town of Jackson retained an Urban Land Institute (ULI) Panel to conduct a land use study to define the problems and identify recommendations for handling future growth. The panel developed recommendations to continue preservation while maintaining flexibility in zoning and housing options. Specific recommendations included concentrating development in Teton Village, Teton Pines, Wilson, Porter Ranch, and the Rafter J/Melody Ranch/Seherr-Thoss area. Affordable housing and transportation recommendations made by the panel are discussed further in Section 3.3.

Teton County Land Development Regulations, October 2002

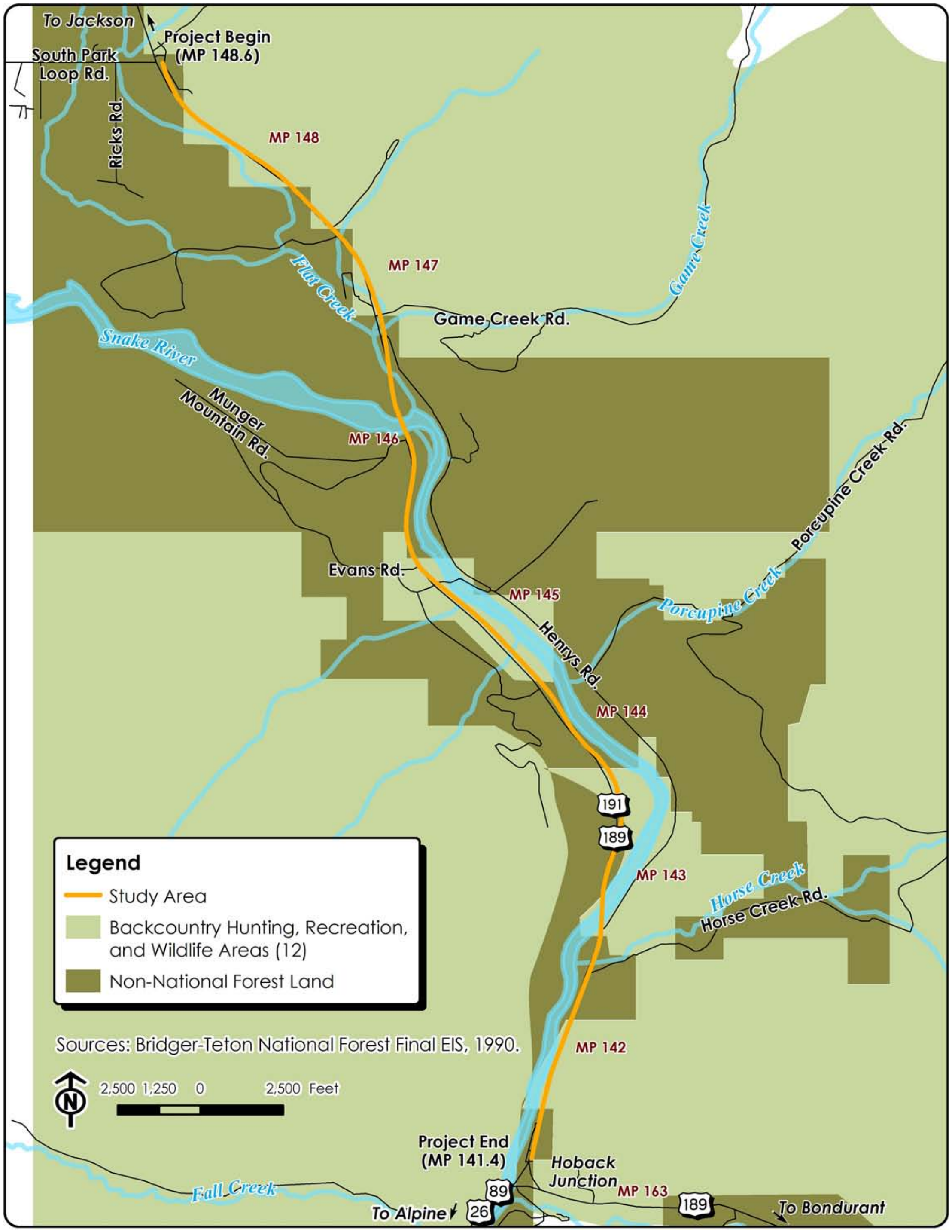
Teton County Land Development Regulations guide the use and intensity of development within the Study Corridor. Development within the Natural Resources Overlay District (NRO) is to be designed to protect the areas that wildlife needs to survive; therefore, development is to be kept outside of the NRO as much as possible. Within the Scenic Resources Overlay District (SRO), design and landscaping of development are regulated so that development preserves, maintains, and/or complements the county's important scenic resources.

***Bridger-Teton National Forest Land and Resource Management Plan*, March 1990 (currently under revision)**

The FEIS prepared for the *Bridger-Teton National Forest Land and Resource Management Plan* includes guidelines for management of forest lands and suggests where various management activities may occur. The FEIS evaluated six alternatives and selected one as the Preferred Alternative. The Preferred Alternative is Alternative F, which emphasizes a balance of land uses that protect sensitive areas while promoting recreation and developed uses. Desired Future Conditions (DFC) established for the National Forest are accompanied by a "management prescription" that, if applied, will bring the DFC into existence. The management prescription areas near the Study Corridor are shown in **Figure 3-6** and defined below.

- Backcountry big game hunting, dispersed recreation, and wildlife security areas (12). An area managed for high-quality wildlife habitat and escape cover, big game hunting opportunities, and dispersed recreation activities. This area covers a majority of lands adjacent to the Study Corridor, with the exception of lands owned by Teton County or other groups.
- Simultaneous development of resources, opportunities for human experiences, and support for big game and a wide variety of wildlife species (10). An area managed to allow for some resource development and roads while having no adverse and some beneficial effects on wildlife. This area is located south of Jackson to the north of the Study Corridor. This area is not shown on **Figure 3-6**.
- River recreation (3). An area managed to give river-recreation and scenic-recreation experiences. The emphasis is to protect river segments that have been determined eligible for potential addition to the national Wild and Scenic River system. This area includes a narrow corridor of land (approximately 0.25 mile on both sides of the river from the river's centerline) along the Snake River (this area is not shown on **Figure 3-6)**. The resource prescriptions, standards, and guidelines that are most pertinent to the Study Corridor include the following:
  - **Wild and Scenic Rivers Prescription**: River segments that have been found to be eligible for inclusion in the Wild and Scenic River system are managed to protect or enhance their wild, scenic, and recreational values.
  - **Facilities Guideline**: Where roads and developed recreation exist, facilities should be provided to enhance existing opportunities. These may include launch ramps, interpretive facilities, camp sites and picnic areas, toilets, and parking areas.
  - **Development Location Guideline**: Developments should be confined to launch and fishing access points to allow a natural appearing setting for recreationists on the river.
  - **Visual Quality Prescription**: The Visual Quality Objectives for this area are Retention and Partial Retention. Partial Retention is generally applied to recreation developments that are visually evident but subordinate to the natural landscape.

Figure 3-6
Bridger-Teton National Forest Management Prescription Areas



The Bridger-Teton National Forest Land and Resource Management Plan and FEIS also include guidelines for inventoried roadless areas. Roadless areas are addressed in Section 3.17.

***Snake River Resource Management Plan*, September 2003**

The FEIS prepared for the *Snake River Resource Management Plan* (RMP) provides management direction for approximately 981 acres of public land surface and 15,123 acres of federal mineral estate administered by the BLM in the Jackson Hole area of Teton County. The Preferred Alternative identified by the FEIS provides for the disposal of some parcels from BLM administration, while ensuring that the lands remain in public ownership and available for recreation, public access, open space, and wildlife habitat.

Within the Study Corridor, two parcels of land are under the jurisdiction of the BLM. One parcel consists of approximately 40 acres located next to the WYDOT South Yard, north of Game Creek, and contains a trash transfer station. Access to this parcel is controlled by Teton County. Under the management plan's preferred alternative, this parcel will continue to be administered by the BLM.

The other parcel consists of approximately 23 acres along the Snake River at the South Park bridge. This area has occasionally been used for landing and launching boats, but has not been developed for this purpose. According to the management plan, there is currently a proposal to develop a boat launch area on public lands near the Snake River bridge at MP 146.09. A *Recreation Project Plan, South Park River Access* was completed in September 2004, which presented a conceptual design for the site and documented the associated screening and public involvement process. Since the development of that plan, the BLM has designated the parcel to be managed by a "Snake River Task Force," and owned in the future by Teton County. The Snake River Task Force is made up of the Snake River Fund, BTNF, Teton County, Wyoming Game and Fish Department, and Jackson Hole Land Trust. Working from the conceptual site design presented in the *Recreation Project Plan, South Park River Access* report, the Snake River Task Force will make the final determination for the future site development and management of the parcel.

3.2 Farmland

The Farmland Protection Policy Act of 1981 protects Prime and Unique Farmland as identified by the US Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS). The purpose of this act is to minimize the extent to which federal programs contribute to the unnecessary and irreversible conversion of farmland to nonagricultural uses. It also assures that federal programs are administered in a manner that, to the extent practicable, will be compatible with government and private programs and policies to protect farmland.

The USDA defines Prime Farmland as having the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. Unique Farmland is described as land other than Prime Farmland that is used for the production of specific high-value food and fiber crops. Farmland of Statewide and Local Importance is defined as land that is being used for, or has the potential for, the production of food, feed, fiber, forage, and oilseed crops, but has not been identified as being Prime or Unique.

The NRCS Pinedale Field Office was contacted to determine the types of soils that are considered to be Prime and Unique or of Statewide or Local Importance in the Study Corridor. According to the NRCS resource soil scientist, there are no Prime, Unique, or Farmland areas of Statewide Importance in the Study Corridor (see letter dated September 4, 2001, in **Appendix A**).

The Teton County Planning Department was contacted to obtain further information regarding Farmland of Local Importance in the Study Corridor. The Teton County Land Development Regulations do not contain any provisions that designate specific locations within the county as being of local importance. Consequently, there are no zones or areas that are restricted from development specifically to protect agricultural operations (see letter dated October 29, 2001, in **Appendix A**).

3.3 Social Conditions

This section describes population, housing, and other social characteristics of Teton County and surrounding localities. Demographic data of the Study Corridor focus on Teton County but extend to include travel characteristics of Sublette and Lincoln Counties to the south and Jackson to the north. The primary sources of information include statistics from the U.S. Census Bureau's *Census 2000*, the *Teton County Comprehensive Plan*, the *Jackson/Teton County Transit Development Plan*, and the Wyoming Department of Administration and Information.

3.3.1 General Population Characteristics

According to the U.S. Census Bureau, the population in Teton County was 18,251 persons in 2000. The populations of Sublette and Lincoln Counties were 5,920 and 14,573, respectively. From 1990 to 2000, Teton County grew approximately 63 percent and Jackson grew approximately 93 percent. These trends are expected to continue in the future.

Table 3-1 shows historical and forecasted population growth in Teton, Sublette, and Lincoln Counties. Alpine, Wyoming's fastest growing town, experienced rapid growth between 1990 and 2000. This growth, while slowing a bit, is expected to continue through 2020. It is important to note that Bondurant is an unincorporated census defined place in Sublette County (southeast of the Study Corridor). Therefore population data specific to Bondurant is not available. According to the Wyoming Department of Administration and Information, Economic Analysis Division, Sublette County is expected to reach a population of 9,634 persons in 2020, of which 4,088 are located in incorporated towns. The remaining 5,546 persons will be located in unincorporated towns. Therefore, it is reasonable to assume that Bondurant (with an approximate population of 155 persons in 2000) will experience considerable growth by 2020.

Table 3-1
Historical and Forecasted Population Growth in Teton, Sublette, and Lincoln Counties 1990-2020

Location	1990	2000	% Change 1990-2000	2020	% Change 2000-2020
Teton County	11,173	18,251	63	20,966	15
Jackson	4,708	8,647	84	9,900	14
Sublette County	4,843	5,920	22	7,741	31
Pinedale	1,181	1,414	20	1,829	29
Lincoln County	12,625	14,573	15	16,991	17
Alpine	200	550	175	779	42

Sources: Wyoming Department of Administration and Information, Economic Analysis Division, Wyoming Population Estimates and Forecasts, 1990-2020.

Because the census data generally do not represent seasonal residents who have second homes in the area (who may not be in residence during the April census survey period), the number of persons residing in Teton County is considerably higher during peak times of the year. However, the residences in the Study Corridor are generally not second homes.

3.3.2 Housing

According to the *Jackson/Teton County Comprehensive Plan*, from 1970 to 1990 Teton County created more jobs than homes, leaving the housing supply far below the demand. Additionally, most of the new homes are occupied as second or vacation homes. Because second homeowners generally pay more than residents when purchasing property (*Jackson/Teton Comprehensive Plan*, Chapter 5), housing costs have become unaffordable to most Teton County residents. Furthermore, lots and homes that began as affordable housing for Teton County residents, such as the Rafter J area along the U.S. Highway 26/89/189/191 corridor, have seen an escalation in sale and rental prices above affordable levels. If these trends continue, Teton County risks losing its socioeconomic diversity and flexibility in housing options.

Census 2000 data documented a total of 10,267 housing units in Teton County. Of those, 7,688 (75 percent) were occupied units and 2,121 (21 percent) were vacant for seasonal, recreational, or occasional use. The *Teton County Affordable Housing Support Study* written in May 2002 identified the existing and future affordable housing needs of Teton County. According to the report, housing affordability is evaluated by comparing the price of housing to prevailing wage and salary incomes. A national benchmark for evaluating affordability is whether median family incomes in a community are at the level where the family could afford a median priced home. In Teton County, housing is considered affordable when employees and their families make between 80 and 120 percent of the median family income. Analysis shows that based on the goal of providing affordable housing for 70 percent of the work force, affordable housing needs of Teton County in 2000 were an additional 495 units. By 2015 the needs would increase to an additional 804 affordable units.

A study entitled *Teton County, Wyoming, Strategies for Addressing Future Growth* (Urban Land Institute Advisory Services Panel in October 2000) identified issues concerning growth and the future of Teton County. According to this document, the difficulty in providing affordable housing is evident in employee recruitment problems, overcrowding in current housing, the inability of grown children of long-time residents to buy into the community, and the out-migration of families to surrounding towns and counties. The out-migration of residents to Idaho or Lincoln and Sublette Counties, Wyoming, places a burden on area roadways and increases commuter traffic through the Study Corridor.

3.3.3 Community Facilities

The Study Corridor is within the Teton County School District, which has six elementary schools, one middle school, and two high schools. There is one library, one post office, and numerous churches and other places of worship in Teton County. St. John's Hospital, located in eastern Jackson, provides nursing home and outpatient care. The region's major senior center is Pioneer Homestead Senior Services in eastern Jackson.

The Jackson Police Department and the Teton County Sheriff's Department provide protection services in and around the Study Corridor. The Jackson/Teton County Fire Department has volunteer and paid fire fighters and EMS specialists housed at six stations across the county. Two of the stations service the Study Corridor. The Adam's Canyon station is located off U.S. Highway 89/191 on Adam's County Road north of South Park Loop Road. It provides training and a service testing ground for the department. The Hoback station is currently located west of U.S. Highway 89 at Hoback Junction. The Hoback fire station service boundaries include Sublette and Lincoln County lines to the south and west and South Park Loop Road, located approximately eight miles north of Hoback Junction.

The rural nature of the Study Corridor community allows for mobile home parks and neighborhoods to be spread thinly along the alignment. Such distance between neighbors lends to a lack of cohesion in the Study Corridor.

3.4 Environmental Justice

On February 11, 1994, President Clinton issued Executive Order 12898 (EO 12898), *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, that reinforces Title VI of the Civil Rights Act of 1964. The order requires federal agencies to incorporate consideration of environmental justice into the National Environmental Policy Act (NEPA) evaluation process. The purpose of this order is to ensure that minority and low-income populations and minority-owned businesses do not receive disproportionately high and adverse human health or environmental impacts as a result of federal actions as compared to the surrounding non-minority and non-low-income community. Subsequent Department of Transportation (DOT) and FHWA Orders (DOT Order 5610.2 and FHWA Order 6640.23) have provided guidance on how to incorporate EO 12898 into the NEPA process. As an entity utilizing federal funds, WYDOT is responsible for successfully integrating environmental justice into its program and planning activities. This environmental justice analysis has been prepared in accordance with the guidance provided in these regulations.

Minority and low-income populations within 0.5 mile from either side of the Study Corridor were included in this analysis.

3.4.1 Minority Populations

The discussion of minority populations is based on *Census 2000* data at the block level. Census blocks represent the smallest geographic area that displays racial data. Minority populations are comprised of racial and/or ethnic minorities. Mutually exclusive racial classifications used by the U.S. Census Bureau include White, Black or African American, American Indian and Alaska Native, Asian, Native Hawaiian and Other Pacific Islander, some other race, and two or more races. Hispanic is accounted for under ethnicity and is not listed as a racial category. Therefore, to identify minority populations, the total population of the census block is subtracted from the total White, non-Hispanic population of the census block. This value is then compared to the minority population within Teton County.

According to *Census 2000*, 9 percent of Teton County residents categorize themselves as minorities. There are a total of 36 blocks within 0.5 mile of the Study Corridor. Together, these blocks contain 1,875 persons and 83 minority persons. Census blocks with a higher percentage of minorities than the rest of Teton County were evaluated for disproportionately high and adverse impacts.

Census analysis identified two blocks along the Study Corridor with minority populations above the county average of 9 percent. Two blocks are part of the Evans Mobile Home Park, located east of U.S. 26/89/189/191 from Evans Road north to Munger Mountain Road. There are approximately 70 mobile homes in the park. A large number of the mobile homes are approximately 100 feet from the highway. One block has a population of 65 persons, 18 of which (28 percent) are minority; the other block that is part of the Evans Mobile Home Park has a population of 44 persons, 8 of which (18 percent) are minority. The Evans Mobile Home Park contains three additional blocks. All three of these blocks do not contain minority populations above the county average.

The Jackson Chamber of Commerce was contacted regarding minority-owned businesses along the Study Corridor. The Chamber provided a reference for a local business contact who indicated that there are no minority-owned businesses along the Study Corridor.

Census blocks with a higher percentage of minorities than the rest of Teton County are described in **Table 3-2** and shown by location in **Figure 3-7**.

Table 3-2
Census Blocks with a Higher Percentage of Minorities than Teton County

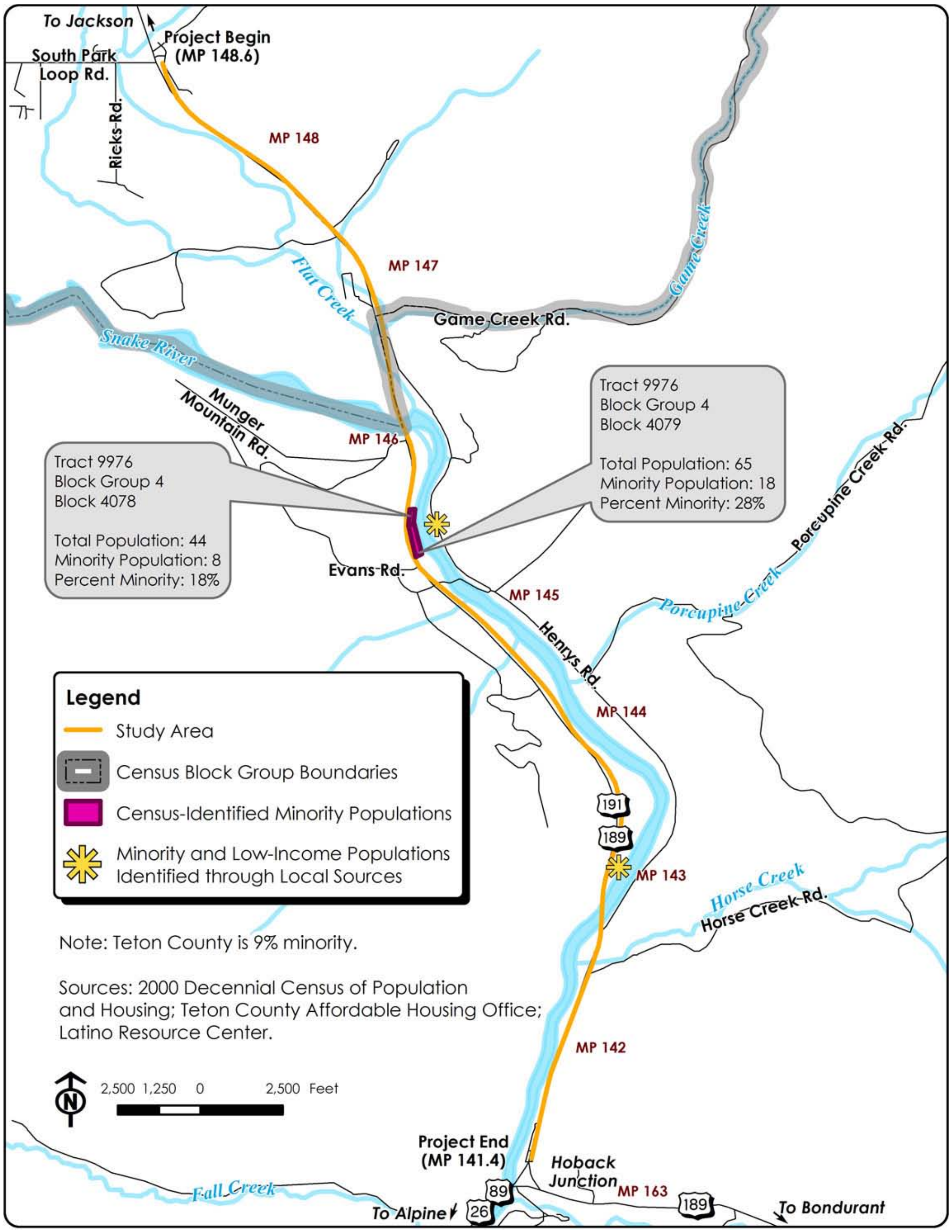
Census ID	Total Population	Total Minority Population	Percent Minority	Teton County Average	Percent Above County Average
Tract 9976, Block Group 4, Block 4078	44	8	18%	9%	9%
Tract 9976, Block Group 4, Block 4079	65	18	28%	9%	19%
Source: 2000 Decennial Census of Population and Housing					

3.4.2 Low-Income Populations

For purposes of privacy, the census block group (larger than a census block) is the most detailed level of data that displays income information. Two block groups intersect the Study Corridor. The geographic boundaries of these block groups extend well outside of the Study Corridor (between 5 and 25 miles). Together these block groups contain nearly 2,000 households, most of which are not within 0.5 mile of the Study Corridor. To identify concentrations of low-income populations, the following data sources were used: *Census 2000*, Teton County data, and 2006 poverty thresholds established by the U.S. Department of Health and Human Services (HHS).

FHWA's EO 6640.23 *FHWA Actions to Address Environmental Justice in Minority and Low-Income Populations* defines Low-Income as a household income at or below the Department of Health and Human Services poverty guidelines. The 2006 national poverty level, according to the Department of Health and Human Services, was reported to be $20,000 for a family of four. Because census income statistics are divided into increments of $5,000, the income threshold of $24,999 is used in this analysis; therefore, any household with an income less than $25,000 is considered low-income. Within Teton County, 17 percent of the population is considered low-income. According to the census data, in neither of the two block groups that intersect the Study Corridor do more than 17 percent of households earn less than $25,000. Therefore, census data does not indicate concentrations of low-income households within 0.5 mile of the Study Corridor.

Figure 3-7
Minority and Low-Income Populations



3.4.3 Additional Data Sources

Because data collected from the U.S. Census Bureau is geographically broad, additional research was conducted to identify minority and low-income residences that may be affected by the proposed action. This research included field investigation, interviewing local property owners, and contacting the following local agencies: Teton County Affordable Housing Office, Teton County School District #1, and the Latino Resource Center. The Teton County Affordable Housing Office identified the Snake River KOA Campground, Evans Mobile Home Park, and Snake River Mobile Home Park as potential low-income areas. A representative from the Affordable Housing Office also noted that both mobile home parks are likely to house a number of permanent minority residents.

In 2004, the Teton County School District #1 had a total student enrollment of 2,328 students. Of the total students, approximately 8 percent are minorities and 7 percent are eligible to receive free/reduced price lunches. The school nearest to the Study Corridor, Jackson Hole Middle School, located on South Park Road, had an enrollment of 533 students. Of the total students, 10 percent are minorities and 11 percent are eligible to receive free/reduced price lunches. The Jackson Hole Middle School is a central school, so the enrollment comes from all parts of the district and not just the South Park Loop area. According to the Teton County School District, the majority of the county's Hispanic population lives within Jackson city limits.

The Latino Resource Center confirmed census data and indicated that several Latino families reside in the Evans Mobile Home Park. A representative from the center also indicated that they were unaware of any minority populations in the KOA Campground or Snake River Mobile Home Park.

According to the property owner of the Snake River Mobile Home Park (located on approximately five acres north of Horse Creek Road and east of U.S. 26/89/189/ 191), there are 26 mobile homes on the property. The owner of the Snake River Trailer Park noted that there may be a few minority families residing in the park.

Based on these data sources, the Snake River Mobile Home Park was evaluated for disproportionately high and adverse impacts to minority and low-income populations. In addition, the Evans Mobile Home Park was evaluated for disproportionately high and adverse impacts to low-income populations.

Minority and low-income populations identified through census data or other local sources that were evaluated for disproportionately high and adverse impacts are shown in **Figure 3-7**.

3.4.4 Specialized Outreach

Specialized outreach to low-income and minority populations was conducted as part of the public involvement process (during the Hoback Junction EIS process) to gather comments and concerns regarding the proposed action. In addition to traditional communications (press releases, project mailings, newsletters, and open houses), special outreach efforts were made to ensure an increased level of project awareness and participation in the process. Specialized outreach activities included the following:

- Hand delivery of newsletters to the Evans and Snake River Mobile Home Parks.
- Spanish language translation and interpretation upon request for all project mailings and public meetings.
- Targeted newsletter distribution to organizations serving low-income and minority populations.
- Public meetings at locations convenient to Study Corridor residents (the Fire Hall at Hoback Junction and WYDOT Offices on Evans Road).

These and additional public involvement efforts are detailed in Chapter 6.0, Comments and Coordination, of this EIS.

3.5 Right-of-Way

Right-of-way owned by WYDOT varies, but is approximately 100 feet from the centerline along the highway.

Utilities

Overhead powerlines are located along the Study Corridor. In addition, Lower Valley Energy has constructed a buried 6.625-inch steel natural gas pipeline that brings gas service to the Jackson area from a location near Merna, Wyoming (for more information, refer to the *Final Environmental Impact Statement, Lower Valley Energy Natural Gas Pipeline Project*, January 2008). Within the Study Corridor, the pipeline is located along the highway for approximately two miles, beginning at the existing Lower Valley Energy facility located at 4000 South Highway 89 (north of South Park Loop Road), and running south to approximately Game Creek Road, the location of a valve assembly facility. From there, the pipeline veers away from the highway to the east and continues south to US 189/191, following the highway alignment to the southeast. In the Study Corridor, the pipeline crosses the highway at two locations – MP 148.72 (South Park Loop Road) and MP 146.73 (Game Creek).

3.6 Economic

3.6.1 Employment

The Study Corridor highway is designated as a principal arterial, a designation that is important to the safe and efficient transport of goods and people through western Wyoming. Consequently, highway conditions play a vital role in the overall economic vitality of the region. This section describes economic trends in Teton County and surrounding areas. Data sources include the U.S. Census Bureau, U.S. Department of Labor—Bureau of Labor Statistics, U.S. Department of Commerce—Bureau Economic Analysis, Wyoming Department of Labor and Employment, Wyoming Department of Administration and Statistics, Teton County, and the Town of Jackson.

3.6.2 Employment, Income, and Industry

Wyoming State and Teton, Lincoln, and Sublette County employment and income statistics for the period 1990-2004 are shown in **Table 3-3**.

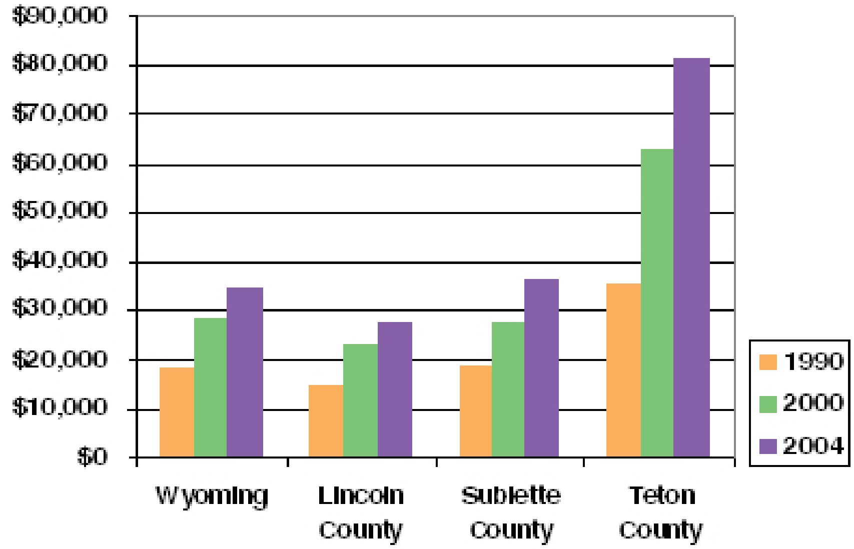
Table 3-3
Employment and Income Statistics, 1990-2004

Location	Labor Force	Unemployment Rate	Per Capita Income
Wyoming			
1990	236,043	5.3	$18,002
2000	266,862	3.8	$28,460
2004	281,847	3.9	$34,279
Percent Change	19%	-.26%	90%
Lincoln County			
1990	5,778	6.3	$14,454
2000	7,357	3.9	$23,057
2004	8,213	3.9	$27,384
Percent Change	42%	-38%	89%
Sublette County			
1990	2,665	2.7	$18,644
2000	3,558	2.9	$27,678
2004	4,603	2.3	$36,348
Percent Change	73%	-15%	95%
Teton County			
1990	8,221	2.0	$35,318
2000	14,182	2.4	$62,831
2004	13,972	3.3	$81,231
Percent Change	70%	65%	130%

Sources: Bureau of Labor Statistics—Local Area Unemployment (LAUS) Statistics, 1990-2004; Bureau of Economic Analysis—Local Area Annual Estimates, 2000-2004.

According to the U.S. Department of Labor–Bureau of Labor Statistics, the Teton County labor force (which includes population 16 years old and over) grew from 8,221 workers in 1990 to 14,182 workers in 2004. This represents an increase of approximately 70 percent over the 10-year period. The growth in the labor force between 1990 and 2004 is shown for each county in **Figure 3-8**.

Figure 3-8
Per Capita Income (1990 to 2004)

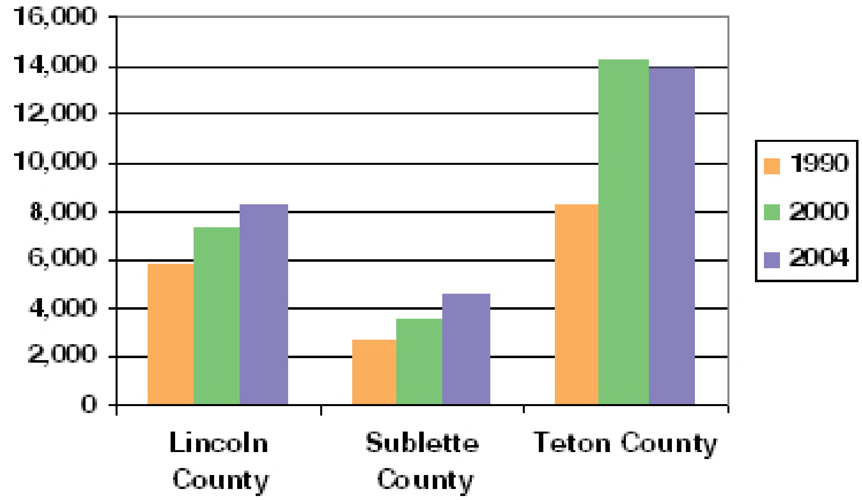


Source: U.S. Department of Labor—Bureau of Labor Statistics

Between 1990 and 2004, unemployment rates in Lincoln and Sublette Counties decreased substantially (by 2.4 percent and 0.4 percent respectively). In Teton County, however, unemployment rates increased by 1.3 percent. The observed increase in unemployment may in part be attributed to the nationwide decrease in tourism during those years (see Section 3.6.3).

As shown in **Table 3-3** Teton County has, by a large margin, the highest per capita income in the state of Wyoming, with a 2004 per capita income of $81,231. Per capita income in Teton County was 58 percent higher than the state of Wyoming in 2004. The increase in per capita income between 1990 and 2004 is shown for each county and the State of Wyoming in **Figure 3-9**. Nationally, the Community Housing Forum (May 2000) indicated that Teton County ranks #1 of all U.S. counties in terms of average dividend income and sources of "other income" (sole proprietor, capital gains, and IRA income). Between 1990 and 2004, employment, labor force, and per capita income grew faster in Teton County than in the state of Wyoming overall.

Figure 3-9
Labor Force (1990 to 2004)



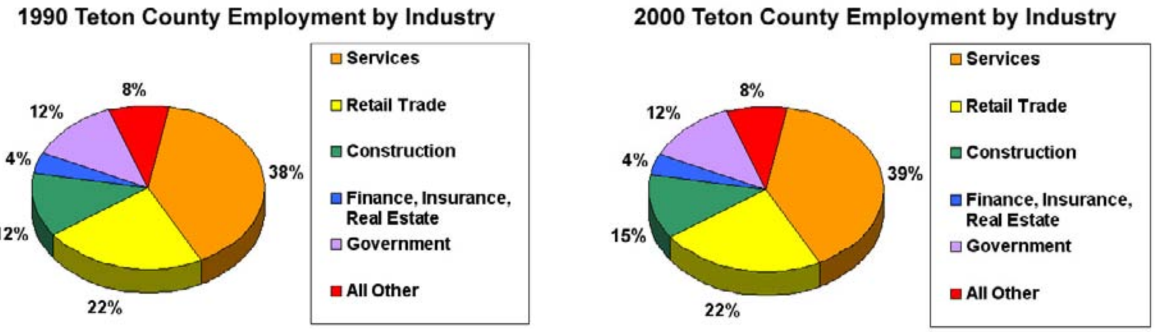
Between 1990 and 2000, Teton County's largest employment was the services industry. Retail and wholesale trade also represent a large portion of total employment within the county. The services, retail, and wholesale industries rely heavily on tourism revenue. Between 1990 and 2000, the most substantial shift in employment occurred in the construction industry. This is primarily attributable to the rise in housing starts, which increased construction-related jobs by 99.5 percent. Teton County employment by industry is shown in **Table 3-4** and **Figure 3-10**.

Table 3-4
Teton County Employment by Industry, 1990-2000

Job Sector	Teton County Employment				Percent Change
	1990	Percent	2000	Percent	1990-2000
Services	3,956	38.3	6,464	39.3	63.4
Retail Trade	1,470	22.2	3,664	22.3	36.7
Construction	1,221	11.8	2,437	14.8	99.5
Finance, Insurance, Real Estate	451	4.4	623	3.8	38.1
Government	1,249	12.2	1,955	11.9	56.5
All Other	767	7.5	1,289	7.8	68.0
Total	**10,324**	**100.0**	**16,432**	**100.0**	**59.2**

Note: Total employment in Table 3-4 differs from that in Table 3-3. Complete industry statistics are not available from the Bureau of Labor Statistics. For the purposes of consistency, different sources were utilized for each table.
Source: Wyoming Department of Employment, Research and Statistics 1990 and 2000.

Figure 3-10
Teton County Employment by Industry (1990-2000)



Major employers in Teton County include Grand Targhee Resort, Grand Teton National Park, Jackson Hole Mountain Resort, and Snow King Resort in Jackson. In addition to providing regional employment opportunities, these resorts contribute greatly to the economic vitality of the county. St. John's Medical Center, the Teton County School District, and the Jackson State Bank are other primary employers in the region. Commercial activity south of the Study Corridor is concentrated at Hoback Junction and includes Hoback Market gas/groceries, raft and kayak rental, and the Hoback River Resort.

3.6.3 Tourism

Tourism and travel in Teton County is a vital link to the economic stability of the region. In 2004, travel spending in Teton County totaled $471 million and total earnings (including wage and salary disbursements, other earned income, and proprietor income) were $153 million *(Wyoming Travel Industry, 2004 Impact Report)*. According to the report, tourism contributes 28,640 direct full time and part time jobs to the Wyoming economy.

Jackson's resort industry and proximity to the Grand Teton and Yellowstone National Parks, the National Elk Refuge, and the Jackson Hole, Grand Targhee and Snow King ski areas make tourism the major contributor to the area's economy. Jackson Hole, Grand Targhee, and Snow King ski areas create the opportunity for more year-round employment. According to the 2002 *Jackson/Teton County Comprehensive Plan*, all three ski resorts have expansion potential and expansion plans.

U.S. Census Bureau statistics indicate that there were 2.5 million visitors to Grand Teton National Park in 2001. From 2001 to 2002, Grand Teton experienced a 2.1 percent decrease in the number of visitors. During the same time period, Yellowstone National Park experienced a 2.8 percent decrease in tourists. These statistics reflect the national economic downturn in tourism during that period.

3.6.4 Commuting Trends

Local employment conditions in Teton County have been characterized by a growth in employment and a lack of affordable housing (see Section 3.3.2 for a description of housing conditions in Teton County). This trend has led to an out-migration of residents and an increase in the number of commuters from surrounding counties in Wyoming and eastern Idaho.

Trip characteristics documented in the *Teton County Travel Study of 2001* (National Research Center, 2001) showed that since 1996 the number of trips made per person had increased from 4.7 trips on average per person per day to 6.5 trips. Likewise, the number of miles traveled on average per person per day had grown, from 24.4 miles in 1996 to 32.5 miles in 2001.

The number of persons commuting to a place of work in 1990 and 2000 is illustrated in **Table 3-5**. The number of persons living in Teton County, Idaho, and working outside the state increased from 362 to 1,060, an increase of nearly 200 percent. The number of intercounty commuters from Lincoln County nearly tripled, increasing from 358 to 1087. The number of intercounty Wyoming commuters from Sublette County increased from 235 to 309, a more than 30 percent increase. Although not all of these commuters are traveling to Teton County, the vast majority are commuting to jobs in the Jackson area.

Table 3-5
Intercounty Commuters, 1990 and 2000

County	1990	2000	Percent
Lincoln County	358	1,087	203.6
Sublette County	235	309	31.5
Total	**955**	**2,456**	**157.2**

Source: U.S. Census Bureau, 1990 and 2000.

The increases in intercounty and interstate commuting are contributing to the increased traffic volumes and congestion on many of the highways in Teton County. This trend is expected to continue unless substantial affordable housing is made available in Teton County.

3.7 Parks and Recreation Resources

The Study Corridor and surrounding areas have an abundance of recreation resources. Official and unofficial recreation areas are located within the BTNF and lands owned by the BLM and the WGFD. Recreation sites surrounding (outside of) the Study Corridor include Yellowstone, Grand Teton National Park, Grand Targhee Ski Resort, Jackson Hole Mountain Ski Resort, and Snow King Ski Area.

Recreational activities within or near the Study Corridor occur year-round; however, most are concentrated from Memorial Day through Labor Day. Peak use varies by activity, but is generally greatest during the summer season. Recreational activities found in the Study Corridor that can be accessed from the highway include:

- River floating (non-motorized boats, rafts, kayaks, canoes)
- Scenic driving
- Camping
- Cross-country skiing
- Horseback riding
- Hiking
- Biking
- Hunting
- Fishing

See **Figure 3-11** for location of recreational access points within Study Corridor.

3.7.1 Parks

There are currently no designated parks within Teton County jurisdiction in the Study Corridor.

3.7.2 Boating Activities

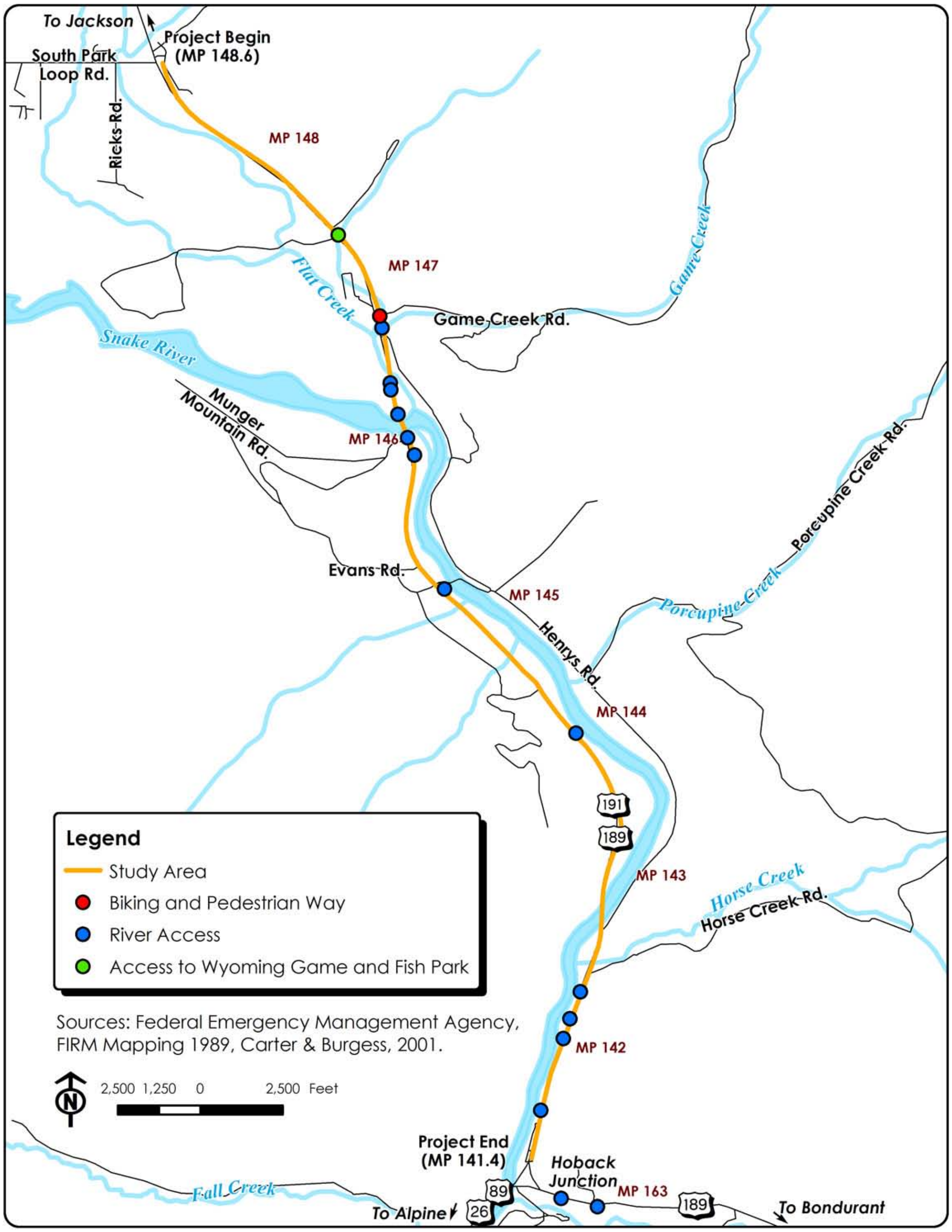
In Jackson Hole, water-related recreation activities and demand for these activities have increased dramatically over the past 20 years, and this trend is expected to continue. Commercially guided scenic floating, rafting, and fishing trips are popular along the Snake River within the Study Corridor. According to the *Snake River Resource Management Plan,* commercial, competitive, and large group floating activities are unregulated within the Study Corridor north of the Snake River Bridge at MP 146.09 except where floating access is provided by the National Park Service (NPS).

Boat use consists of outfitted and non-outfitted raft use, outfitted kayaking, and outfitted and non-outfitted float fishing. Commercially guided scenic floating, rafting, and fishing trips are popular along the Snake River within the Study Corridor. White water rafting occurs primarily on the Snake River south of the Study Corridor. Anglers use these sections of the Hoback and Snake Rivers because it is easy to float or wade.

The U.S. Forest Service (USFS) regulates commercial, competitive, and group use in river segments below the South Park Bridge through a permit system. Private citizens can float the river any time without a permit. In 1973, an estimated 24,300 people floated the Snake River. In 1995, the use peaked at an estimated 159,200 floaters, and then decreased to 140,230 in 2004. The decrease in use since 2000 is attributable to the adoption of the *Snake River Resource Management* Plan and the delays related to the recently completed Snake River Canyon highway project.

A number of informal river access points are located along the rivers within the Study Corridor. These spots are used primarily by bank fishermen and kayakers who park along the highway and walk to the river. Some points have two track roads leading to the rivers. The only formal boat access is Von Gontard's Landing, located on the northern bank of the Snake River east of the South Park Bridge (MP 146.1). No formal river access currently exists south of the Snake River bridge.

Figure 3-11
Recreational Access Points



The Von Gontard site was developed in the 1980s through a lease agreement between the private property owner and the Wyoming Game and Fish Department. As the primary river access point serving the destination resort town of Jackson, the site serves local residential and area visitors, and has experienced steadily increasing use. This boat access point is primarily used as a take-out point for users floating the Wilson Bridge to South Park segment of the river. The site provides parking and portable toilets. It is accessed via a narrow, steep road that drops down toward the river from the west side of the highway. This steep access road, combined with the lack of highway turn lanes or acceleration/deceleration lanes at this location, creates a safety concern for site users and traveling motorists.

According to the *Recreation Project Plan, South Park River Access*, September 2004, a new river access is planned directly across the Snake River from Von Gontard's Landing on a 23-acre parcel owned by the BLM. The parcel is bisected by the highway. On the east side of the highway, plans include a formal boat access area on the south bank of the Snake River with two boat launch areas, parking, restrooms, changing rooms, picnic area, and trails to connect these facilities. On the west side of the highway, plans include a "gateway park" with a visitors' center, picnic shelter, restrooms, parking, regional trail connections, and non-boat river access. An underpass below the highway would connect the two sides of the development, and provide a safe passage for visitors between the two areas. In its plans for the underpass, BLM cites the need for close coordination with WYDOT during the highway and bridge design phase to ensure that WYDOT officials are aware of BLM intentions and the underpass is compatible with the improved bridge and roadway.

3.8 Transportation

3.8.1 Transportation Planning

Transportation planning along U.S. Highway 26/89/189/191 has been addressed in local, state, and federal plans. The *Jackson/Teton County Comprehensive Plan* (October 2002) states that future traffic volumes from continuing auto-dominated travel behavior and dispersed development patterns will far exceed available roadway capacity. Future traffic volumes are anticipated to exacerbate the problem, which could impair mobility and safety if improvements are not made. The transportation component of the plan includes the following goals:

- Goal No. 1: "To plan for future mobility that meets the needs of residents and tourists within the context of community character."
- Goal No. 3: "To improve the safety and efficiency of the transportation system in Jackson and Teton County."
- The *Bridger-Teton National Forest Land and Resource Management Plan* (USFS 1990) provides specific recommendations for the Study Corridor including a preference for both motorized and nonmotorized areas and safe access to the Snake River (see Section 3.1, Land use).

WYDOT's *Statewide Long Range Transportation Plan* (August 2005) provides policy guidance to the department in fulfilling its mission "to provide a safe, high quality, and efficient transportation system" (pg. 3). The State Transportation Improvement Program (STIP) is a component of the long-range plan and outlines spending priorities for the next six years (2009 to 2014). The 2009 STIP provides funds for projects to reconstruct the Study Corridor and provide enhancements such as landscaping and pathways (see **Table 3-6**).

Table 3-6
Study Corridor Improvements Included in 2009 State Transportation Improvement Program

Project Location	Mileposts	Activity	Fiscal Year
Hoback Junction Enhancement (project no. N104078)	140.69-142.50	Enhancements	2010
Snake River Section (project no. N104066)	142.50-145.50	Reconstruction	2012
Snake River Enhancements (project no. N104079)	142.50-148.60	Enhancements	2012
Hoback Junction/Snake River Section 2 (project no. N104083)	145.50-148.60	Reconstruction	2014

Source: Wyoming Department of Transportation 2009 STIP.

3.8.2 Existing Roadway and Traffic Conditions

Roadway Classification

Roadways are grouped according to the relative importance of the movement and access functions provided on the facility. Highly functional classifications are assigned to roadways that provide regional mobility at higher speeds with more restrictive access control. Those roadways providing access to adjacent properties are generally assigned a low functional classification and typically have low speeds and lenient access controls.

The current configuration of U.S. 26/89/189/191 is generally comprised of two 12-foot lanes with variable shoulder widths. It is classified as a Rural Principal Arterial and is on the National Highway System. Principal Arterial is a classification that includes the interstate system and all non-interstate principal arterials. The arterial serves movements having trip length and travel density characteristics indicative of interstate travel, with high access control and high mobility. The primary purpose of the Rural Principal Arterial is the safe and efficient movement of goods and people. American Association of State Highway and Transportation Officials (AASHTO) guidelines call for this type of highway to be designed to at least Level of Service (LOS) C. See Section 1.5.2 for LOS descriptions.

U.S. Highway 26/89/189/191 carries commuter, tourist, and commercial traffic to and from Jackson. Commuter traffic has increased with growth in outlying "bedroom" communities. Recreation destinations include Yellowstone, Grand Teton National Park, Grand Targhee Ski Resort, Jackson Hole Mountain Ski Resort, and the Snow King Ski

Area. During the summer months, buses carrying recreational rafters use the route to access the Snake River. Commercial traffic uses the highway year-round providing goods and services to Jackson.

Annual Average Daily Traffic (AADT) is defined as the total traffic for the year divided by 365 (number of days in a year). The AADT on U.S. Highway 26/89/189/191 ranges between 5,690 and 8,110. Historic AADT records indicate that volumes nearly doubled for the highway between 1985 and 2006. As discussed in Section 1.5, traffic is projected to increase an average of approximately 46 percent over the next 20 years. In turn, this likely will lead to increased safety issues along the Study Corridor (see Section 1.7, Improve Traffic Safety).

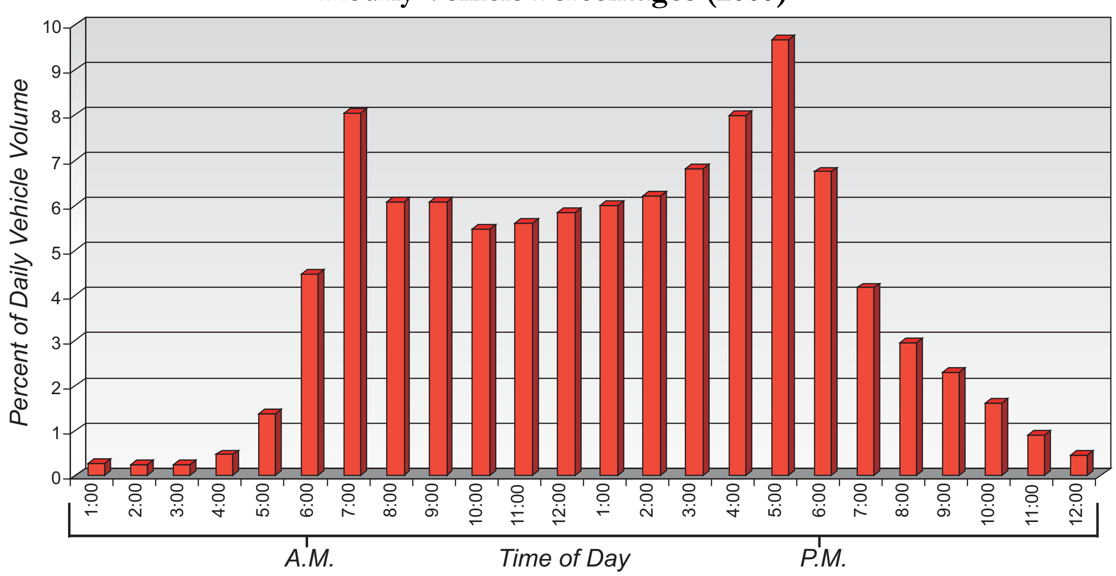
Seasonal Variations

Traffic data indicate that traffic volumes increase during the summer tourist season. For example, in year 2007, the AADT was 6,006 with a peak of 9,158 in July.

Hourly Variations

Hourly traffic volumes through 2007 indicate that there are two peaks—a distinct one that occurs between 6:00 AM and 8:00 AM and another from 4:00 PM to 6:00 PM (see **Figure 3-12**). This data indicates that commuter traffic between Jackson and outlying communities causes these traffic peaks.

Figure 3-12
Hourly Vehicle Percentages (2007)



3.8.3 Future Roadway Conditions

Assessing future conditions requires traffic forecasting (see Section 1.5.1 for details). Traffic volumes in the Study Corridor continue to grow rapidly, increasing by approximately 179 percent between 1985 and 2006. **Table 3-7** shows 2006 and projected year 2026 traffic volumes for the Study Corridor. 2026 traffic projections indicate traffic on the highway will continue to grow, with traffic volumes projected to increase an average of approximately 46 percent over the next 20 years.

Table 3-7
Existing (2006) and Forecasted (2026) Annual Average Daily Traffic (AADT) Volumes

Milepost (From-To)	2006	2026	Percent Change: 2006 to 2026
141.3-145.64	5,690	8,820	+55.0
145.64-147.23	7,500	9,620	+28.2
147.23-147.30	8,110	10,180	+25.5
147.30-148.60	8,110	11,470	+41.4

Note: Trucks = 7.6 percent of AADT.
Source: Wyoming Department of Transportation

Level of Service (LOS) is a rating of traffic operating conditions that is calculated by comparing traffic volumes to available capacity along a roadway segment or intersection. LOS provides a qualitative definition of the extent of congestion with LOS "A" representing minimal delay and congestion and LOS "F" representing substantial delay (see Section 1.5, Accommodate Travel Demand).

As shown in **Table 3-8**, 2006 LOS for the Study Corridor is LOS D. WYDOT forecasted LOS for 2026 for the existing two-lane roadway from just north of Hoback Junction to south of the existing five-lane section. The analysis assumed that traffic would consist of 7.6 percent trucks, and the Study Corridor would have 50 percent no passing zones and four-foot shoulders. It was determined that highway operations during the peak travel hour would deteriorate to LOS E between MP 145.6 and 148.6. Speeds would be low, passing will be virtually nonexistent, and maneuverability would be extremely restricted. The remainder of the highway would function at LOS D in 2026.

Table 3-8
Existing (2006) and Future (2026) Level of Service by Segment and Milepost

Roadway Segment	2006 LOS	2026 LOS
North (MP 145.6 and 148.6)	D	E
North (MP 142.5-145.6)	D	D

Access

Numerous access points exist along the Study Corridor (see **Figure 3-11**). Access is provided to private properties, recreation areas and scenic viewing areas. The *WYDOT Access Manual: Rules and Regulations and Policy for Accesses to Wyoming State* Highways (2005) has different access control standards depending on the highway classification and the type of entrance. Since Rural Principal Arterials accommodate statewide or interstate travel, they typically have high access control.

3.8.4 Design Speeds

AASHTO's *2001 Green Book: A Policy on Geometric Design of Highways and Roads* is a guiding policy on highway design. Roadway designers refer to the *Green Book's* guidelines on design curvature, grades, design speeds, and other features. The *Green Book* states the following: "Design speed is the maximum safe speed that can be maintained over a specified section of highway when conditions are so favorable that the design features of the highway govern." The *Green Book* recommends higher design speeds for roadways with higher functional classifications that carry larger volumes of traffic. It recommends a 55 mph design speed for high-traffic, rural arterials in level terrain, with lower design speeds recommended to account for mountainous terrain. Currently, the Study Corridor has several substandard vertical curves that only meet 40 and 45 mph design speeds based on today's standards.

3.8.5 Transit

This section outlines existing and future transit plans in the Study Corridor.

Transit Plans and Studies

Preparation of this section involved review of the following land use plans and transit studies:

- *Jackson/Teton County Comprehensive Plan*, 2002
- *Jackson/Teton County Transit Development Plan*, 2000
- *Transit Impact Fees, Teton County*, 2002
- *Teton County Travel Study*, 2001
- *Hoback Junction Charrette Report*, 2002

***Jackson/Teton County Comprehensive Plan, 2002* (currently being updated)**

Chapter 8 of the *Jackson/Teton County Comprehensive Plan* focuses on the issues, goals, objectives, and recommendations for the transportation network in Jackson and Teton County. The chapter describes the Southern Teton Area Rapid Transit (START) System, a bus system that is the sole public transit provider in the area. The plan explains that START funding and service expansions represent the greatest challenges to transit in the area, and lists areas to evaluate for transit expansion.

Chapter 8 explores the development of a relatively high level of transit service and a change in resident behavior to use the service as important mechanisms that can reduce the rate of traffic growth. In addition to providing service in the winter ski season and on-call pickup services for the elderly and disabled, the plan suggests a restructuring of the system to serve resident year-round commuting and recreational needs, and visitor and tourist year-round needs. This year-round service needs to be in place in order to achieve a five percent summer transit mode share.

The plan identifies U.S. Highway 26/89/191 as a "spine" service, along with WY 22, WY 390, and local streets in Jackson. As part of the new proposed system, the plan calls for express commuter service to Jackson from Alpine along U.S. Highway 26/89/191.

The *Jackson/Teton County Transit Development Plan* was produced by the Town of Jackson, Teton County, and Charlier and Associates. The plan describes elements to a successful transit system in the area. In June 2000, both the Town of Jackson and Teton County approved the plan.

Transit Impact Fees, 2001
Tischler & Associates, Inc. completed a transit impact fee analysis for Teton County that studied the feasibility of an impact fee to assist with funding for the START system. Transit impact fees were to be one-time payments imposed on both new residential and commercial development in Jackson and Teton County. The County did not approve the impact fee proposal.

Teton County Travel Study, 2001
The *Teton County Travel Study* surveyed Teton County residents about factors that would encourage them to drive less and use alternative modes of transportation more often. The highest ratings related to transit included convenient stops (3.8 on a 5-point scale) and frequency of service (3.3 on a 5-point scale).

Hoback Junction Charrette Report, 2002
Recommendations from the charrette process included a need for a START transit stop at Hoback Junction along with a park-n-ride facility.

Existing Public Transit Facilities

START is a public bus service funded partially by the Town of Jackson, Teton County, and the federal government. The service has been in operation since 1987. Ridership has increased considerably, from approximately 150,000 passengers per year in 1993 to 625,874 riders per year in 2006 (START, 2007). Over the past three years, total ridership has increased approximately 72 percent. The majority of these riders are winter visitors traveling daily between the Jackson and Teton Village. In June 2001, START won the annual "Transit System of the Year" award for its increased ridership and its free in-town shuttle implemented in the summer of 2000.

START distributed a transit survey in 2003 to residents of Alpine, Star Valley, and Afton to help estimate the demand for bus service to Jackson. The results helped to determine the appropriate location, timing, and frequency of buses at future transit stops. Based on the survey, START began four runs a day between Alpine and Jackson in December 2003—two in the AM rush hour and two in the PM rush hour. The two buses collectively carry roughly 60 passengers to Jackson each morning. As **Table 3-9** shows, ridership has increased steadily over the past three years.

Table 3-9
START Ridership Numbers: Alpine to Jackson Commuter Service

Month	Pick-Up Location	
	Alpine	Hoback
March 2004	932	7
March 2005	1531	n/a
March 2006	1721	11

Source: START, Teton County.

The Alpine commuter route is being funded through the fares collected and through a Federal Transit Administration (FTA) intercity grant through WYDOT. The fares cover a majority of the cost.

Planned and Programmed Transit Improvements
In Chapter 8 of the *Jackson/Teton County Comprehensive Plan*, the feasibility of START expanding and maintaining service to the area was identified as a need for further analysis. The Jackson Hole, Alpine, and Star Valley areas have commuters who travel from outlying areas into Jackson Hole. The high cost of living has forced workers to live outside of the area and commute by automobile, a trend expected to continue. According to the *Jackson/Teton County Transit Development Plan*, a park-n-ride is tentatively planned in the Hoback Junction area.

3.9 Bicyclist and Pedestrian Facilities

According to the *Jackson/Teton County Comprehensive Plan*, walking and bicycling usage in Teton County is comparatively low for a mountain community. Counts taken in July 1996 (peak season) indicate that walking and bicycling make up 9 percent and 6 percent of the mode share, respectively, reflecting the limited facilities available. The *Teton County Travel Study*, 2001 noted that bicycling is most commonly used for trips of a distance less than 2.5 miles, and walking is used mostly for trips of less than 1.0 mile. Study participants did not make any bicycle trips over 15 miles. Although the Hoback Junction area is located approximately 12 miles from the Town of Jackson, area plans indicate a strong need to provide bicycling amenities to connect the two areas.

Through the 1990s, bicycling and pedestrian issues grew in significance. According to the *Teton County Travel Study*, bicycle and pedestrian use has been growing. According to the study, the percentage of bicycle trips increased from 6 percent to 10 percent between 1996 and 2001, which represents a 67 percent change in bicycle trips and an overall increase of 4 percent. Walking remained constant between 1996 and 2001 at 9 percent. Many of these bicycle trips were used to commute to and from work. The study also noted that the average household has 2.9 bicycles.

Residents who participated in the *Teton County Travel Study* rated the expansion of the bicycle network as the number one strategy to reduce traffic congestion. In April 1991, Teton County began formally planning communities that support enhanced pedestrian and bicycle facilities by creating the Pathways Task Force (PTF) Board. The PTF is an advisory group of citizens whose mission is to “improve and enhance nonmotorized opportunities for transportation and recreation within Teton County.” The group meets monthly to coordinate efforts among Friends of Pathways, Jackson Hole Community Pathways (JHCP), and other partners. WYDOT, Teton County, and the Town of Jackson represent governmental entities that cooperate in implementation of bicycle and pedestrian facilities. This effort is supplemented by cooperative agreements with federal land managers to provide access to the various recreational trails in Grand Teton National Park and the Caribou Targhee and Bridger-Teton National Forests. On nonfederal area lands, the Teton County/Jackson Department of Parks and Recreation Pathways Division is the primary entity responsible for planning, implementation, maintenance, and operation of Teton County's pathways system. Friends of Pathways, a nonprofit organization, provides community advocacy, educational programming, and support for area pathways.

3.9.1 Bicycle and Pedestrian Facilities

Background

Information on pedestrian and bicycle facilities in the Study Corridor was compiled from state and local planning sources, including:

- *Hoback Junction Charrette Report*, July 2002
- *Hoback Junction EIS Bicycle/Pedestrian Plan*, Draft, March 2003
- *Jackson/Teton County Comprehensive Plan*, October 2002 (currently being updated)
- *Pathways in Jackson Hole: A Conceptual Plan*, 1992
- *Pathways Master Plan, Town of Jackson and Teton County*, June 2007
- *Recreation Project Plan, South Park River Access*, Department of the Interior and Bureau of Land Management, September 2004
- State of Wyoming
- Teton County
- *Teton County Travel Study*, 2001
- Town of Jackson
- *Wyoming Bicycle and Pedestrian Transportation Plan*, 2002

Goals from area plans and results from public surveys indicate a strong desire to develop more multiuse pathways (for walking, bicycling, horseback riding, cross-country skiing, and snowshoeing) to complete missing links to the current pathway system, and to provide additional interfaces between the pathway system and other area trail networks, such as hiking and mountain bike trails. Another goal is to improve integration of the pathway system with the START system. The START buses are equipped with bicycle and ski carriers, providing people with the opportunity to use transit for both commuting and recreational access.

According to the *Pathways Master Plan*, the JHCP System is already in place or in development, and the missing links and future pathway corridors have been identified. The JHCP System consists of 28.6 miles of paved shared-use, 10-foot-wide asphalt pathways with associated rest areas, trailheads, safety, wayfinding, and interpretive signage. The existing pathways have been well received by the community and are experiencing high levels of use. Demand exists for expansion and overall connectivity of the system. The complete system will be 75 to 80 miles long, and will connect to a growing regional network that includes the proposed pathways in Grand Teton National Park, trails in the BTNF, and other public lands. The *Pathways Master Plan* presents a vision for a phased implementation of the pathway system over the next 25 years, with full implementation by 2032.

The capital project five-year priority list in the *Pathways Master Plan* includes the following pathways located in the study area:

- South Park Loop Pathway: Includes completion of the shared-use pathway network around South Park Loop Road.
- South 89 Pathway: Construction of a shared-use path from Game Creek to Hoback Junction.

Pathways in Jackson Hole: A Conceptual Plan, identifies key pathway corridors within Teton County for construction of separated pathways and pedestrian facilities. The plan outlines the following goals:

- Use pathways to reduce the number of vehicle and bicycle/pedestrian crashes.
- Provide access for close-to-home recreation without the use of automobiles.

The U.S. Highway 26/89/189/191 corridor was identified as a roadway in need of an adjacent multiuse pathway to extend from the Town of Jackson to Hoback Junction.

The goals and objectives described in Chapter 8 of the *Jackson/Teton County Comprehensive Plan* place importance on shifting automobile dependence toward other modes, such as walking, bicycling, and public transit, and include the following:

- **Alternative Modes and Programs**. An important theme of Chapter 8 is the fact that the "alternative modes" – walking, bicycling and public transit – are underrepresented in the community today and should receive emphasis in the future.
- **Roads and Streets**: An important aspect of Chapter 8 is the identification of, and recommendations for, additions and expansions to roadways that include consideration of alternative modes.
- **Systematically plan for future mobility that meets the needs of residents and tourists within the context of community character**. Ensure all modes are evaluated when roadway corridors are planned and designed, and incorporated when possible.
- **Decrease the rate of anticipated vehicular traffic growth in the community.** Decrease automobile reliance by shifting resident travel mode shares.
- **Improve the safety and efficiency of the transportation system in Jackson and Teton County.** Maintain or reduce existing accident levels, and reduce accident severity by 10 percent. Reduce pedestrian and non-motorized vehicle accidents by 10 percent while increasing the amount of pedestrian and non-motorized vehicle travel. Provide a safe, convenient, appealing, and reliable transit system.

Section 1202(b) of the Transportation Equity Act for the 21st Century (TEA-21), an update to the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA), calls upon the Secretary of Transportation, "in cooperation with the American Association of State Highway and Transportation Officials, the Institute of Transportation Engineers, and other interested organizations to develop guidance on the various approaches to accommodating bicycles and pedestrian travel." Specifically, TEA-21 calls for the mainstreaming of bicycling and pedestrian projects into the planning, design, and operation of the nation's transportation system. The new design guideline language explains the recommended approach and states that bicycling and walking facilities will be incorporated into all transportation projects unless "exceptional circumstances" exist. The *Wyoming Bicycle and Pedestrian Transportation Plan*, provides guidance for WYDOT to provide for and improve bicycle transportation across the state. The plan also provides current planning information, design, facility selection, and funding guidance for local governments in Wyoming developing their own bicycle plans and facilities. Through this plan, the federally recommended approach has been incorporated into the analysis of existing and proposed enhancements for the Study Corridor.

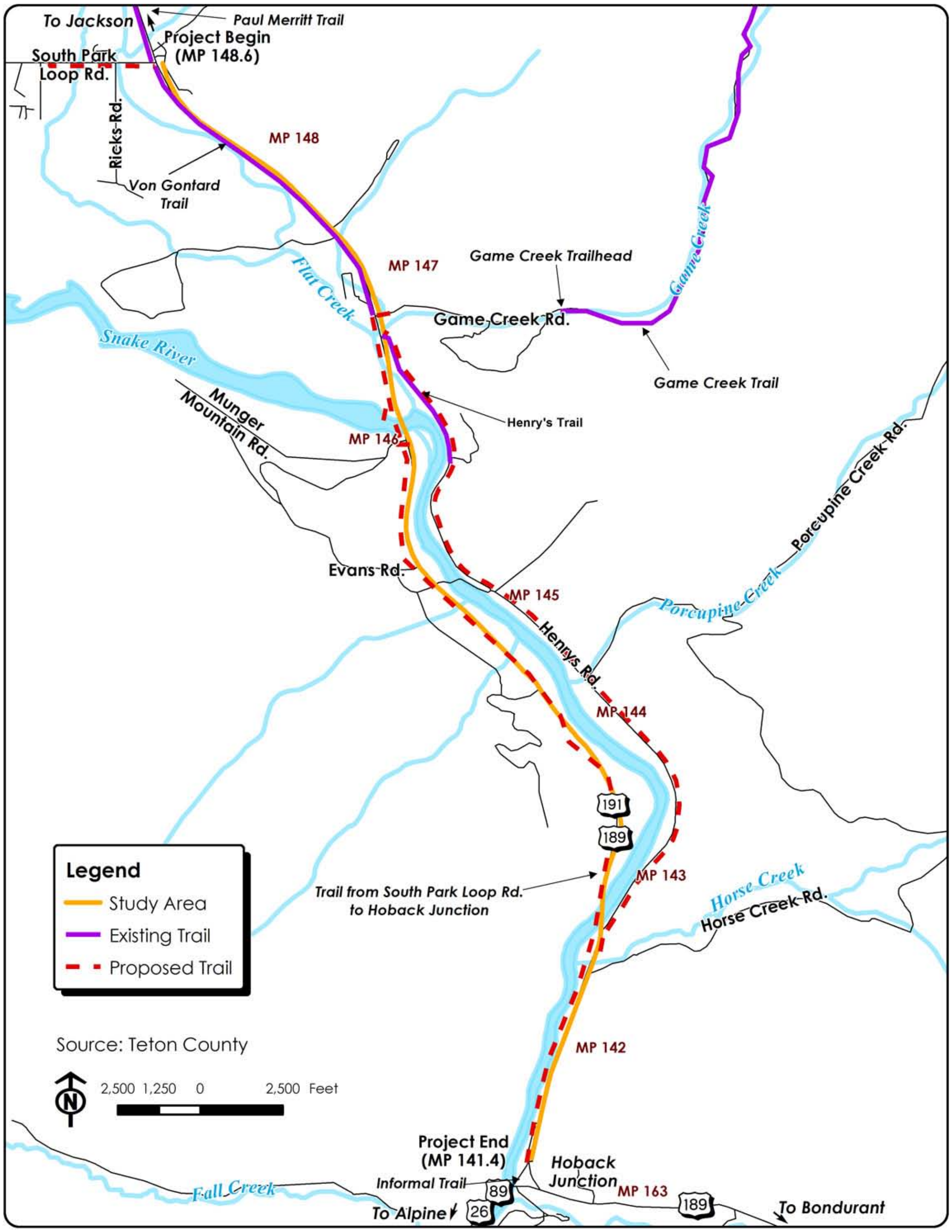
Existing Bicycle Facilities

Bicycle pathways may be on the street or separated from vehicular traffic. All pathways located within or adjacent to the Study Corridor are multiuse trails that accommodate bicycling, walking, rollerblading, and nonmotorized trail users. Some trails also have an adjacent equestrian trail, and others are groomed for winter use, such as cross-country skiing and snowshoeing. These trails are described below, from north to south. The locations of existing and proposed trails are shown in **Figure 3-13**. Because the Cache Creek Trail is outside the Study Corridor, it is not shown on this figure.

The **Paul Merritt (3.4 miles long) and Von Gontard (2.0 miles long) multiuse trails** are immediately adjacent to and along the west side of U.S. Highway 26/89/189/ 191, and were completed in 1999. The Paul Merritt Trail extends from Jackson south to its terminus at the south leg of South Park Loop Road. The Von Gontard Trail begins at the south end of the Paul Merritt Trail and runs south to its terminus opposite Game Creek Road. Both trails consist of a 10-foot asphalt surface path. The Von Gontard Trail is groomed for cross-country skiing and snowshoeing in the winter months, and contains a parallel equestrian trail. These trails are located within WYDOT right-of-way and, where they extend onto private property, on easements owned by Teton County. The County's Parks and Recreation Department maintains the trails.

Von Gontard Trail Section—View to South

Figure 3-13
Existing and Proposed Trails



The **Henry's Road Trail** is a multiuse trail that begins south of Game Creek Road and falls within the old highway right-of-way (called "Henry's Road") located on the east side of the Snake River. The unpaved trail segment is approximately 0.25 mile long and 10 feet wide. This trail is maintained by the Teton County Parks and Recreation Department. Henry's Road runs from Game Creek south to Horse Creek and provides an important bicycle/pedestrian link between Game Creek Road and Horse Creek Road because the U.S. Highway lacks shoulders between these two roads. Henry's Road carries very little vehicular traffic, and is currently used by recreational bicyclists and pedestrians. WYDOT has upgraded Henry's Road and plans to transfer it to Teton County, where it will be incorporated into the County's road network.

The **Game Creek Trail** is a multiuse trail that accommodates bicycling, walking, and horseback riding, and is managed and groomed in the winter season for cross-country skiing. The trail runs along Game Creek and provides access to the BTNF. The trailhead is located at the western terminus of the trail along Game Creek Road, approximately one mile east of U.S. Highway 26/89/189/191. From the trailhead, Game Creek Trail runs approximately five miles northeast along Game Creek until it intersects with the Cache Creek Trail at Cache Creek. It is located on USFS land and is maintained by the USFS.

The **Cache Creek Trail** is a multiuse trail that accommodates bicycling, walking, and horseback riding, and is managed and groomed in the winter season for cross-country skiing and snowshoeing. The trail runs along Cache Creek to the east of U.S. Highway 26/89/189/191 within the BTNF backcountry area. The trailhead is located at the north terminus of the trail located south of the Town of Jackson on Cache Creek Road. It is located on USFS land and is maintained by the USFS.

Together, the Cache Creek and Game Creek trails create a loop (the Cache Creek/Game Creek loop) that is popular with bicyclists, pedestrians, and equestrians. According to Jackson Hole Community Pathways, approximately 100 persons use the trail daily.

Existing Pedestrian Facilities

In general, the Study Corridor lacks a connecting network of bicycle and pedestrian amenities. The existing trails, noted above, are multiuse trails that serve pedestrians, bicyclists, rollerbladers, and other nonmotorized trail users. Area residents responding to travel surveys conducted in 1996 and 2001 placed a high priority on improving sidewalks and walkway systems.

Existing pedestrian facilities within the Study Corridor include the facilities described in the Existing Bicycle Facilities section. In addition, there are a number of recreation trails found in the adjacent public lands.

According to the *Jackson Teton County Comprehensive Plan*, approximately 9 percent of daily summer trips countywide are made by walking, which is slightly higher than the typical suburban community but low for a mountain setting. Most of the utilitarian walking (walking for travel, not recreational purposes) in the area occurs in Jackson. Outside of Jackson, little utilitarian walking takes place because the lack of sidewalks and defined street crossings discourages walking. The principle objective of future development and inclusion of pedestrian, bicycle, and transit amenities is to decrease automobile reliance. The 2020 goal is to increase pedestrian and bicycle trips by 53 percent, from 15 percent in 1996 to 23 percent in 2020.

3.9.2 Bicycle and Pedestrian Facilities Plans

There are many strong advocates for pathways in Jackson and the surrounding area. Much of the effort to improve the local pathway system has been spearheaded by the Teton County Pathways Department. The Town of Jackson and Teton County initiated *Pathways in Jackson Hole: A Conceptual Plan* in 1992. In 1992, a plan was initiated to guide decision-making for pathways through the year 2012. In June 2007, the Town of Jackson and Teton County prepared a *Pathways Master Plan* that presents a vision for a fully developed pathway system implemented during the next 2, 5, 10, and 25 years.

It was found that the projected land use patterns (uniform residential spread with commercial development concentrated in Jackson) inhibited the growth of a viable pathway system. General goals set forth in the pathways plan and in Chapter 8 of the *Jackson Teton County Comprehensive Transportation Plan* include:

- Decrease automobile reliance by increasing share of alternate modes.
- Pursue changes in land development that promote non-vehicular travel, such as concentrating development in small nodes throughout the county which would bring jobs and other common household destinations closer together.
- Connect bicycle and pedestrian networks to BTNF trails and close to home recreational opportunities.

Recommendations for the Study Corridor cited in Pathways in Jackson Hole: A Conceptual Plan, 1992; Hoback Junction EIS Bicycle/Pedestrian Plan, Draft, 2003; and Recreation Project Plan, South Park River Access, September 2004 are shown in **Figure 3-13** and include:

- A separated pathway from the south end of the Von Gontard Trail at Game Creek Road (approximately MP 146.75) to Hoback Junction. This would be a separated pathway within the existing highway easement. However, it would be preferable to use the old highway right-of-way ("Henry's Road") between Horse Creek and Game Creek.
- A grade-separated highway crossing at the Game Creek intersection. This underpass also would serve Henry's Road located on the east side of the Snake River.
- A grade-separated crossing near MP 142.5 between the south end of Henry's Road and Horse Creek to connect a future pathway along the west side of the highway.
- Pathway access to Munger Mountain Road on the west side of the highway at approximately MP 146.

- A pathway providing access to the Snake River at South Park Bridge.
- South Park Loop Road trail.

3.10 Air Quality

3.10.1 Ambient Air Quality Standards

The U.S. Environmental Protection Agency (EPA) has set national ambient air quality standards (NAAQS) for six criteria pollutants to protect the public from health hazards associated with air pollution. These criteria pollutants are carbon monoxide, lead, nitrogen dioxide (NO_2), ozone, particulate matter (PM_{10} and $PM_{2.5}$), and sulfur dioxide (SO_2). The NAAQS have been modified by the Wyoming Department of Environmental Quality—Air Quality Division (WDEQ-AQD) and are listed in **Table 3-10**. Transportation contributes to carbon monoxide, nitrogen dioxide, ozone, and particulate matter.

Table 3-10
Wyoming Ambient Air Quality Standards

Pollutant		Averaging Time	Concentration
Carbon Monoxide	Primary	1-hour*	35 ppm
	Primary	8-hour*	9 ppm
Ozone	Primary /Secondary	8-hour**	0.075 ppm
Nitrogen Dioxide	Primary /Secondary	Annual arithmetic mean	0.053 ppm
Sulfur Dioxide	Primary	Annual arithmetic mean	0.02 ppm
	Primary	24-hour*	0.14 ppm
	Secondary	3-hour*	0.5 ppm
Particulate (PM10)	Primary	Annual arithmetic mean (3-year average)	50 µg/m3
	Primary	24-hour***	150 µg/m3
Particulate (PM2.5)	Primary	Annual arithmetic mean (3-year average)	15 µg/m3
	Primary	24-hour (98th percentile)	35 µg/m3
Lead	Primary	Calendar quarter	1.5 µg/m3

*This concentration is not to be exceeded more than once per year.
**The 8-hour Ozone standard is set at 0.08 ppm as the 3-year average of the annual 4th maximum 8-hour average concentration.
***The 24-hour standard is attained when the expected number of exceedances for each calendar year, averaged over three years, is less than or equal to one.

The WDEQ-AQD monitors these criteria pollutants. If monitored levels of any of these pollutants violate the NAAQS, then the EPA, in cooperation with the State of Wyoming, will designate the contributing area as "non-attainment."

The Clean Air Act designated a number of areas in the state of Wyoming as Mandatory Class I Federal Areas where visibility is an important value. Generally, these areas contain wilderness areas greater than 5,000 acres or National Parks greater than 6,000 acres that have the most stringent protection of air quality. Class II areas refer to all areas that lack the designation of a Class I area. The WDEQ-AQD has implemented a State Implementation Plan for Class I Visibility Protection. **Table 3-11** includes the parks and wilderness areas in the vicinity of the Study Corridor.

Table 3-11
Parks and Wilderness Areas in the Vicinity of the Study Corridor

Name	Class Status	Size (acres)	Location
Gros Ventre Wilderness Area (Bridger-Teton National Forest)	Class I	300,000	2 miles
Grand Teton National Park	Class I	310,000	12 miles north
Yellowstone National Park	Class I	2,219,800	60 miles north
Teton Wilderness Area (Bridger-Teton National Forest)	Class I	585,240	40 miles northeast
Gros Ventre Wilderness Area	Class II	300,000	2 miles east

The Study Corridor is located within the Snake River valley, which is currently listed by the EPA as in attainment for all NAAQS criteria pollutants. The closest monitoring site to the Study Corridor is for particulate matter size fractions of 2.5 um^3 ($PM_{2.5}$) and 10 um^3 (PM_{10}) located four miles northwest of the Study Corridor in Jackson. According to EPA monitoring data, CO was monitored within the town limits of Jackson between years 2001 and 2003. CO and ozone are currently monitored within Yellowstone National Park located 60 miles north of the Study Corridor. There have been no recorded exceedances of ozone, carbon monoxide, $PM_{2.5}$, or PM_{10} from these monitoring stations since 1996.

3.10.2 Mobile Air Toxics

In addition to the NAAQS criteria air pollutants, EPA regulates air toxics. Most air toxics originate from human-made sources, including on-road mobile sources, non-road mobile sources, area sources, and stationary sources, such as airplanes, dry cleaners, and factories or refineries. Mobile Source Air Toxics (MSATs) are a subset of the 188 air toxics defined by the Clean Air Act. The MSATs are compounds emitted from highway vehicles and non-road equipment. Some toxic compounds are present in fuel and are emitted to the air when the fuel evaporates or passes through the engine unburned. Other toxics are emitted from the incomplete combustion of fuels or as secondary combustion products. Metal air toxics also result from engine wear or from impurities in oil or gasoline.

The EPA is in the process of assessing the health hazards and risks of various kinds of exposures to these pollutants:

- **Benzene** is characterized as a known human carcinogen.
- The potential carcinogenicity of **acrolein** cannot be determined because the existing data are inadequate for an assessment of human carcinogenic potential for either the oral or inhalation route of exposure.

- **Formaldehyde** is a probable human carcinogen, based on limited evidence in humans, and sufficient evidence in animals.
- **1,3-butadiene** is characterized as carcinogenic to humans by inhalation.
- **Acetaldehyde** is a probable human carcinogen based on increased incidence of nasal tumors in male and female rats and laryngeal tumors in male and female hamsters after inhalation exposure.
- **Diesel exhaust** (DE) is likely to be carcinogenic to humans by inhalation from environmental exposures. Diesel exhaust as reviewed in this document is the combination of diesel particulate matter and diesel exhaust organic gases.
- **Diesel exhaust** also represents chronic respiratory effects, possibly the primary noncancer hazard from MSATs. Prolonged exposures may impair pulmonary function and could produce symptoms, such as cough, phlegm, and chronic bronchitis. Exposure relationships have not been developed from these studies.

Evaluating the environmental and health impacts from MSATs on a proposed highway project involves several key elements, including emissions modeling, dispersion modeling in order to estimate ambient concentrations resulting from the estimated emissions, exposure modeling in order to estimate human exposure to the estimated concentrations, and then final determination of health impacts based on the estimated exposure. Each of these steps is encumbered by technical shortcomings or uncertain science that prevents a more complete determination of the MSAT health impacts of a project.

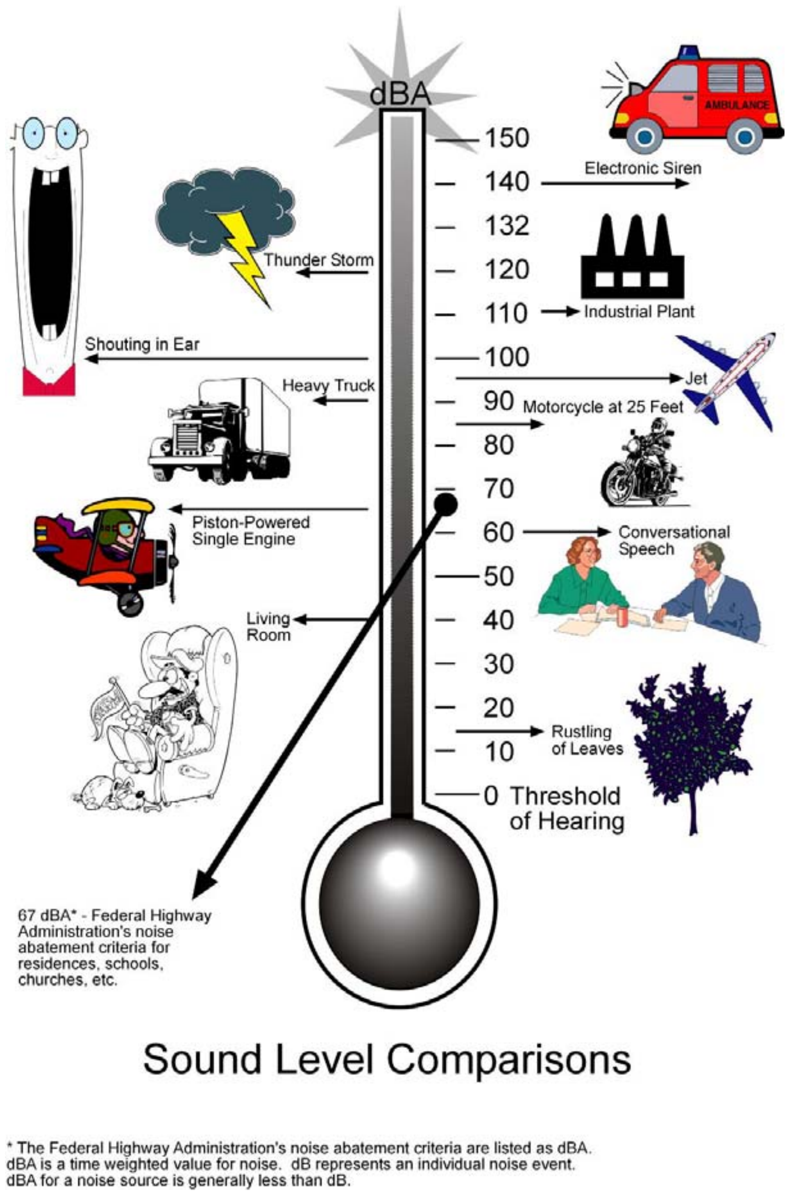
3.11 Noise

3.11.1 Existing Condition

Traffic noise can potentially impact the daily activities and quality of life for people living near streets and highways. Traffic noise levels depend on traffic volume, traffic speed, and the type of traffic. Vehicle noise is produced by the engine and exhaust system, but is primarily a result of the interaction of tires with pavement. Factors such as terrain, vegetation, and obstacles can also affect the level of traffic noise. Typically traffic noise is less noticeable for people living 500 feet or more from heavily traveled freeways or more than 100 to 200 feet from lightly traveled roads.

All sound level measurements and estimates are reported as Leq(h) in units of decibels that are A-weighted (dBA). The Leq or equivalent steady state sound level describes the receiver's average noise exposure from all events recorded over a given period of time. In the case of traffic noise, this period is one hour, designated Leq(h). The A-weighting filters sound to reduce the strength of very low and very high frequency noise to better resemble how the human ear would hear. On average, a noise increase of 10 dBA corresponds to a doubling of the loudness. Some noise levels that commonly occur in the environment are shown in **Figure 3-14**.

Figure 3-14
Examples of Common Outdoor Noise and dB(A) Levels



3.11.2 Traffic

Traffic data used in the noise analysis included 1999 average annual daily traffic (AADT) and forecasts for future traffic conditions in 2026. Adequate level of service (LOS C/D) for peak hour of traffic was estimated at 16 percent of AADT. On average, 7.6 percent of traffic is comprised of medium and heavy trucks. Data used in the noise analysis is summarized in **Table 3-12**.

Table 3-12
Traffic Data for the Study Corridor

Mileposts	Hourly, Unidirectional Traffic Volumes							
	Existing Condition (1999)				Future Conditions (2026)			
	AADT	Autos	Medium Truck	Heavy Truck	AADT	Autos	Medium Truck	Heavy Truck
148.6-147.3	6200	484.1	10.3	28.84	11470	897.7	19.1	53.48
147.3-145.6	5500	432.4	9.2	25.76	9900	770.8	16.4	45.92
145.6-141.3	4770	376	8	22.4	8820	690.9	14.7	41.16

The original 1999 traffic volumes were updated with 2006 traffic volumes in the transportation section of this document. However, the noise analysis was not remodeled using the 2006 traffic volumes. Traffic is anticipated to increase from the year 2006 and beyond. The incremental increases in traffic would result in corresponding increases in noise levels along the corridor. However, the 1999 volumes provide a "worst-case" scenario for predicted noise impacts. This is because the differences in traffic from the existing year to the 2026 design year would be greater using the 1999 data, and therefore substantial increases in noise would be greater. Whether 1999 or 2006 traffic volumes are used, the predicted noise levels in 2026 would remain the same.

3.11.3 National Abatement Criteria

The noise analysis was conducted according to the WYDOT noise guidelines, which are set forth in the document entitled *Wyoming Noise Analysis and Abatement Guidelines*, June 1996. The WYDOT noise guidelines are consistent with those of the Federal Highway Administration (FHWA) (23 CFR 772).

WYDOT has adopted noise abatement criteria (NAC), which are used to determine noise impacts from traffic sources on certain land uses. These are shown in **Table 3-13.**

Table 3-13
WYDOT Noise Abatement Criteria (NAC)

Category	Leq(h)* dB(A)	Description of Activity Category
A	56 Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	66 Exterior	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	71 Exterior	Developed lands, properties, or activities not included in Categories A or B above.
D	--	Undeveloped lands.
E	51 Interior	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

*L_{eq}(h) describes the hourly value of L_{eq}. L_{eq} is the mean noise level during the peak traffic period.
Source: Federal Highway Administration's (FHWA) Procedures for Abatement of Highway Traffic Noise and Construction Noise (23 CFR Part 772); Wyoming Noise Analysis and Abatement Guidelines, June 1996.

The above criteria are typically applied to outdoor areas of use, which for residences are usually described as a first-floor outdoor patio/deck areas. If a project would result in noise levels above these thresholds, noise mitigation would need to be considered as a part of the proposed action. A noise impact is considered to be substantial if the project would result in a noise increase of 15 dB(A) or greater above existing noise levels. Noise mitigation would then be considered as a part of the proposed action.

3.11.4 Existing Noise

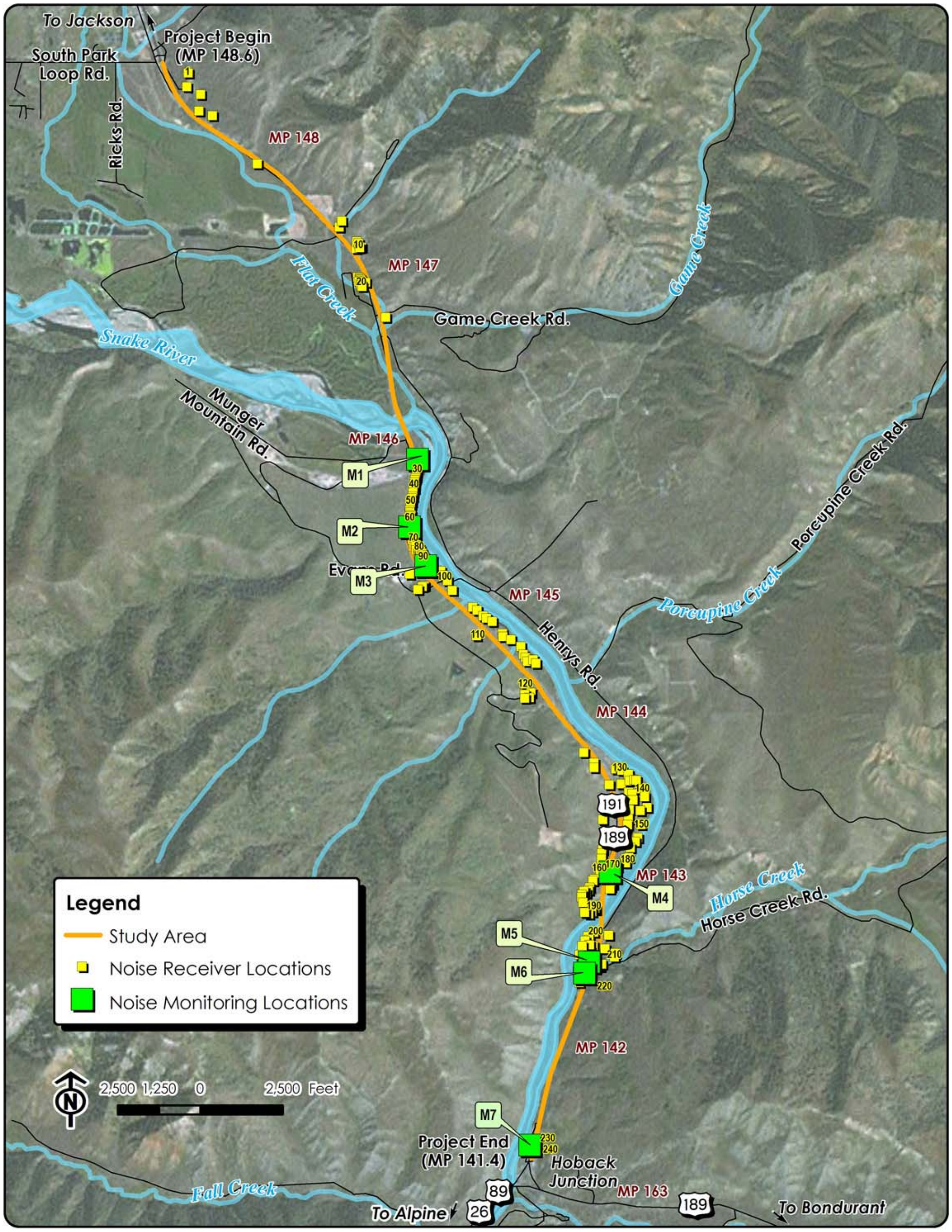
Noise measurements were conducted at seven locations, labeled M1 through M7 on **Figure 3-15** and shown in **Table 3-14**. The Traffic Noise Model (TNM) v2.5 noise model was validated by comparing predicted and measured noise levels. Noise levels were predicted at each measurement location using the traffic volumes, speeds, and vehicle mix monitored during the noise measurements. The averaged measured and predicted noise levels were then compared, as shown in **Table 3-14**. The measured and predicted levels are within the desired accuracy of ±3 dBA. The 3.3-decibel difference between averaged measured and predicted noise levels is considered acceptable.

Table 3-14
Noise Monitoring Sites

Monitor Site	Category	Location	Measured AM dBA	Measured PM dBA	Average Measured dBA (AM/PM)	Modeled dBA	dBA Difference (+/-)
M1	B	Evans Mobile Home Park—north end	65.3	62.9	64.1	64.2	+0.1
M2	B	Evans Mobile Home Park—middle section	61.7	61.7	61.7	64.6	+2.9
M3	B	Evans Mobile Home Park—south end	59.4	58.1	58.8	61.7	+2.9
M4	B	Mobile homes north of Henry's Road and Snake River. Crossing	55.3	56.4	55.9	58.7	+2.8
M5	B	House across from "Horse Creek Station"	59.0	60.4	59.7	60.4	+0.7
M6	C	KOA campground store	60.6	61.4	61.0	59.1	-1.9
M7	B	Lazy J Corral RV Park – north end	54.6	56.8	55.7	58.0	+2.3

Noise levels were predicted for existing (1999) conditions at each of the 228 Category B and C receiver locations using TNM v2.5. They are shown in **Figure 3-15** and detailed in the *Hoback Junction Noise Technical Report, 2007.*

Figure 3-15
Noise Receivers and Monitoring Sites



3.12 Water Resources

3.12.1 Surface Water

The Study Corridor lies within the Grey-Hoback Watershed hydrologic unit code (HUC) 17040103 of the Wyoming Snake River Basin. The Snake River crosses into Idaho and joins with the Columbia River.

The Snake River and several of its tributaries drain the Study Corridor (see **Figure 3-18**, 100-Year Floodplain). Named intermittent and perennial tributaries to the Snake River in the Study Corridor include:

- Flat Creek
- Game Creek
- Squaw Creek
- Dells Canyon Creek
- Georges Canyon Creek
- Porcupine Creek
- Horse Creek
- Horsethief Canyon Creek
- Little Horsethief Canyon Creek

The Hoback River parallels U.S. 189/191 and joints the Snake River just south of the Study Corridor.

U.S. Highway 26/89/189/191 parallels the Snake River from approximately MP 146 to the project terminus at MP 141.4 just north of Hoback Junction. Bridges over the Snake River are located at approximately MP 146 and MP 142. The highway crosses Game Creek (146.4) and Horse Creek (MP 142.22) via culverts.


View of Snake River from Von Gontard's Landing near Bridge at MP 146.09

Portions of the Snake River within the Study Corridor are eligible for designation as Wild and Scenic Rivers (see Section 3.16). Also, this portion of the Snake River is used for commercial and private raft and boat trips (see Section 3.7).

The types of stream channels found in the Study Corridor vary. In several areas, such as above the Snake River bridge at MP 146, the Snake River has a wide, braided form with considerable depositional material and a wide floodplain. In most other areas, the river and other streams are more narrow and contained within their stream channels. Streams are generally characterized as meandering with wide floodplains.

Data derived through the Teton County Levee Department documented approximately 24.5 miles of levees along the Snake River within the Snake River and Gros Ventre Levee System. The U.S. Army Corps of Engineers (USACE) built and maintains these levees with assistance from Teton County. There are some private levees that were built and are maintained by private landowners. USACE comes to Jackson Hole in July of each year to inspect the levees and determine rehabilitation needs based on the amount of riprap lost due to spring runoff. These systems are located outside of the Study Corridor.

3.12.2 Groundwater

In the South Park area of the Study Corridor, depth to groundwater is approximately 5 to 6 feet in the summer when crops are irrigated and 30 to 35 feet in winter when the irrigation system is not in use.

3.13 Water Quality

3.13.1 Existing Conditions

To fulfill Section 303(d) of the federal Clean Water Act (CWA), the Wyoming Department of Environmental Quality (DEQ) prepares a 303(d) List of Waters Requiring Total Maximum Daily Loads (TMDLs). These are waters for which technology-based effluent limitations and other required controls are not stringent enough to attain water quality standards. 303(d) waters are classified as Waterbodies with Water Quality Impairments, Waterbodies with National Pollutant Discharge Elimination System (NPDES) Discharge Permits Containing Waste Load Allocation Expiring, and Waterbodies with Water Quality Threats.

The only waterway in the Study Corridor listed as threatened or impaired on the Wyoming DEQ's 2008 303(d) list is Flat Creek. Flat Creek drains the Town of Jackson and joins the Snake River just north of Milepost 146. It is listed on Table C (Waterbodies with Water Quality Threats) of the 303(d) List, and a watershed improvement project is underway to reduce sediment loading to the stream from urban sources. Downstream of the Study Corridor, the Snake River has been included on the 303(d) list of impaired waters for temperature and total dissolved gas by either Idaho, Oregon, or Washington, as appropriate. All public water systems of the Study Corridor are in compliance with state and federal regulations.

3.13.2 Water Use Designations

Under Section 305(b) of the Clean Water Act, the Wyoming DEQ classifies surface water quality based on categories related to their use. These categories are:

- Class 1, Outstanding Waters
- Class 2, Fisheries and Drinking Water
- Class 3, Aquatic Life Other than Fish
- Class 4, Agriculture, Industry, Recreation, and Wildlife.

No Class 1 or Class 4 waters are located within the Study Corridor.

The Snake River, Flat Creek, Game Creek, Porcupine Creek, Horse Creek, and Hoback River are rated Class 2AB. Class 2AB waters are known to support game fish populations or spawning and nursery areas at least seasonally. All use designations are supported (drinking water, game fish, nongame fish, fish consumption, other aquatic life, recreation, wildlife, agriculture, industry, and scenic).

Squaw Creek is rated Class 3B. Class 3B waters are tributary waters not known to support fish populations or drinking water supplies and where those uses are not attainable. Only the use designations of other aquatic life, recreation, wildlife, agriculture, industry, and scenic are supported.

Little Horsethief Canyon Creek, Horsethief Canyon Creek, Dells Canyon Creek, Georges Canyon Creek, and Coles Canyon Creek were not present on Wyoming surface water classifications lists.

3.13.3 Waste Water Treatment

The Jackson Sewage Treatment Facility, which serves Jackson and portions of adjacent unincorporated areas, is located between Melody Ranch and the South Park Wildlife Habitat Management Area (SPWMA) of the WGFD. The facility was constructed in 1980 with the most recent treatment upgrade completed in 1997. The treatment capacity is 5.0 million gallons per day, and the average volume treated is approximately 2.3 million gallons per day. Treatment methods are an aerated lagoon system and ultraviolet light disinfection. The treated water is monitored for biological oxygen demand, total suspended solids, pH, and fecal coliform before exiting the lagoon system. The facility has continually been in compliance with state and federal water quality standards except for rare occasions when algal blooms disrupt the pH balance. Treated water flows through a designed waterfowl system of ponds and wetlands of the adjacent South Park Wildlife Habitat Management Area prior to discharge into the Snake River.

3.13.4 Sources of Pollution

Most pollutants entering the Study Corridor's waterways are from nonpoint sources. Nonpoint source pollution is dispersed and not easily traced to definable locations, as opposed to pollution from point sources, such as industrial discharges or sanitary sewer outfalls. Pollutants potentially affecting water quality in the Study Corridor may include fertilizers, sediments, pesticides, herbicides, and highway runoff.

3.14 Waters of the U.S., Including Wetlands

Waters of the U.S. are described generically in EPA's 404(b) guidelines as rivers, streams, ponds, and special aquatic sites (e.g., wetlands). Within the Study Corridor, waters of the U.S. includes waterways (e.g., streams, rivers) and wetlands. This section describes the waters of the U.S. that occur in the Study Corridor. For purposes of the wetland evaluation, the Study Corridor is defined as a corridor 600 feet wide, 300 feet on either side of the centerline of the existing highway. The functions and values of wetlands are also described.

President Carter signed EO 11990 in 1977 that called for avoiding to the extent possible the long- and short-term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative. Wetlands are defined by the USACE and the EPA as "areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstance do support, a prevalence of vegetation typically adapted for life in saturated soils conditions." Waters of the U.S., including wetlands, are protected and regulated under the CWA. Wetlands are waters of the U.S. that meet the following criteria:

- **Hydrophytic vegetation:** Plant life that occurs in areas where there are saturated soils of sufficient duration to exert an influence on the character of the plant species present.
- **Hydric soils**: Soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions that favor the growth and regeneration of hydrophytic vegetation.
- **Wetland hydrology**: Permanent or periodic inundation at water depths of 6.6 feet or saturated soils to the surface at some time during the growing season.

3.14.1 Wetland Occurrence in the Study Corridor

Wetlands in the Study Corridor were delineated in accordance with the USACE's 1987 *Wetland Delineation Manual*. Wetlands were mapped on black and white aerial photography and the boundaries of each wetland were recorded with a global positioning system unit. Waters of the U.S. were also delineated on USGS quadrangle maps of the study area.

Twenty-one wetlands were delineated in the Study Corridor (see **Figure 3-16**). The location and description of each is provided in the *Preliminary Wetlands and Other Surface Waters Report* (WEST, Inc., 2005). Two wetland systems occur in the Study Corridor: riverine and palustrine. Riverine systems include all wetlands and deepwater habitats within a water channel. Palustrine systems are all nontidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens. Within these wetland systems, three types of wetlands are identified based on the WYDOT wetland classification system:

- **Shrub Swamp**: Scrub-shrub wetlands within all nontidal water regimes except permanently flooded.
- **Inland Fresh Meadow**: Emergent (nonshrubby) wetlands with saturated water regimes.
- **Inland Shallow Fresh Marsh**: Emergent (nonshrubby) wetlands with semi-permanently to seasonally flooded water regimes.

Figure 3-16
Location of Wetlands in the Study Corridor

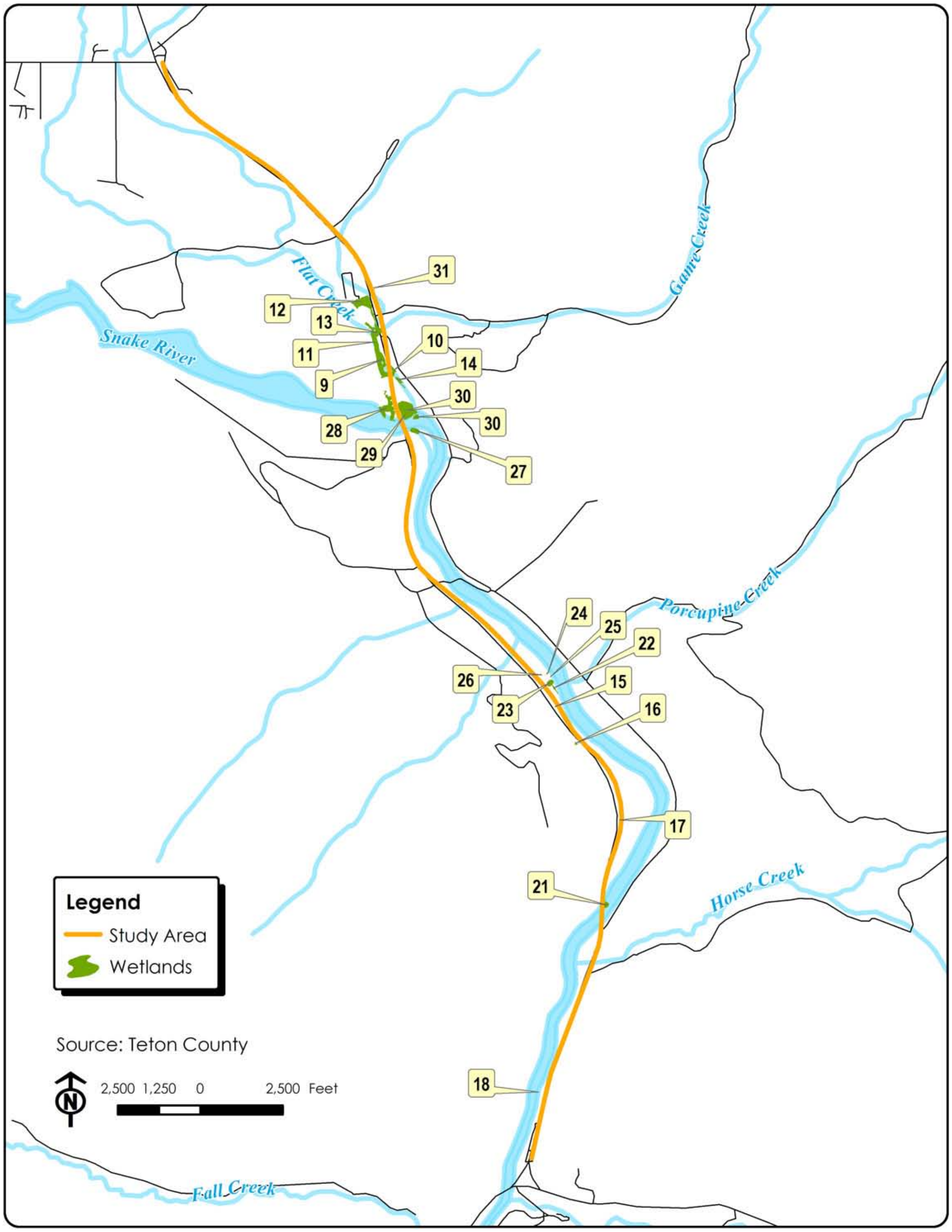


Table 3-15 lists wetland types in the Study Corridor.

Table 3-15
Wetland Area by Type in the Study Corridor

Wetland Type	Number of Wetlands	Total Area acres
Shrub swamp	4	5.44 acres
Inland fresh meadow	16	8.78 acres
Inland shallow fresh marsh	1	4.10 acres
Total	**31**	**18.32 acres**

Shrub Swamp Wetlands

There are four shrub swamp wetlands in the Study Corridor, totaling approximately 5.44 acres. All shrub swamp wetlands are associated with the Snake River; therefore, the wetland hydrology is related either to seasonal flooding or high groundwater. The shrub swamp wetlands are typically dominated by various willow species (*Salix* spp.) in the overstory; however, some also include alder *(Alnus incana)* and/or narrowleaf cottonwood *(Populus angustifolia)*. The understory often includes a mix of grasses, sedges, rushes, and forbs, although many of the willow-dominated wetlands are very dense and have little to no understory. Most of the shrub swamp wetlands have sandy soils.

Fresh Meadow Wetlands

There are 16 inland fresh meadow wetlands in the Study Corridor, totaling approximately 8.78 acres. Many inland fresh meadow wetlands are located in the floodplains of the Snake River and Flat Creek; others, however, are associated with other hydrologic features, such as a small pond, irrigation ditch, and topographic depressions with high groundwater. These wetlands are dominated by a variety of herbaceous species, including sedges (*Carex* spp.), rushes (*Juncus* spp.), and grasses such as meadow foxtail *(Alopecurus pratensis)*, tufted hairgrass *(Deschampsia cespitosa)*, and reed canarygrass *(Phalaris arundinaceae)*. Stands of cattail *(Typha latifolia)* are occasionally present. Soils vary from sandy to clayey soils, with the sandy soils more common in those wetlands adjacent to the Snake River.

One inland shallow fresh marsh is present in the Study Corridor, a relatively large wetland totaling approximately 4.1 acres. It is located in the Snake River floodplain, near the confluence with Flat Creek. It is a large wetland complex, including areas of open water, some patches of willows, but primarily dominated by emergent herbaceous vegetation such as beaked sedge (*Carex rostrata*), manna grass *(Glyceria borealis)*, reed canarygrass, creeping spike rush *(Eleocharis palustris)*, and patches of cattail. This site is likely flooded occasionally when the Snake River floods; however, the hydrology largely appears due to high groundwater. Soils are clayey with evidence of hydric conditions.

3.14.2 Wetland Functions and Values

The functions and values associated with each wetland were quantified using the Montana Department of Transportation (MDT) Montana Wetland Assessment Method

(Berglund, 1999). The purpose of this assessment was to determine the functions and values of the wetlands as well as to develop wetland mitigation that will replace not only the wetland acreage but the functions and values as well.

The following functions and values were evaluated using the MDT method:

1) Habitat for federally listed or proposed threatened or endangered plants and animals
2) Habitat for U.S. Forest Service sensitive species
3) General wildlife habitat
4) General fish/aquatic habitat
5) Flood attenuation
6) Short and long term surface water storage
7) Sediment/nutrient/toxicant retention and removal
8) Sediment/shoreline stabilization
9) Production export/food chain support
10) Groundwater discharge/recharge
11) Uniqueness
12) Recreation/education potential

The assessment considers all 12 functions and values (when applicable), which are rated as "low", "moderate", or "high" and scored on a scale of 0.1 (lowest) to 1 (highest) "functional points." Functional points are summed and expressed as a percentage of the possible total. This percentage is then used in conjunction with other criteria to provide an overall wetland ranking from Category I through IV. Category I wetlands are of exceptionally high quality and are generally rare to uncommon in the state or are important from a regulatory standpoint. Category II wetlands are more common than Category I wetlands and are those that provide habitat for sensitive plants or animals, function at very high levels for wildlife/fish habitat, are unique in a given region, or are assigned very high ratings for other functions or values. Category III wetlands are typically quite common, and less diverse, smaller, and more isolated than wetlands in a higher rated category (i.e., I or II). They can provide many functions and values, but are not primary habitat for federally-listed threatened or endangered species, are not unique or rare, or are not assigned a high rating for the other functions and values assessed. Category IV wetlands are generally small, isolated, and lack vegetative diversity. These sites provide little in the way of wildlife habitat and are often directly or indirectly disturbed. To quantify the functions and values of project wetlands, the score for each of the 12 variables was multiplied by the size of the wetland (acres) and these scores were summed to come up with the number of wetland functional units associated with Study Corridor wetlands.

Of the 21 wetlands in the Study Corridor, 8 were Category I wetlands, 1 was a Category II wetland, 10 were Category III wetlands and 2 were Category IV wetlands. The Category I wetlands included the wetland fringes along the Snake River and Flat Creek, as well as wetland complexes near the Flat Creek confluence with the Snake River. These wetlands were rated Category I primarily due to high values for federally listed and state sensitive species, general fish/aquatic habitat, flood attenuation, shoreline stabilization, and recreational potential. Only one wetland, a relatively unique wet meadow/open water complex formed by a seep, was rated as a Category II wetland. It was rated fairly high due to high values for wildlife habitat and groundwater recharge. The Category III wetlands were generally non-woody wet meadows within floodplains but not on the river/stream channels themselves or isolated wetlands within the highway right-of-way. The Category IV wetlands included one wetland that was a narrow fringe along an irrigation ditch and a small, isolated depression within the highway right-of-way. Based on results of the functional assessment, there are a total of 132.10 wetland functional units associated with the 21 wetlands in the Study Corridor.

3.14.3 Other Waters of the U.S.

In addition to wetlands, 13 waters of the U.S. are located in the Study Corridor (these are numbered on **Figure 3-17**). Waters of the U.S. include the Snake River, Flat Creek, and several perennial and intermittent drainages.

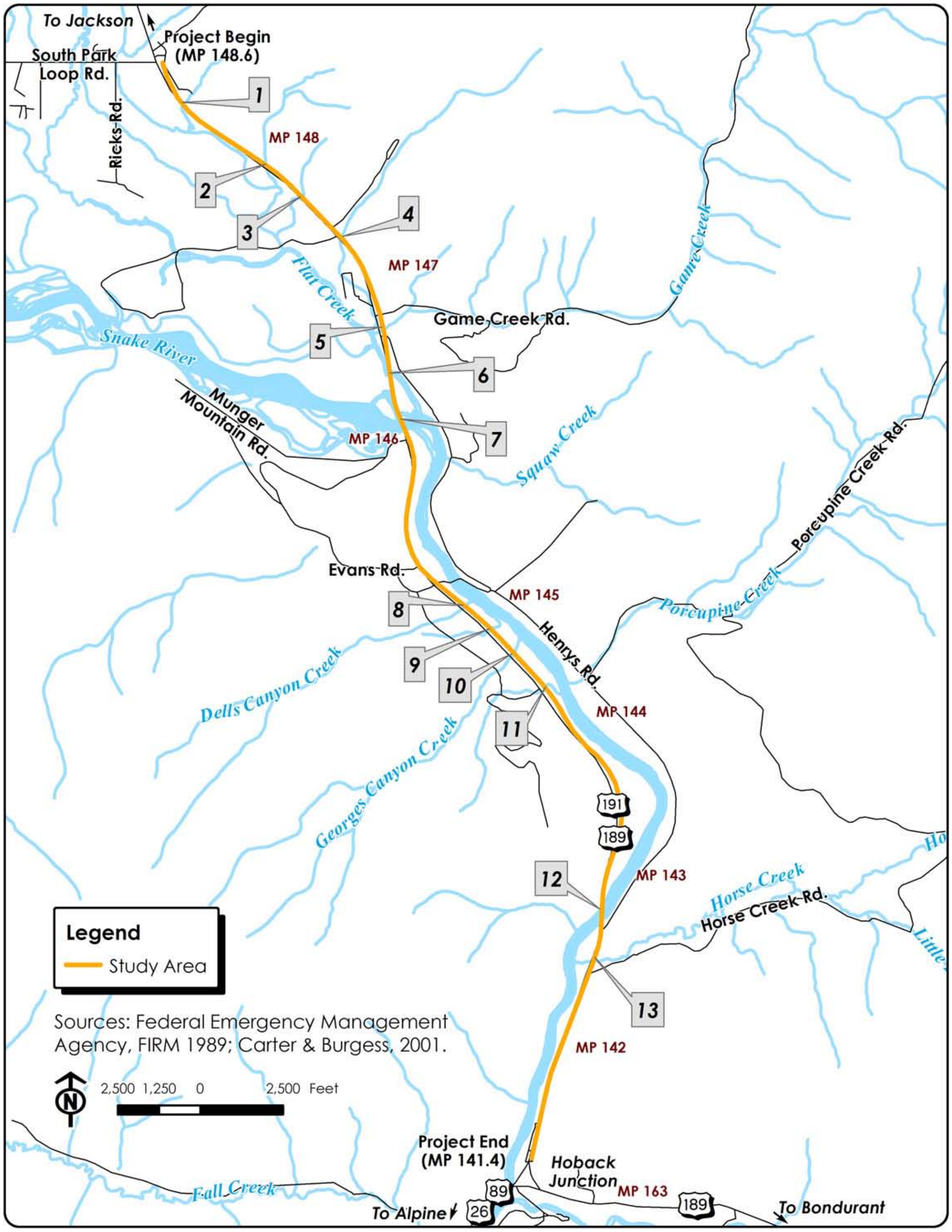
3.15 Floodplains

Floodplains provide many functions and benefits including flood retention and storage, habitat, and filtering of pollutants from stormwater runoff. Executive Order 11988 requires federal agencies to avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains, and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative. In accomplishing this objective, "each agency shall provide leadership and shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health, and welfare, and to restore and preserve the natural and beneficial values served by floodplains in carrying out its responsibilities." Federal agencies consult with the Federal Emergency Management Agency (FEMA) concerning implementation of this Executive Order. 23 CFR 650 Subpart A contains FHWA’s floodplain regulations.

The Teton County Floodplain Management Resolution (2005) requires maintenance of flood-carrying capacity within any altered or relocated portion of a watercourse. Teton County’s land development regulations allow for development of essential facilities within a floodplain provided that the project complies with the Floodplain Management Resolution, wildlife impacts are minimized, and fill standards are met.

One hundred-year floodplains are defined as those areas having a one percent chance of flooding in any given year. Information for 100-year floodplains within the Study Corridor was obtained from the FEMA Flood Insurance Rate Maps (FIRM) and FEMA Flood Insurance Study Reports prepared in May 1989. The FEMA maps indicate that the Snake River and two of its tributaries—Flat Creek and Horse Creek—have associated floodplain hazard areas. The remaining water crossings do not have regulated floodplains.

Figure 3-17
Location of Waters of the U.S. in the Study Corridor



Near MP 146.5, Flat Creek and the Snake River share the same floodplain upstream of their crossings of the highway. This area is located within the limits of a detailed Flood Insurance Study for Teton County, published on May 4, 1989. The study maps the combined floodplain for Snake River and Flat Creek as Zone AE. The FIRM map also shows the regulated floodway limits. No additional encroachment into the floodway can be allowed unless an equal amount of conveyance is provided to compensate for the conveyance loss caused by the encroachment. If an increase in the water surface cannot be practically avoided, a public review and physical map revision and adoption by the community is needed.

The floodplain below the Snake River/Flat Creek crossing is mapped as Zone A. Unlike Zone AE, this designation is not supported by detailed hydrologic and hydraulic analysis and therefore lacks accuracy. WYDOT's project mapping provides more accurate contour data than used in the delineation of the Zone A flood boundary. Therefore, this mapping was used at various locations to compute the water surface elevations and provide more accurate floodplain boundary delineation.

Figure 3-18 shows where the Study Corridor crosses 100-year floodplains, and **Table 3-16** identifies the approximate floodplain widths at these crossing locations.

Table 3-16
100-Year Floodplain Widths

Waterway	Approximate Milepost Location	Approximate Floodplain Width
Snake River and Flat Creek Confluence	146.5	2,300 feet
Snake River	142.8	400 feet
Horse Creek	142.5	300 feet

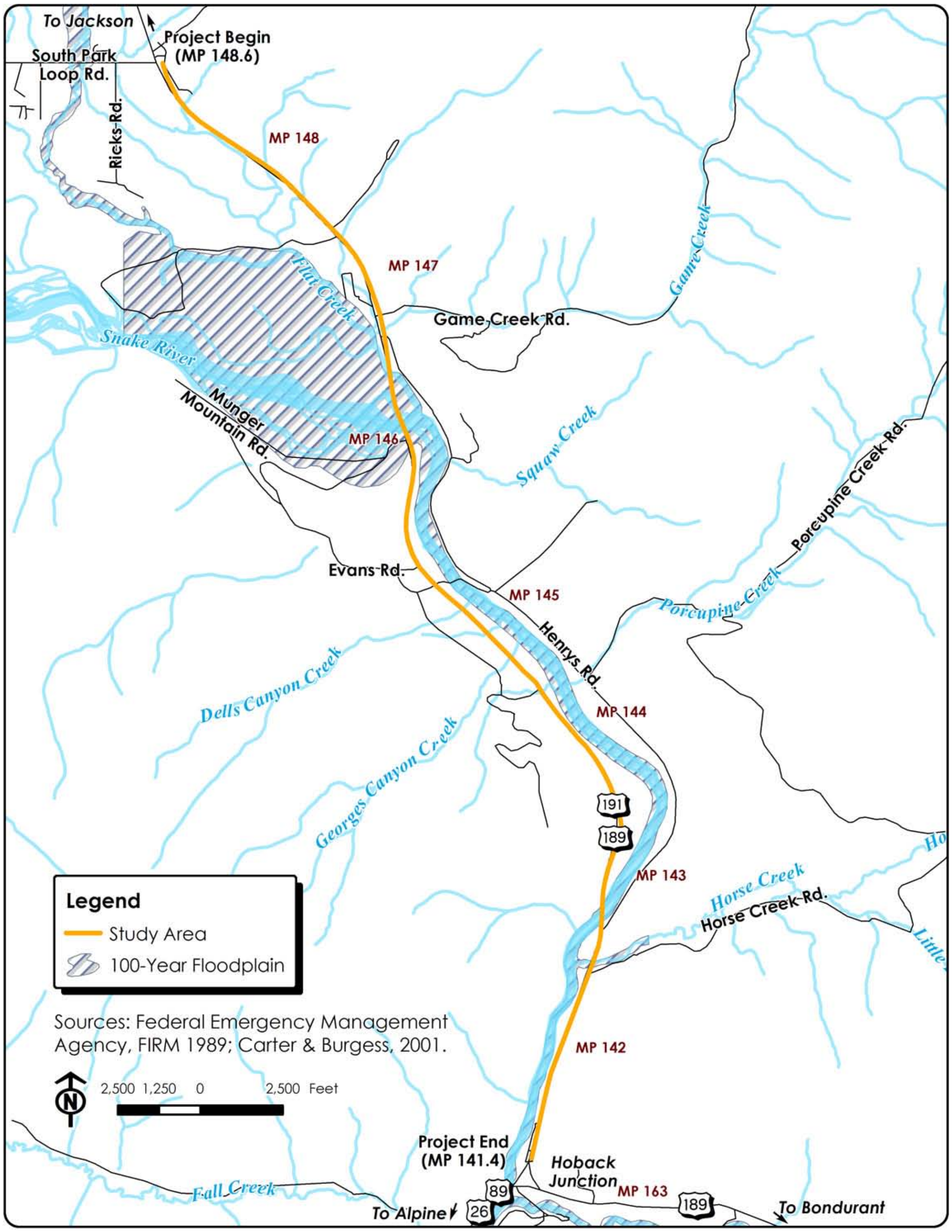
3.16 Wild and Scenic Rivers

The Wild and Scenic Rivers (WSR) Act, enacted in 1968, protects rivers across the nation that are free-flowing and possess outstandingly remarkable values (ORVs), such as scenic, recreational, geologic, fish and wildlife, historic, cultural, or similar values. The Act states that the rivers "shall be preserved in free-flowing condition and their immediate environments shall be protected."

If designated, a river is classified and administered as a Wild River Area, Scenic River Area, Recreational River Area, or a combination thereof.

Wild River Areas are those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted.

Figure 3-18
100-Year Floodplain



Scenic River Areas are those rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads.

Recreational River Areas are those rivers or sections of rivers readily accessible by road or railroad, and may have some development along the shoreline or may have undergone some diversion or impoundment in the past.

To be considered eligible, a river must be free-flowing and have at least one ORV. An officially eligible river is one that has been specifically authorized as a *Study River* by the U.S. Congress. Congress authorizes and funds a study to determine whether a river is eligible or suitable for study and, eventually, for designation as a WSR. *Study Rivers* are exceedingly well protected.

Other ways in which a river can be considered potentially eligible for WSR designation are through listing on the Nationwide Rivers Inventory (NRI) list or by recommendation by a federal agency. Although eligibility of a river under these circumstances does not make the river a *Study River*, it promotes protection of river values and characteristics until an evaluation process and possible designation is completed. Eligible river segments on federal lands are managed at the discretion of the administering agency to protect free-flow and ORVs.

A Presidential Directive by Carter in 1979 stated that each federal agency, as part of its normal planning and environmental review process, must “take care to avoid or mitigate adverse effects on rivers identified in the Nationwide Rivers Inventory.” Further, all agencies are required to coordinate with the National Park Service prior to taking actions that could impact the status of the rivers on the Inventory. However, the Directive does not prohibit an agency from taking, supporting, or allowing an action that could adversely affect the wild and scenic values of a river on the NRI.

In 1975, Congress identified the Snake River from the south boundary of Grand Teton National Park to Palisades Reservoir as a river to be studied for inclusion under the Wild and Scenic Rivers Act. The Bridger-Teton National Forest completed the study in 1979 and recommended 25.5 miles of the Snake River below the South Park Bridge for inclusion in the National Rivers System as a Recreational River Area with scenic, recreational, and wildlife ORVs. Although Congress has not yet acted on that recommendation, the U.S. Forest Service (USFS) is responsible for proper stewardship of the river, including maintaining its free-flowing character and the ORVs that make it suitable for designation. Therefore, it is managed as an eligible river, with a tentative *Recreational* classification.

The Snake River is also considered potentially eligible by the USFS under the *Bridger-Teton National Forest Plan*. Under this plan, the standard for managing an eligible Recreation River is to meet a visual quality objective of *retention* within the river corridor (0.25 mile on either side of the river). *Retention* means that any new man-made alterations to the natural landscape would not be noticed by the average viewer.

The Craig Thomas Snake Headwaters Legacy Act passed in March 2009 protects portions of the Snake River and its major tributaries under the Wild and Scenic Rivers Act. The portion of the Snake River within the Study Corridor was not included in that legislation.

3.17 Roadless Areas

3.17.1 Background

Roadless Area management became the focus of national attention in 1972 when the USFS initiated a Roadless Area Review and Evaluation (RARE I) of National Forest Service roadless areas greater than 5,000 acres to determine their suitability for inclusion in the National Wilderness Preservation System. Since that time, federal direction for the management of roadless areas has been continually evolving. The USFS is currently operating under an Interim Directive (Interim Directive No. 1920-2004-1) issued by the Chief of the USFS on July 16, 2004. The new policy states:

> *"Inventoried roadless areas contain important environmental values that warrant protection. Accordingly, until a forest-scale roads analysis (FSM 7712.13b) is completed and incorporated into a forest plan, inventoried roadless areas shall, as a general rule, be managed to preserve their roadless characteristics. However, where a line officer determines that an exception may be warranted, the decision to approve a road management activity or timber harvest in these areas is reserved to the Chief or the Regional Forester as provided in FSM 1925.04a and 1925.04b. On a project-specific basis, the Chief, for good cause, may grant exceptions to the reservations of authority set out in this interim directive, upon the written request of a Regional Forester or Forest Supervisor."*

Inventoried roadless areas are areas identified in a set of inventoried roadless area maps, contained in the *Forest Service Roadless Area Conservation, Final Environmental Impact Statement*, Volume 2, dated November 2000, and any subsequent update or revision of those maps through the land management planning process.

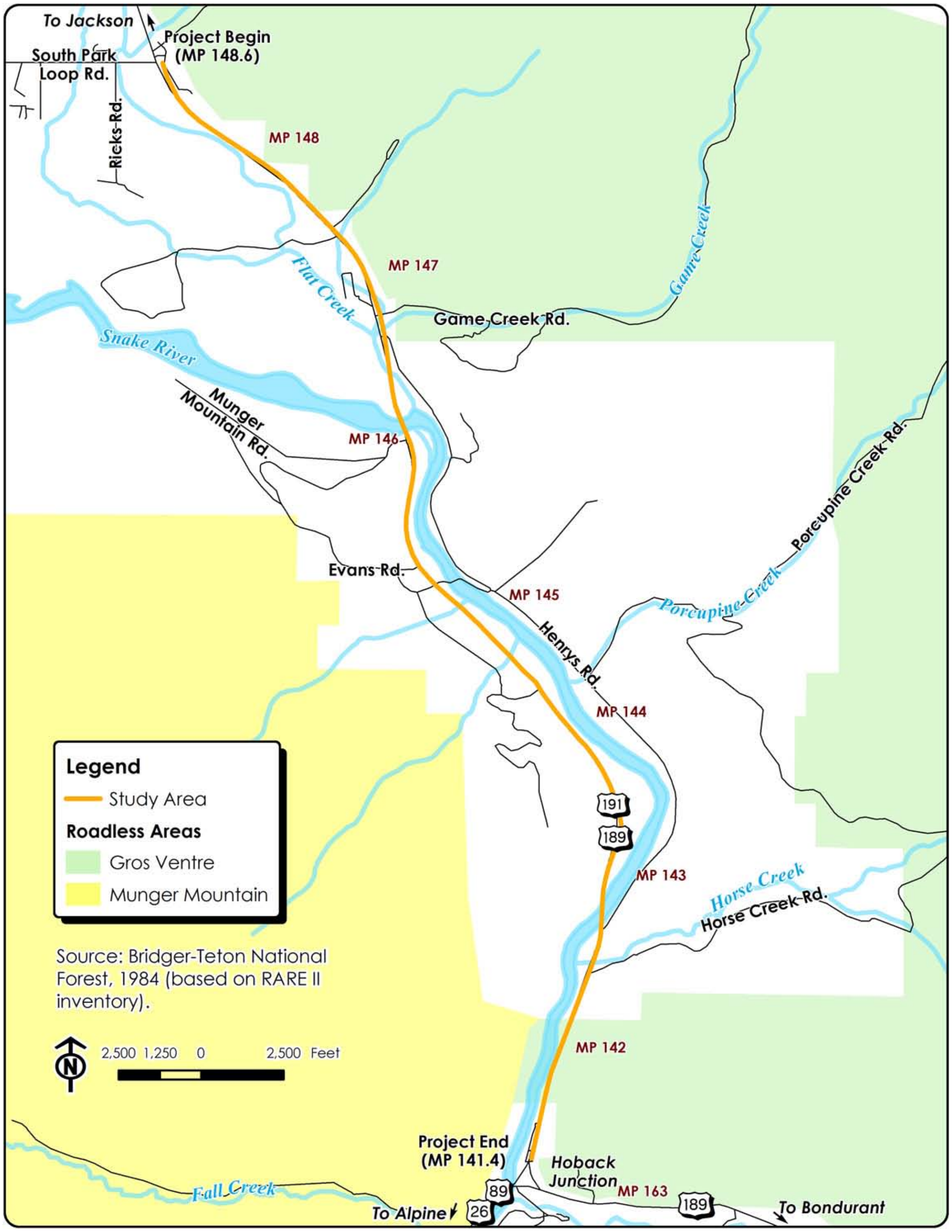
3.17.2 Existing Conditions

Two roadless areas are located in the vicinity of the Study Corridor: Munger Mountain and Gros Ventre.

- The **Munger Mountain Roadless Area** extends from U.S. Highway 26/89/189/191 alignment to the west for over 12,800 acres.
- The **Gros Ventre Roadless Area** extends from U.S. Highway 189/191 to the north for over 284,000 acres.

Roadless areas adjacent to the Study Corridor are shown in **Figure 3-19.**

Figure 3-19
Roadless Areas



3.18 Wildlife and Fisheries

This section describes the wildlife and fisheries resources that may occur in the Study Corridor, including:

- Threatened, endangered, proposed, or candidate species listed under the Endangered Species Act
- Delisted Sensitive Species
- Migratory Birds
- USFS management indicator species (MIS)
- Big game
- Raptors
- Non-game wildlife species
- Waterfowl
- Upland game birds
- Small game
- Furbearers
- Fisheries

The seven-mile Study Corridor parallels the Snake River for approximately 4.5 miles. Approximately 300 wildlife species occur or potentially occur in the greater Study Corridor (see **Appendix B**) (*Wyoming Gap Analysis*, 1996). The greater Study Corridor refers to a one-township buffer around the Study Corridor.

3.18.1 Threatened and Endangered Species

A request was made to the U.S. Fish and Wildlife Service (USFWS) for a list of federally protected species potentially occurring in the Study Corridor. Six threatened, endangered, and proposed listed wildlife species potentially occur in the Study Corridor (**Table 3-17**).

Table 3-17
Federally Threatened and Endangered Listed Wildlife Species

Species	Status
Canada lynx *(Lynx canadensis)*	Threatened
Gray wolf *(Canis lupus)*	Endangered-Experimental
Grizzly bear *(Ursus arctos)*	Threatened
Whooping crane *(Grus americana)*	Experimental**
Black-footed ferret *(Mustela nigripes)*	Endangered
Bald eagle (*Haliaeetus leucocephalus*)	Threatened*

Source: U.S. Fish and Wildlife Service
*The Bald eagle was delisted in 2007.
**The Rocky Mountain region population of Whooping crane has been extirpated.

Canada Lynx

The Canada lynx is a federally listed threatened species that ranges across most of northern North America, inhabiting most of Canada and Alaska. In Wyoming, lynx are confined largely to montane forests in the northwest portion of the state (Crowe, 1986). Distribution and abundance of lynx appears to be tied to that of the snowshoe hare (Kohler and Aubry, 1994). While snowshoe hares provide the primary food source, lynx also feed on mice, squirrels, grouse, and ptarmigan, especially during summer months (McCord and Cardoza, 1982). Only one record of lynx was found that occurred within the townships in which the Study Corridor occurs (WYNDD, 2002). The WGFD radio-telemetry study of lynx in the Wyoming Range found that long-range movements were not uncommon (Laurion and Oakleaf, 1998). Although studies of radio-collared lynx in Colorado determined 5 of 39 deaths resulted from vehicle collisions (Shenk, 2001), it does not appear lynx movements in Wyoming are affected by the presence of existing highways (Laurion and Oakleaf, 1998).

According to recent research on lynx in the Greater Yellowstone Area (GYA), there are no known records of lynx use between Hoback Junction and South Park Loop Road; the area is not foraging habitat, or within lynx core habitat (N. Berg, pers. comm.). While habitat surrounding the Study Corridor could be used by lynx during wide ranging movements, the high human presence likely precludes use by lynx and they are not expected to occur in the project area.

The Northern Rockies Lynx Management Direction (NRLMD) provides several standards and guidelines relative to roads and highways intended to minimize potential impacts to lynx, and covers lands within the Bridger-Teton National Forest, including the project area. Traffic volumes of 4,000 vehicles or more per day are believed to present mortality risk and potential habitat fragmentation for lynx (Ruediger et al., 2000). Currently, traffic volumes in the project area meet the 4,000 vehicle per day threshold and would create a potential barrier to movement according to the Lynx Conservation Assessment and Strategy (Ruediger et al., 2000).

In February, 2008, the USFWS published a Proposed Rule (73 FR 10860) to revise the designated critical habitat for the contiguous United States distinct population segment of Canada Lynx. The proposed revised critical habitat in Wyoming occurs in portions Fremont, Lincoln, Park, Sublette, and Teton Counties, including parts of Yellowstone National Park and Bridger-Teton and Shoshone National Forests, and small areas of Bureau of Land Management and private lands. A small portion of the proposed highway project occurs along the western boundary of proposed lynx critical habitat in Wyoming. As such, there is no critical lynx habitat on the west side of the highway and the Snake River is effectively a barrier in the areas where the critical habitat is designated (between Hoback Junction and Horse Creek on the east side of the highway). Lynx critical habitat is defined as those areas that contain four primary constituent (PCE) necessary for the conservation of lynx. These include: (1) presence of sufficient prey populations, specifically snowshoe hare, and their preferred habitat conditions, including dense understories of young trees or shrubs tall enough to protrude above the snow; (2) winter snow conditions that are generally deep and fluffy for extended periods of time; (3) sites for denning having abundant, coarse, woody debris, such as downed trees and root wads;

and (4) matrix habitat (other habitat types that do not support snowshoe hares) that occurs between patches of boreal forest in close juxtaposition such that lynx are likely to travel through such habitat unimpeded. With the exception of potential matrix habitat, the project area lacks lynx PCEs and would not be considered critical habitat.

Gray Wolf

The gray wolf is a federally listed endangered species; however, wolves in the Study Corridor are considered part of the reintroduced experimental nonessential population of Yellowstone National Park (YNP). The Northern Rocky Mountain gray wolf population was removed from the threatened and endangered list in early 2008 but was reinstated in July 2008 by U.S. Federal District Court. Prior to European settlement, gray wolves were distributed across most of North America above 20 degrees latitude (e.g., above mid-Mexico) in all habitats that supported ungulate populations (Young and Goldman, 1944). Today, gray wolves in the lower 48 states occur primarily in wilderness forests of Minnesota, Michigan, Wisconsin, Idaho, Wyoming, and Montana. For wolves in the GYA, elk are the primary food source and represent 80 percent to 90 percent of wolf kills (USFWS et al., 2001). Den sites are variable, but tend to occur on elevated knolls or on side hills close to water (Mech, 1970).

Prior to reintroduction efforts, wolves were believed eliminated from Wyoming by the 1930s. In 1995, the USFWS began implementing a wolf reintroduction program in central Idaho and YNP, where 66 wolves from Canada were released (31 in YNP, 35 in Idaho). Reintroduction efforts in YNP have been considered successful, and at the end of 2004, 171 wolves in 16 packs were present in YNP (Smith et al., 2005). In addition, up to 11 packs resided outside YNP in 2004 (USFWS et al., 2006).

Habitat through the Study Corridor supports large numbers of ungulates and is suitable habitat for wolves. Wolf pack locations are highly dynamic and the Study Corridor has been in close proximity to several packs over the years including the Teton, Green River, and Pinnacle wolf packs. Wolves have been documented to be killing elk on and near the WGFD Horse Creek and Camp Creek feedgrounds (WGFD, 2001).

Grizzly Bear

The grizzly bear historically inhabited a wide range of habitats across western and central North America, from the Arctic Ocean to central Mexico. Today the grizzly bear is restricted to approximately half of its former range, and within the lower 48 states they have been eliminated from all but two percent of their original range (Pasitschniak-Arts and Messier, 2000). Grizzly bears occupy six different areas in the contiguous United States, including parts of Washington, Idaho, Montana, and Wyoming (Servheen, 1990). Grizzly bears are wide ranging omnivores that require large home ranges, across a diversity of habitats.

Most grizzly bear activity in the greater Yellowstone area occurs north and northeast of the Study Corridor. The Study Corridor is outside the primary conservation area for grizzly bear (*Final Conservation Strategy for the Grizzly Bear in the Greater Yellowstone Area*, March 2007). While habitat surrounding the Study Corridor could be considered suitable, the high human presence likely precludes heavy use by grizzly bears.

The Yellowstone grizzly bear population was removed from the federal list of threatened and endangered species in 2007. However, on September 21 2009, the U.S. District Court in Montana ordered that the grizzly bear be placed back on the federal list of threatened and endangered species, with immediate effect. The ruling cited a decline in whitebark pine trees, which is a key food source for many bears that has been disrupted by climate change, forest fires, and other factors. It also stated that state and federal conservation plans meant to protect Yellowstone area grizzly bears in the future were inadequate.

Whooping Crane

Whooping crane was included on the list of endangered species in 1967 prior to the enactment of the Endangered Species Act (USFWS, 1967). Historically, Wyoming has been outside its range, except for one nesting record from YNP (Luce et al., 1999). Between 1975 and 1988, extensive efforts were made to establish a migratory population of Whooping Cranes that bred in the Gray's Lake National Wildlife Refuge, Idaho, and wintered in the middle Rio Grande Valley, New Mexico. This population never exceeded 33 individuals, but some occasionally migrated through or summered in western Wyoming. By 1997 only three non-breeding adult whooping cranes survived in the Gray's Lake population (USFWS, 1997) and currently there are no individuals known to exist in this population (M. Jennings, pers. comm.). Typical habitat is wet meadows and grasslands, marshes, poorly drained potholes, and shorelines with water depths less than 11.8 inches (Doughty, 1990). During migration, habitats most frequently used by whooping cranes include wetlands and shallow river sandbars for roosting and cropland for feeding (Johns et al., 1997; Currier et al., 1985).

Although whooping cranes were occasionally observed throughout western Wyoming in the 1970s and 1980s, no observations near the Study Corridor have been made since 1979. The Snake River in the Study Corridor does not provide whooping crane habitat, and because this population has been extirpated, they will not occur in the study area.

Black-footed Ferret

The black-footed ferret is a federally listed endangered species that was historically distributed across the western plains of North America wherever prairie dogs occurred (Anderson et al., 1986). Black-footed ferrets are habitat specialists and dependent on prairie dog colonies for survival (Biggins et al., 1985), and prairie dogs comprise more than 90 percent of black-footed ferret diets (Campbell et al., 1987). Because of large-scale reductions in prairie dog populations, black-footed ferrets were nearly eliminated by the 1980s. Recovery and reintroduction programs have had good results; however, at least one Wyoming population persists in Shirley Basin.

No suitable black-footed ferret habitat exists in or adjacent to the Study Corridor. Although white-tailed prairie dogs are known to inhabit the Green River Basin, no prairie dog colonies occur in the Snake River Basin of Wyoming (Clark and Stromberg 1987; Luce et al., 1999).

3.18.2 Delisted Sensitive Species

The USFWS included the bald eagle in their list of federally threatened and endangered species potentially occurring in the Study Corridor (see **Table 3-17**). Therefore, bald eagle was included in the effects assessment conducted in the earlier phases of this project. In 2007, the federal government removed the bald eagle from the list of threatened and endangered species. However, because the bald eagle remains a sensitive species, the results of research conducted are included in this EIS, and are presented below.

Bald Eagle

Although the bald eagle was removed from the federal list of threatened and endangered species in 2007, it continues to be protected under the Bald and Golden Eagle Protection Act (BGEPA) and the Migratory Bird Treaty Act (MBTA). The bald eagle historically occurred over most of North America in a variety of habitats. Generally, they require areas in proximity of water for nesting, and during winter areas with readily available, abundant food sources and good roost sites. Roosts are generally old, large trees with good visibility and little human disturbance. In Wyoming, bald eagles are listed as an uncommon resident and usually occur in coniferous forests and cottonwood/riparian habitats in the northwestern portion of the state. In the winter, the population of bald eagles in Wyoming increases because of an influx of migrants from the north. Wintering eagles are primarily found in open areas near water where they feed on fish, carrion, and waterfowl. By 1996 there were 70 known pairs nesting in Wyoming, with the majority of these occurring in Yellowstone and Grand Teton National Parks. Since that time the number of nesting pairs in Wyoming has potentially doubled and they occupy habitat along all major river corridors in the state (B. Oaklead, WGFD, pers. comm.).

Records indicate that bald eagles are common in the Study Corridor (WGFD WOS, 2002). Bald eagles occur year-round in the Study Corridor and there are four bald eagle nests in or adjacent to the Study Corridor, including the Munger Mountain pair, the Porcupine pair, Hoback Junction pair, and the South Park pair. The riparian habitat along the Snake River is considered nesting and foraging habitat for bald eagles.

3.18.3 Migratory Birds

The Migratory Bird Treaty Act (MBTA) is a federal statute (16 USC Section 703 et. seq.) under the jurisdiction of the USFWS with the original intent to curtail international trade in birds and bird parts. The MBTA was originally passed in 1918 to stop the "indiscriminate slaughter" of migratory birds by market hunters targeting birds for the millinery and commercial food trade. The MBTA specifies that no one may take, possess, import, export, transport, sell, purchase, or barter, any migratory bird, or parts including nests and eggs unless authorized by permit. The MBTA provides protection to 861 species based on the most recent revised list (Fish and Wildlife Service - 50 CFR Part 10).

The USFWS Office of Migratory Bird Management published a list of *Migratory Nongame Birds of Management Concern* in 1995 (USFWS, 1995). The list superseded a similar list prepared in 1987 (USFWS 1987). While the MBTA protects all migratory birds, the birds of concern list was intended to identify species, subspecies, or populations of migratory birds that are likely to become candidates for listing under the Endangered Species Act

(ESA) in the absence of conservation measures. The overall purpose of the list was to identify those species of migratory nongame birds that are considered to be of concern in the United States because of population declines, small or restricted populations, and/or dependence on restricted or vulnerable habitats. The list has not been updated since 1995; however, the USFWS has since published the *Birds of Conservation Concern* list in 2002 (USFWS, 2002). With similar intent, the *Birds of Conservation Concern* list was formed to identify species that may be in need of conservation measures to prevent or remove the need for future ESA listings. The *Birds of Conservation Concern* list considers all bird taxa including species not protected under the MBTA.

There are 40 species of migratory birds on the list of Migratory Nongame Birds of Management Concern for the USFWS Region 6, which includes Wyoming. Of these, 30 species occur in or migrate through Wyoming, and 14 potentially occur in the project area based on habitat and known distribution (see **Table 3-18**). The bald eagle is also protected under the BGEPA and is discussed in Section 3.18.2.

Common loon, trumpeter swan, and northern goshawk are listed by the BTNF as sensitive species and are addressed in Sections 3.18.6 and 3.18.7. Brewer's sparrow is a USFS Management Indicator Species and is addressed in Section 3.18.6. American bittern, white-faced ibis, long-billed curlew, and black tern are uncommon summer residents and migrants found throughout Wyoming and are typically associated with marshes, aquatic habitats, wet meadows, and/or palustrine emergent wetland habitats. There is little if any habitat suitable for these species in the project area. The Snake River riparian corridor is not considered highly suitable for these species because it is riverine in nature with forested riparian habitat. Northern harrier, ferruginous hawk, and loggerhead shrike are common summer residents and migrants throughout Wyoming typically found in shrubland or grassland habitats. Areas scattered throughout the project corridor may be suitable for these species, but they are not expected in large numbers due to the overall influence of the region by montane habitats and the developed nature of the project area. Red-headed woodpecker and veery are uncommon summer residents and migrants throughout Wyoming, typically associated with cottonwood riparian or aspen habitats and may be present in the project area in these habitats.

Table 3-18
Migratory Birds of Management Concern Potentially Occurring in the Project Area

Species	Typical Habitat	Wyoming Occurrence/Distribution
Common Loon (*Gavia immer*)	Lakes and reservoirs above 6,000 feet elevation	Uncommon summer resident in the northwest; potential migrant statewide
American Bittern (*Botaurus lentiginosus*)	Marshes	Uncommon summer resident or migrant statewide
White-faced Ibis (*Plegadis chihi*)	Marshes, wet meadows, lake shores, irrigated meadows	Uncommon summer resident and migrant, primarily in the southwest
Trumpeter Swan (*Cygnus buccinators*)	Lakes, rivers, large marshes with open water	Common resident in the northwest
Northern Harrier (*Circus syaneus*)	Grassland, shrubland, marshes	Common summer resident and migrant, statewide
Northern Goshawk (*Accipiter gentilis*)	Conifer and aspen forest	Common resident and migrant , statewide
Ferruginous Hawk (*Buteo regalis*)	Shrubland, grassland, foothills, rocky outcrops	Common resident and migrant, statewide
Long-billed Curlew (*Numenius americanus*)	Wet-moist grasslands, irrigated meadows, agricultural with nearby aquatic areas	Uncommon summer resident and migrant, statewide
Black Tern (*Chlidonias niger*)	Marshes, aquatic areas	Common summer resident and migrant, statewide
Red-headed Woodpecker (*Melanerpes erythrocephalus*)	Cottonwood riparian, ponderosa pine savammah	Uncommon summer resident and migrant, statewide
Olive-sided Flycatcher (*Contopus borealis*)	Coniferous forest, aspen forest, riparian areas above 8,000 feet elevation	Common summer resident and migrant, statewide
Veery (*Catharus fuscescens*)	Aspen, cottonwood riparian, open coniferous forest below 9,000 feet elevation	Uncommon summer resident and migrant, statewide
Loggerhead Shrike (*Lanius ludovicianus*)	Shrubland, pine-juniper, woodland chaparral	Common summer resident and migrant, statewide
Brewer's Sparrow (*Spizella breweri*)	Shrublands, sagebrush	Common summer resident and migrant, statewide

Source: USFWS 2002

3.18.4 USFS Management Indicator Species—Big Game

Management indicator species (MIS) are those species designated by the *Bridger-Teton National Forest (BTNF) Land and Resource Management Plan*, 1990, used to indicate the effects of habitat changes associated with forest management activities. The USFS recognizes these three types of MIS for the BTNF: harvested species (big game), ecological indicator species, and sensitive species.

3.18.5 Harvested Game Species/Big Game

Harvested MIS designated by the BTNF include mule deer, elk, moose, bighorn sheep, and pronghorn. With the exception of mountain goat, mountain lion, and black bear, harvested MIS include all of the species managed as big game by the WGFD. Harvested MIS and big game are both described in this section.

Big game species were identified during scoping as a wildlife resource of concern. Five ungulate species of big game could occur in or adjacent to the Study Corridor, including mule deer, elk, moose, bighorn sheep, and mountain goat. The WGFD identifies several types of seasonal ranges used by big game in the Study Corridor. These are described in **Table 3-19**. Acres of potentially affected seasonal ranges are shown by big game species in **Table 3-20**.

Table 3-19
Seasonal Ranges for Big Game Populations

Range	Definition
Crucial	Crucial range is any particular range or habitat component which determines whether a population maintains and reproduces itself at or above the WGFD population objective over the long term.
Winter	A population or portion of a population uses this habitat annually in substantial numbers only during winter (December 1 to April 30).
Winter/Yearlong	A portion of a population uses this habitat yearlong, but during winter there is a significant influx of animals into this area from other seasonal ranges.
Yearlong	A population or substantial portion of a population uses this habitat yearlong.
Spring/Summer/Fall	A population or portion of a population uses this habitat annually (May 1 to November 30), excluding winter.
Parturition	Birthing areas commonly used by a substantial number of females from a population.

Source: Wyoming Game and Fish Department, 1990.

Table 3-20
Seasonal Ranges Among Herd Units for Potentially Affected Ungulate Big Game Species

Species (Herd Unit)	Total Occupied Habitat (acres)	Area (Acres) of Seasonal Ranges Potentially Affected						
		Crucial Habitat		Spring / Summer / Fall	Winter	Winter / Yearlong	Year-long	Parturition*
		Winter	Winter/ Yearlong					
Mule Deer (Sublette)	3,414,180	141,130	145,182	2,823,021	137,939	166,908	---	61,378
Elk (Fall Creek)	429,889	---	30,558	371,734	2,200	25,397	---	43,794
Moose (Sublette)	2,833,517	41,215	324,057	1,783,271	104,143	161,222	419,609	--
Bighorn Sheep (Targhee)	696,477	10,708	958	683,369	1,442	---	---	--
Bighorn Sheep (Jackson)	1,118,289	23,448	15,620	1,047,723	16,776	14,722	---	--
Mountain Goat (Palisades)	178,669	---	7,360	171,309	---	---	---	4,281

*Because parturition areas overlap other seasonal ranges, they are not included in total occupied habitat.
Source: WEST, Inc.

Mule Deer

The Study Corridor passes through the northwest portion of the Sublette Mule Deer Herd Unit. The Sublette Mule Deer Herd Unit is the third largest in the state, extending from the Wind River Range northwest to the Snake River Range. The herd unit encompasses 4,225,197 acres and includes 15 Hunt Areas. The WGFD manages this herd unit for a post-season population objective of 32,000 deer. An estimated population of 34,700 was present in 2001, with a five-year (1996 to 2000) average of 29,140 (WGFD, 2001a). A total of 3,223 animals were harvested in 2001 and provided 43,108 recreation days to hunters. A recreation day is defined as a day a licensed hunter spent in the field.

Deer in the Sublette Mule Deer Herd Unit are likely the most migratory deer herd in North America, annually moving 60 to 100 miles between winter and summer ranges (Sawyer and Lindzey, 2001). These deer congregate to winter in the sagebrush deserts of the Green River Basin, then distribute themselves among five different mountain ranges (Wind River Range, Gros Ventre Range, Snake River Range, Wyoming Range, and Salt River Range) during the summer (Sawyer and Lindzey, 2001). Approximately 70 percent of these deer use the Hoback Basin for parturition (June 1 to June 15) (Sawyer and Lindzey, 2001).

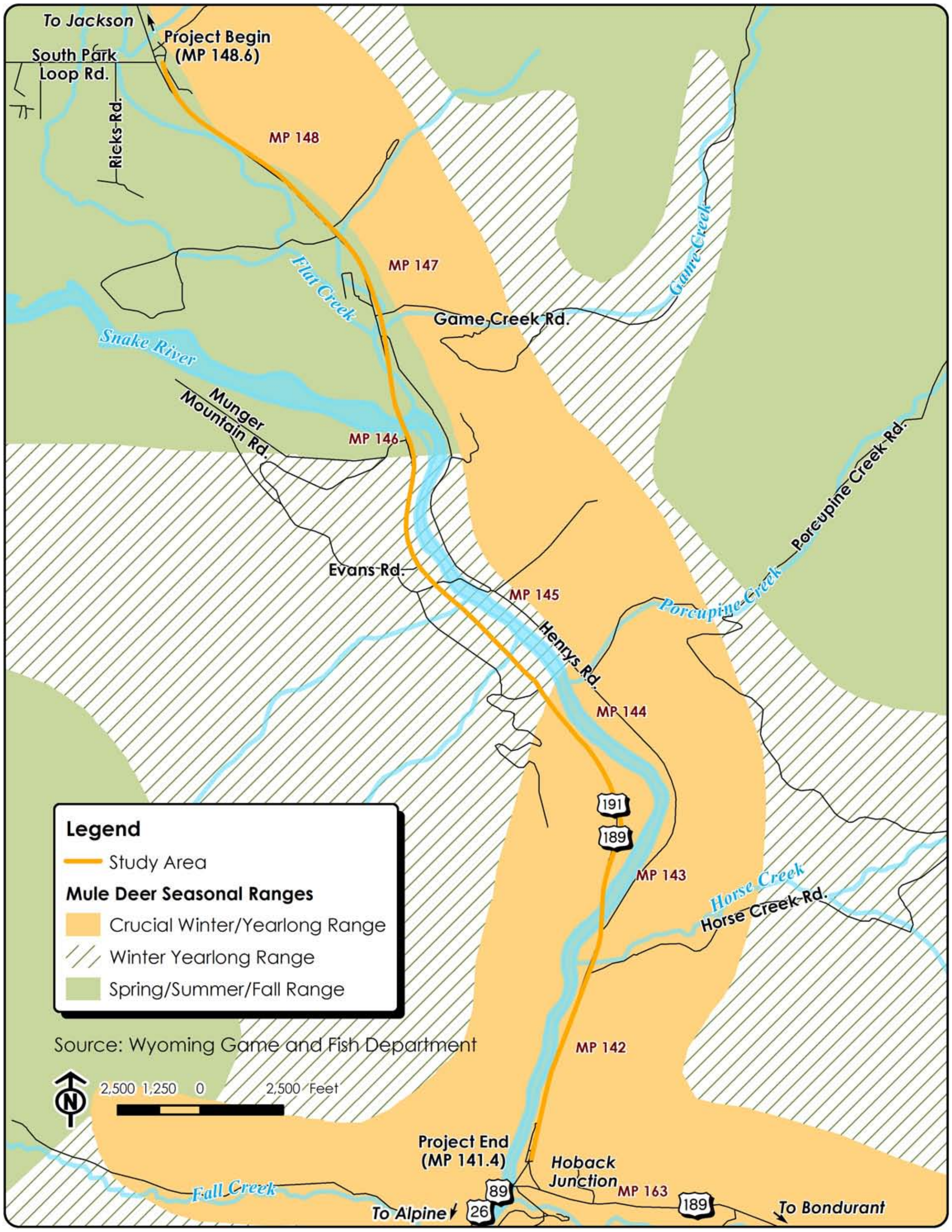
A variety of mule deer seasonal ranges occur in and adjacent to the Study Corridor, including crucial winter/yearlong, winter/yearlong, and spring/summer/fall ranges (see **Figure 3-20**). Although mule deer occupy the Study Corridor year-round, they occur at higher densities during the winter. Depending on weather conditions, mule deer generally utilize the entire Study Corridor during the winter and often move back and forth across the highway.

Elk

The Study Corridor passes through the central portion of the 672-square-mile Fall Creek Elk Herd Unit. The USFS manages 91 percent of the land in this herd unit, which includes two Hunt Areas and has a post-season population objective of 4,400 elk. The Fall Creek Elk Herd Unit includes four winter feedgrounds (South Park, Horse Creek, Camp Creek, and Dog Creek) (see **Figure 3-21**) and allow the herd unit to support a much larger number of elk than could be sustained on native ranges alone (WGFD, 2000). Feeding usually begins in early to mid-December, depending on weather conditions. During the 2001 to 2002 winter, approximately 1,200 elk were fed at South Park, 1,400 at Horse Creek, 1,000 at Dog Creek, and 1,100 at Camp Creek (WGFD, 2001a). Winter 2001 to 2002 was the first winter that wolves appeared at feedgrounds in the Fall Creek Herd Unit, killing 15 elk at Horse Creek and Camp Creek (WGFD, 2001a).

An estimated population of 5,259 elk was present in 2001, with a five-year (1996 to 2000) average of 4,643 animals (WGFD, 2001a). In 2001, 703 elk were harvested and provided 12,091 recreation days to hunters.

Figure 3-20
Mule Deer Seasonal Ranges



Source: Wyoming Game and Fish Department. 2002. Big game seasonal range maps. Wyoming Game and Fish Department, Cheyenne, Wyoming.

A variety of elk seasonal ranges occur in and adjacent to the Study Corridor, including crucial winter/yearlong, winter/yearlong, and spring/summer/fall ranges (see **Figure 3-21**). Although elk occupy the Study Corridor on a year-round basis, they occur at higher densities during the winter when they are concentrated on or near WGFD feedgrounds. When weather conditions allow, elk may utilize natural winter ranges adjacent to WGFD feedgrounds.

Bighorn Sheep
The Study Corridor bisects two bighorn sheep herd units: the Targhee and Jackson. The Targhee Bighorn Sheep Herd Unit encompasses 1,138 square miles west of the Study Corridor and comprises Hunt Area 6. The WGFD manages this herd unit for a post-season population objective of 125 bighorn sheep. Current distribution is restricted to the crest of the Teton Range (WGFD, 2000). An estimated population of 118 was present in 2000, with a five-year (1995 to 1999) average of 111 (WGFD, 2000). Four licenses were issued in 2000 and resulted in no harvest and 14 hunter recreation days.

The Jackson Bighorn Sheep Herd Unit encompasses 1,747 square miles east of the Study Corridor and comprises Hunt Area 7. The WGFD manages this herd unit for a post-season population objective of 500 bighorn sheep. Although some bighorn sheep in this herd unit remain above timberline during winter, most migrate to low-elevation winter ranges along the Gros Ventre River, National Elk Refuge, and Hoback Canyon (WGFD, 2000). An estimated population of 571 bighorn sheep was present in 2000, with a five-year (1995 to 1999) average of 562 (WGFD, 2000). A total of 14 bighorn sheep were harvested in 2000 and provided 224 recreation days to hunters.

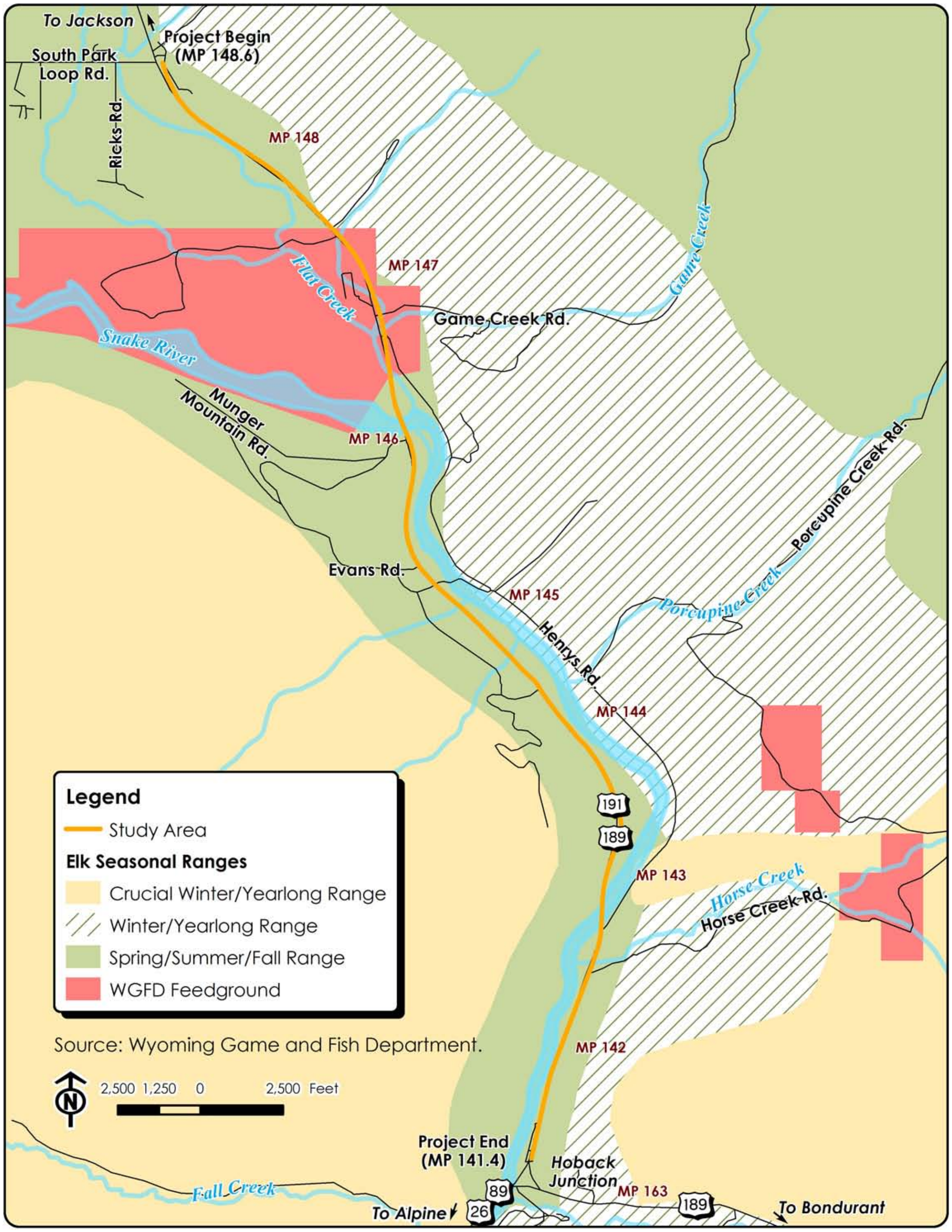
There are a variety of bighorn sheep seasonal ranges in and adjacent to the Study Corridor, including spring/summer/fall ranges (see **Figure 3-22**).

Moose
The Study Corridor passes through the northwest portion of the Sublette Moose Herd Unit. The herd unit encompasses 5,801 square miles and includes ten Hunt Areas. The WGFD manages this herd unit for a post-season population objective of 5,500 moose. An estimated population of 5,665 was present in 2001, with a five-year (1996 to 2000) average of 5,768 (WGFD, 2001a). A total of 551 animals were harvested in 2001 and provided 3,078 recreation days to hunters.

There are a variety of moose seasonal ranges in and adjacent to the Study Corridor, including crucial winter/yearlong, winter/yearlong, and spring/summer/ fall ranges (see **Figure 3-23**). Although moose occupy the Study Corridor on a year-round basis, they occur at higher densities during the winter.

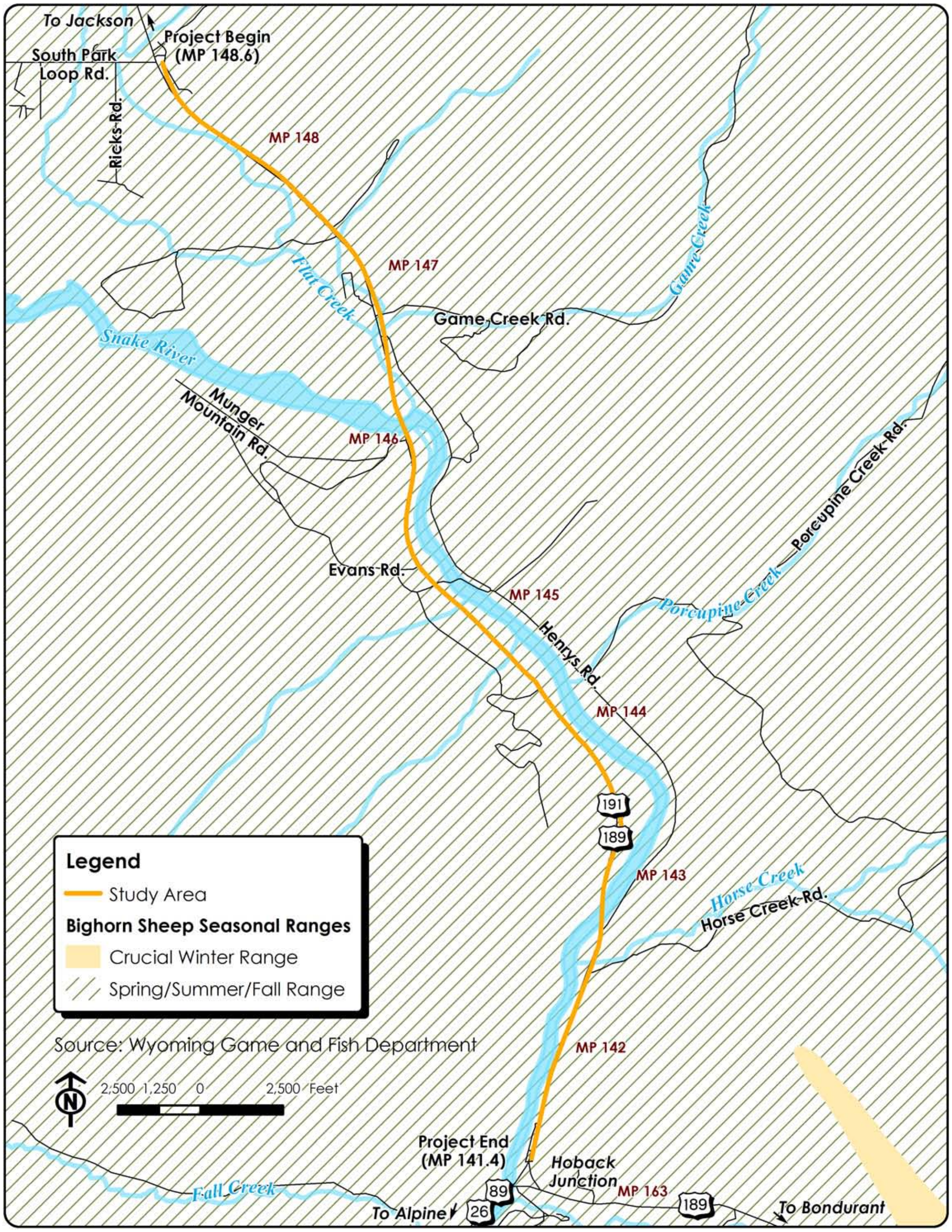
Mountain Goat
The portion of the Study Corridor immediately adjacent to the Snake River forms the eastern boundary of the 279 square miles Palisades Mountain Goat Herd Unit. This herd unit comprises Hunt Area 2 and is managed by the WGFD for a post-season population

Figure 3-21
Elk Seasonal Ranges



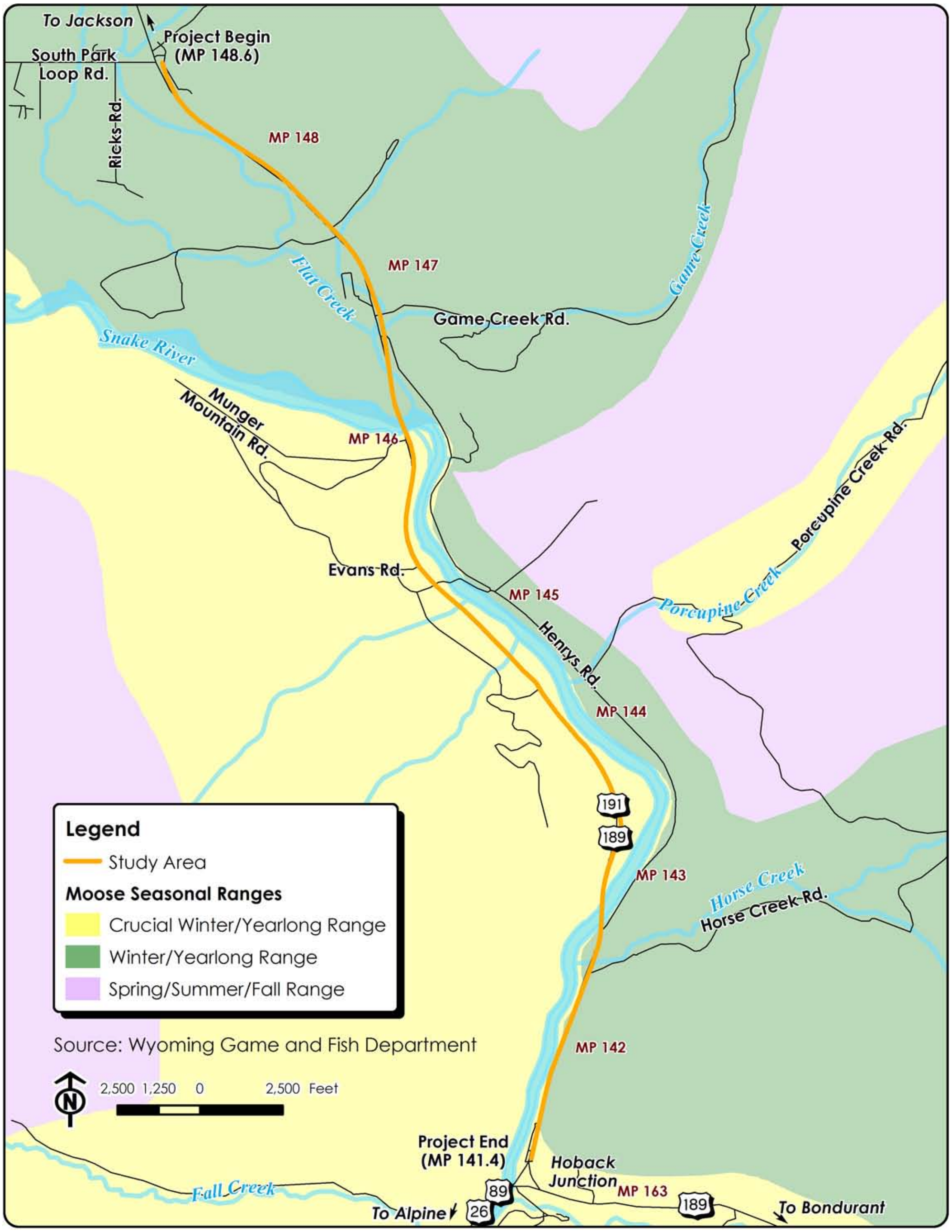
Source: Wyoming Game and Fish Department. 2002. Big game seasonal range maps. Wyoming Game and Fish Department, Cheyenne, Wyoming.

Figure 3-22
Bighorn Sheep Seasonal Ranges



Source: Wyoming Game and Fish Department. 2002. Big game seasonal range maps. Wyoming Game and Fish Department, Cheyenne, Wyoming.

Figure 3-23
Moose Seasonal Ranges



Source: Wyoming Game and Fish Department. 2002. Big game seasonal range maps. Wyoming Game and Fish Department, Cheyenne, Wyoming.

objective of 50 animals. This population originated from mountain goats that dispersed from Idaho, following transplant operations conducted by the Idaho Game and Fish Department in the 1960s and 1970s. Wildlife managers in Wyoming and Idaho continue to coordinate surveys and share data relative to the management of this interstate population. An estimated population of 70 mountain goats was present in 2000, with a five-year (1995 to 1999) average of 36 mountain goats (WGFD, 2000). Three licenses were issued and filled in 2000, and provided 12 recreation days to hunters.

Mountain goat seasonal spring/summer/fall ranges occur immediately west of the Study Corridor (see **Figure 3-24**). Mountain goats are known to cross the Snake River and U.S. Highway 26/89, southwest of the Study Corridor.

Mountain Lion

The Study Corridor passes through the Mountain Lion Hunt Area 2 (Teton), which has an annual mortality quota of 12 lions, but cannot exceed six females. A total of 12 lions were harvested in 2000, including six males and six females (WGFD, 2001b).

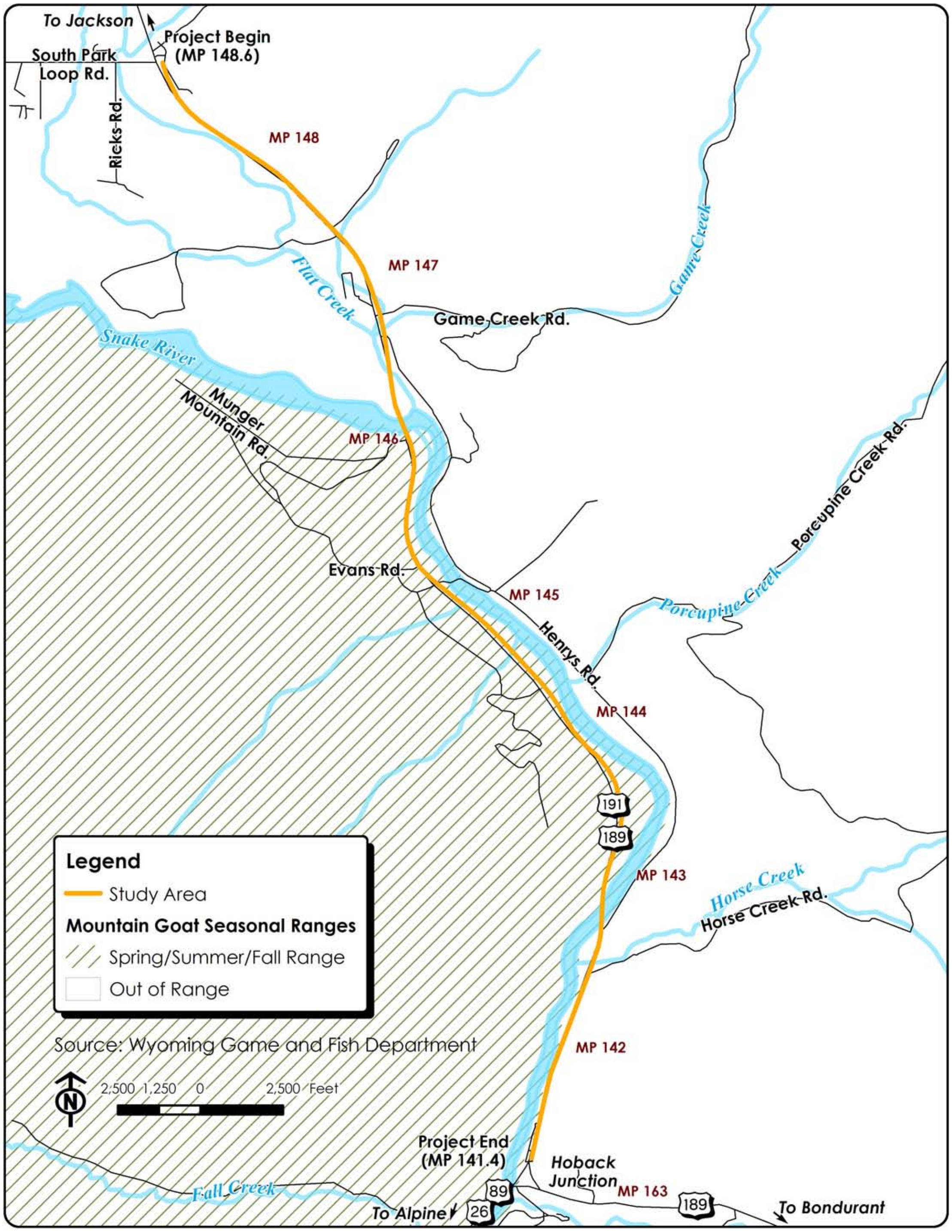
Black Bear

The Study Corridor borders Black Bear Hunt Area 17 (Hoback) to the south. Hunt Area 17 is part of the Greys River Black Bear Management Unit, which allows both spring and fall hunting seasons with female mortality quotas of nine and four, respectively. A total of 531 recreation days were provided to hunters during 2000 (WGFD, 2001b). The Study Corridor also borders Black Bear Hunt Area 18 (Fall Creek) to the west and Hunt Area 20 (Gros Ventre) to the east. Both Hunt Areas 18 and 20 are part of the Jackson Black Bear Management Unit, which allows both spring and fall hunting seasons with female mortality quotas of nine and seven, respectively. During 2000, Hunt Area 18 provided 211 recreation days to hunters, while Hunt Area 20 provided 947 recreational days to hunters (WGFD, 2001b).

Vehicle-Related Mortality of Big Game Species

Because U.S. Highway 26/89/189/191 traverses seasonal ranges and movement corridors for many of the big game species, collisions between vehicles and animals are not uncommon, particularly during winter. Based on data collected and summarized by the Jackson Hole Wildlife Foundation (JHWF), a minimum of 367 vehicle-animal collisions occurred in the Study Corridor between 1990 and 2002 (JHWF, 2002). From 1990 to 1995 the JHWF compiled data collected by WYDOT and Teton County Wildlife Incident Police Reports. WYDOT data included only those vehicle-animal collisions that resulted in at least $500 total damages. Beginning in 1995 the JHWF implemented its own data collection system where volunteers monitored and recorded big game road kills for specific sections of highway. Personnel from WYDOT, WGFD, and Teton County Sheriff's Department supplemented this database by using JHWF data sheets. The following measures were taken to eliminate potential duplicate observations:

Figure 3-24
Mountain Goat Seasonal Ranges



Source: Wyoming Game and Fish Department. 2002. Big game seasonal range maps. Wyoming Game and Fish Department, Cheyenne, Wyoming.

- All observations that occurred within 0.25 mile of each other during a 48-hour time period were considered one observation.
- Only one JHWF volunteer was assigned to a particular section of highway.
- The WYDOT Teton County Maintenance Crew generally removed road kill carcasses within a 24-hour period.

The 367 reported road kills included 298 mule deer, 64 elk, and 5 moose (**Table 3-21**). Most mule deer (77 percent) and elk (89 percent) road kills occurred during winter (November to April), and peaked December through January. The higher incidence of road kills during the winter is presumably a result of big game congregating on lower-elevation winter ranges that are situated near the highway. Although substantial numbers of mule deer road kills were recorded throughout the Study Corridor, the highest number of road kills occurred between MPs 140.7 to 143 and 146 to 147. Among elk killed, most (64 percent) were killed between MPs 146 and 148.8 (see **Table 3-22**), corresponding with the portion of road near the WGFD South Park feedground.

Table 3-21
1990 to 2002 Seasonal Distribution of Mule Deer, Elk, and Moose Road Kills Between MP 140.7 and MP 148.8

Month	Mule Deer	Elk	Moose
January	55	15	3
February	36	8	1
March	50	2	0
April	44	13	0
May	20	2	1
June	14	2	1
July	10	0	0
August	12	0	0
September	6	2	0
October	18	1	0
November	32	3	0
December	56	25	0
Total	**353**	**74**	**6**

Table 3-22
Distribution of Mule Deer, Elk, and Moose Road Kills Among U.S. Highway Mileposts

U.S. Highway	Milepost	Mule Deer	Elk	Moose
26/89	140.7 to 142	53	4	1
26/89	142 to 143	70	8	--
26/89	143 to 144	29	3	--
26/89	144 to 145	21	1	1
26/89	145 to 146	35	5	1
26/89	146 to 147	54	26	1
26/89	147 to 148.8	36	15	1
	Total	**298**	**64**	**5**

Upland Game Birds

Blue grouse and ruffed grouse are the most common upland game bird species in the greater Study Corridor, although incidental reports of sage grouse and gray partridge have been reported. Most sage grouse occur north of the Study Corridor in sagebrush habitats adjacent to the Snake River and Gros Ventre River. Both blue and ruffed grouse are ground nesters that occur predominately in coniferous or aspen habitats (Luce et al., 1999).

Small Game

Nuttall's cottontails, desert cottontails, red squirrels, and snowshoe hares are likely the only small game species in the Study Corridor. While the Nuttall's cottontails often prefer riparian habitats, the desert cottontail typically occurs in shrub-dominated habitats (Clark and Stromberg, 1987). Both the red squirrel and snowshoe hare are most often found in coniferous habitats (Clark and Stromberg, 1987). All of these small game species provide food sources for a variety of avian and mammalian predators.

3.18.6 USFS Management Indicator Species

Ecological Indicator Species

Ecological indicator species represent species restricted to specific habitat types during some phase of their lifespan. Because these species are limited to specific habitat conditions they are particularly sensitive to environmental disturbance. Given their sensitive response to habitat changes, the USFS is able to use these species as indicators of ecological conditions of an area. Ecological indicator species for the BTNF include the pine marten *(Martes americana)* and Brewer's sparrow *(Spizella breweri)*.

Pine (American) marten

Pine marten, a member of the mustelid (weasel) family, occupy a narrow range of habitats in or adjacent to coniferous forests (Allen, 1987). More specifically, they associate closely with late-successional stands of mesic conifers, especially those with complex physical structure near the ground (Buskirk and Powell, 1994). Pine marten occupy large home ranges and occur at low densities (Buskirk and Ruggiero, 1994). While suitable habitat and observations of the species have been documented in the Study Corridor (Luce et al., 1999), pine marten are unlikely to occur in habitats immediately adjacent to the highway.

Brewer's sparrow

Brewer's sparrows are a common summer resident throughout Wyoming. Brewer's sparrows typically nest low in sagebrush or other shrubs and feed on the ground, in tall grass, and in shrubs (Byers et al., 1995). Suitable habitat exists in several portions of the Study Corridor adjacent to sagebrush vegetation.

USFS Sensitive Species

USFS sensitive species are those for which population viability is a concern. Sensitive species identified by the BTNF include four mammals, nine birds, one amphibian, and two fishes (see **Table 3-23**). To determine potential presence of these species in the study area, records of species occurrence were obtained from three sources: Wyoming Natural Diversity Database (WYNDD); WGFD's Wildlife Observation System; and WGFD's *Atlas of Birds, Mammals, Reptiles, and Amphibians* (Luce et al., 1999).

Table 3-23
Sensitive Species for the Bridger-Teton National Forest

Species	Habitat	Occurrence*
Mammals		
Wolverine *(Gulo gulo)*	Dense coniferous forest, alpine tundra	Potential resident; records in area
Fisher *(Martes pinnanti)*	Dense coniferous forest with high canopy closure	Accidental; records in area
Townsend's Big-eared Bat *(Plecotus townsendii)*	Coniferous and deciduous forests, foothill shrubs and caves	Potential resident; records in area
Spotted Bat *(Euderma maculatum)*	Low deserts to coniferous forests; cliffs over perennial water	Unlikely; no records
Birds		
Common Loon *(Gavia immer)*	Lakes above 6,000 feet	Potential summer resident and migrant; records in area
Harlequin Duck *(Histrionicus histrionicus)*	Fast, turbulent rivers in high mountains	Potential summer resident; records in area
Trumpeter Swan *(Cyngus buccinator)*	Marshes with open water, rivers, lakes	Resident; records in area
Boreal Owl *(Aegolius funereus)*	High-elevation spruce/fir forests	Potential resident; records in area
Flammulated Owl *(Otus flammeolus)*	Open, mixed coniferous forest, Ponderosa pine	Potential resident; records in area
Three-toed Woodpecker *(Picoides tridactylus)*	Lodgepole and spruce/fire forests, burns	Potential resident; records in area
Northern Goshawk *(Accipiter gentilis)*	Mature coniferous forest and aspen stands	Potential resident; records in area
Great Gray Owl *(Strix nebulosa)*	Mixed coniferous forest with open areas	Potential resident; records in area
Peregrine Falcon *(Falco peregrinus)*	Mountainous zones or cliffs near large lakes and rivers	Potential resident; records in area
Amphibians		
Spotted Frog *(Rana pretiosa)*	Marshy ponds/lakes and slow moving streams	Potential resident; records in area
Fish		
Colorado River Cutthroat Trout *(Oncorhynchus clarki pleuriticus)*	Cold, clear water in rocky, steep gradient streams	Unlikely; no records
Snake River Fine Spotted Cutthroat Trout *(Oncorhynchus clarki spp.)*	Native of Snake River Drainage, mainly above Palisades Reservoir	Resident; records in Study Corridor

*For the purposes of this document, 'area of occurrence' was defined by latilong #8 (from Dorn and Dorn, 1990); an area that encompasses the northwest portion of the BTNF. A latilong represents the area encompassed within a rectangle of 1 degree latitude and 1 degree longitude.
Source: WEST, Inc. and Wyoming Game and Fish Department

3.18.7 Non-Game and Other Wildlife Species

Non-Game Wildlife Species

Raptors

Numerous raptor species are known or expected to occur in the Study Corridor or nearby (see **Table 3-24**). Documented breeding resident raptors include bald eagle, peregrine falcon, and osprey. Many other species are likely or potentially breeding species in the appropriate habitat, including turkey vulture, northern harrier, sharp-shinned hawk, Cooper's hawk, northern goshawk, Swainson's hawk, red-tailed hawk, golden eagle, American kestrel, merlin, prairie falcon, flammulated owl, great-horned owl, northern pygmy owl, long-eared owl, short-eared owl, great gray owl, boreal owl, and northern saw-whet owl. Rough-legged hawks are potential winter residents. Several species of raptors are considered USFS sensitive species and have been documented within the latilong in which the Study Corridor occurs (see **Table 3-24**). Latilong is defined as the area encompassed by one degree of latitude and one degree of longitude (approximately 70 miles by 50 miles).

The bald eagle, which was a federally listed threatened species until it was delisted in August 2007, is discussed in Section 3.18.2. Peregrine falcon, a former threatened species, nests occur in both Horsethief Canyon and Porcupine Creek. The USFWS removed peregrine falcon from the federal list of threatened and endangered species in 1999.

Table 3-24
Raptor Species Potentially Occurring in the Study Corridor

Species	Habitat	Potential Occurrence
Turkey Vulture *(Carthartes aura)*	Mixed habitat with open areas, generally below 8,000 feet	Potential breeding resident
Osprey *(Pandion haliaetus)*	Lakes and Rivers associated with coniferous and cottonwood forest	Breeding resident
Bald Eagle *(Haliaeetus leucocephalus)*	Lakes and Rivers associated with coniferous and cottonwood forest	Breeding resident
Northern Harrier *(Circus cyaneus)*	Grass and grass-like habitats, marshes, open shrublands	Potential breeding resident
Sharp-shinned Hawk *(Accipiter striatus)*	Mixed forested habitats	Potential breeding resident
Cooper's Hawk *(Accipiter cooperii)*	Mixed forested habitats	Potential breeding resident
Northern Goshawk *(Accipiter gentiles)*	Mature coniferous forest and aspen stands	Potential breeding resident
Swainson's Hawk *(Buteo swainsoni)*	Mixed habitat with open areas, generally below 9,000 feet	Potential breeding resident
Red-tailed Hawk *(Buteo jamaicensis)*	Mixed habitat with open areas, generally below 9,000 feet	Breeding resident
Rough-legged Hawk *(Buteo lagopus)*	Mixed habitat with open areas	Potential winter resident
Golden Eagle *(Aquila chrysaetos)*	Mixed habitat with open areas	Breeding resident
American Kestrel *(Falco sparveius)*	Mixed habitat with open areas, generally below 9,000 feet	Breeding resident
Merlin *(Falco columbarius)*	Mixed forest and wooded habitats generally below 8,500 feet	Potential breeding resident
Prairie Falcon *(Falco mexicanus)*	Cliffs in mixed habitats with open areas	Potential breeding resident
Peregrine Falcon *(Falco peregrinus)*	Mountainous zones or cliffs near large lakes and rivers	Breeding resident

Table 3-24
Raptor Species Potentially Occurring in the Study Corridor

Species	Habitat	Potential Occurrence
Flammulated Owl *(Otus flammeolus)*	Montane forests; Ponderosa pine	Possible breeding resident
Great-horned Owl *(Bubo virginianus)*	Cottonwood riparian and mixed habitats generally below 9,000 feet	Breeding resident
Northern Pygmy Owl *(Glaucidium gnoma)*	Coniferous and aspen forests	Potential breeding resident
Great Gray Owl *(Strix nebulosa)*	Mixed coniferous forest with open areas	Potential resident; records in area
Long-eared Owl *(Asio otus)*	Cottonwood riparian and mixed habitats generally below 8, 000 feet	Potential breeding resident
Short-eared Owl *(Asio flammeus)*	Shrublands, grasslands, marshes	Possible breeding resident
Boreal Owl *(Aegolius funereus)*	High-elevation spruce/fir forests	Potential breeding resident
Northern Saw-whet Owl *(Aegolius acadicus)*	Coniferous and aspen forests	Potential breeding resident

Source: WEST, Inc. and Wyoming Game and Fish Department

Waterfowl

Riparian habitats associated with the Snake River provide habitat to a variety of waterfowl species. Although most species of waterfowl are considered migratory, some are year-round residents of the Snake River watershed (e.g., trumpeter swan, Canada goose). Common summer residents include green-winged teal, mallard, northern pintail, gadwall, and American wigeon. The occurrence of all waterfowl species within the Study Corridor is limited to the aquatic portion of the riparian habitat type.

Furbearers

A variety of furbearers occur in the greater Study Corridor, including beaver, muskrat, mink, pine marten, striped skunk, red fox, raccoon, coyote, bobcat, ermine, river otter, long-tailed weasel, black bear, grizzly bear, gray wolf, and mountain lion. Muskrat, beaver, mink, raccoon, ermine, and river otter are associated with the riparian habitats, while the coyote, red fox, long-tailed weasel, and bobcat would be expected to occur throughout all the habitat types present.

Small Animals

A variety of nongame mammals, birds, reptiles, and amphibians inhabit the areas within or near the Study Corridor. Non-game mammals known or expected to occur in the Study Corridor include many small mammals such as shrews, voles, mice, rats, gophers, squirrels, and chipmunks. All of these species serve as important prey for mammalian and avian predators.

Riparian zones associated with the Snake River provide habitats to more than 150 species of non-game birds, including shorebirds, jays, sparrows, flycatchers, woodpeckers, finches, orioles, hummingbirds, warblers, wrens, nuthatches, grosbeaks, and others.

Amphibians and reptiles are collectively known as herptiles (Parker and Anderson, 2001), which serve as an important food source for some bird, mammal, and fish species (Baxter and Stone, 1985). While ten species of herptiles potentially occur in the Study Corridor, documented records were found only for the boreal toad, boreal chorus frog, tiger salamander, rubber boa, and spotted frog (Wyoming Gap Analysis, 1996, WYNDD, 2002).

3.18.8 Fisheries

There is a variety of fishes in the Snake River. Those portions of the Snake River located in the Study Corridor are considered Class I trout streams by the WGFD. Class I streams are considered premium trout waters supporting fisheries of national importance, while Class III streams are considered important trout waters supporting fisheries of regional importance (WGFD, 1991). Native fish species in these river reaches include the Fine-spotted Snake River cutthroat *(Oncorhynchus clarki clarki)*, Mountain whitefish *(Prosopium williamsoni)*, Utah sucker *(Catostomus ardens)*, Bluehead sucker *(Catostomus discobolous)*, Speckled dace *(Rhinichthys osculus)*, Longnose dace *(Rhinichthys cataractae)*, Piaute sculpin *(Cottus beldingi)* and Mottled sculpin *(Cottus bairdi)* (R. Hudelson, personal communication. WGFD, 8-21). The Fine-spotted Snake River cutthroat is considered a USFS sensitive species (see **Table 3-23**).

The portion of the Snake River within the Study Corridor is primarily a single large channel ranging from 100 feet to over 300 feet in width. Multiple small creeks flow into the Snake River within the Study Corridor. Scattered sandbars and rock outcroppings exist within the river limits.

In this section of the Snake River, the substrate consists almost entirely of quartzite cobbles (three to ten inches in diameter) firmly embedded in a sandy-silt matrix (Hayden, 2005). Water quality in the upper Snake River is high, being slightly alkaline (pH 7.5-8.0) with relatively small amounts of dissolved material (total dissolved solids varies from 100 to 200 mg/liter). Both alkalinity and dissolved materials increase somewhat downstream (Hayden 2005).

3.19 Vegetation

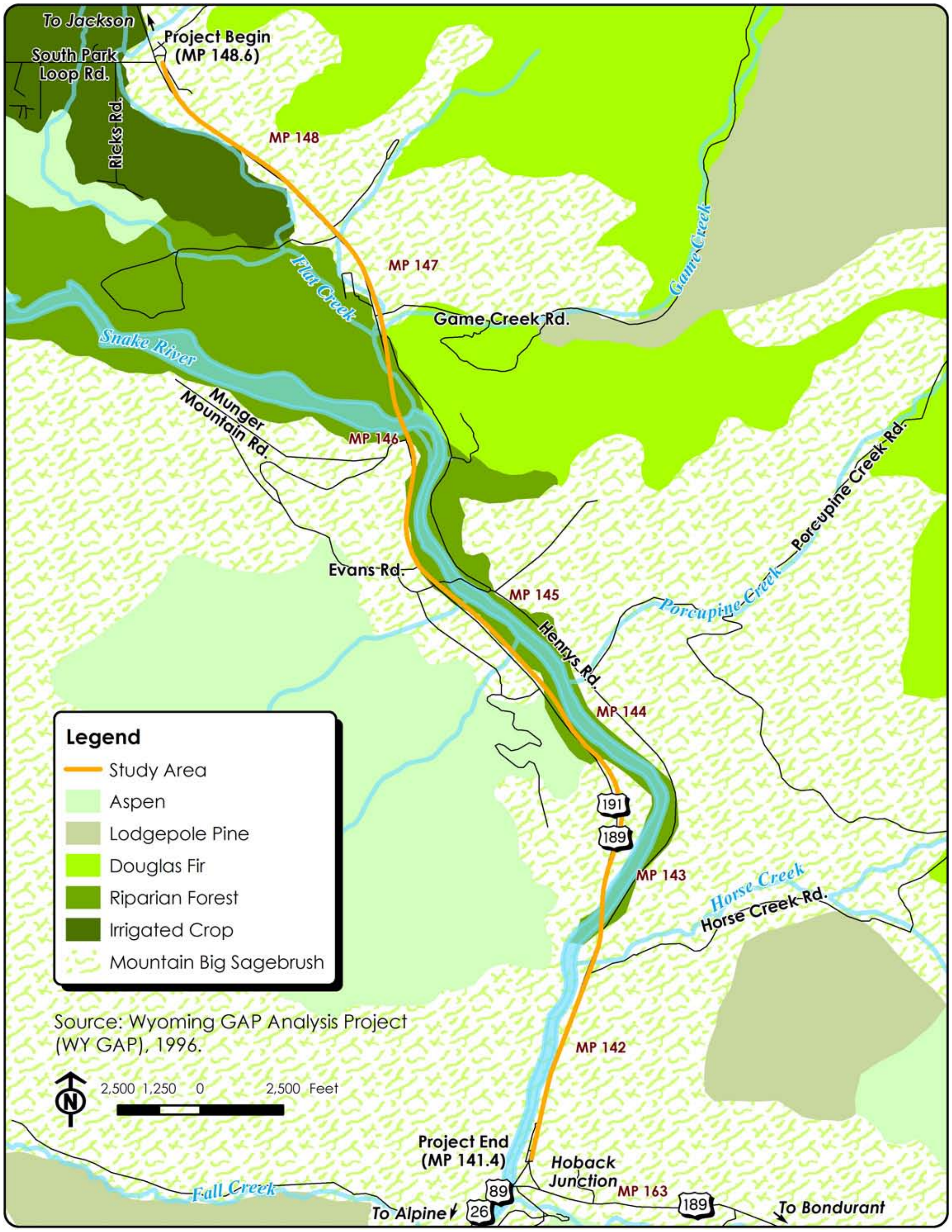
This section describes the general vegetation that occurs in the Study Corridor, as well as provides information on special status plant species and noxious and invasive species. General vegetation types (land cover types) have been mapped for the state of Wyoming as part of the Gap Analysis Project (GAP), a GIS database describing vegetation types for the entire state at a scale of 1:100,000. The GAP project serves as the basis for the description of vegetation in the Study Corridor. Information on special status plant species was obtained from the USFWS, the BTNF, and the WYNDD. Teton County Weed and Pest was contacted for information on noxious weeds. Field reconnaissance surveys were also conducted in August 2002.

The ecoregion of the Study Corridor is classified as the Southern Rocky Mountain Steppe-Open Woodland-Coniferous Forest-Alpine Meadow Province, Overthrust Mountain Section (McNab and Avers, 1994). The pattern of vegetation across the landscape in the project and surrounding area is largely influenced by climate, topography, elevation, aspect, and soils. The continental climate results in relatively dry conditions with brief summers and long, cold winters. The average annual precipitation in the area is approximately 15 inches. The north-facing slopes are typically cooler and more mesic than the warmer and drier south-facing slopes. The topography grades from the valley floor at an elevation of approximately 6,000 feet to steep slopes with peaks at elevations over 7,000 feet.

The GAP project identified nine general vegetation types in and near the Study Corridor (see **Figure 3-25**). Each vegetation type is described below, including the type description from the GAP analysis and information on where the type is found in the Study Corridor.

- ***Mountain Big Sagebrush***: shrub type dominated by mountain big sagebrush (*Artemesia tridentata* ssp. *vaseyana*), often mixed with grasses. Mountain sagebrush is the dominant shrub, and total shrub cover comprises more than 25 percent of the total vegetative cover. Mountain sagebrush sometimes occurs as patches of dense sagebrush within patches of mixed grasses. This is a predominant vegetation type in the Study Corridor, found on dry upland areas both on the valley floor and on some of the slopes. This is the most common vegetation type immediately adjacent to the highway.
- ***Riparian Forest***: riparian zones in which tree species dominate the vegetation of the riparian corridor. Cottonwood (*Populus* spp.) is typically the dominant species, but aspen (*Populus tremuloides*), boxelder (*Acer negundo*), and a variety of conifers can also occur. Trees occupy more than 25 percent of the vegetative cover within the riparian zone. In the Study Corridor, this type occurs along the Snake River and Flat Creek. Cottonwood (*Populus angustifolia*) is the dominant tree species and the understory is primarily made up of herbaceous species such as smooth brome (*Bromus inermis*), sweet clover (*Melilotus* spp.), timothy (*Phleum pratense*), and licorice (*Glycyrrhiza lepidota*). This type occurs adjacent to the highway from approximately MP 147 to MP 143.
- ***Irrigated Crop***: any irrigated agricultural area, including pastureland and hayfields, along with associated farm or ranch facilities and shelterbelts. This type is typically found on alluvial plains of lowlands. Irrigated hay fields are found at the north end of the Study Corridor on the west side of the highway near MP 148.
- ***Aspen***: forests in which aspen (*Populus tremuloides*) dominate the canopy. This type includes pure aspen forest and mixed conifer/aspen forest where aspen occupies more than 50 percent of the total canopy. The total canopy cover by trees is greater than 25 percent. In the Study Corridor, this type is found on various slopes and ridges and extends downslope toward the highway between MP 144 and 143.

Figure 3-25
Vegetation Types



- ***Douglas Fir***: forest or woodland in which the canopy is dominated by Douglas fir (*Pseudotsuga menziesii*). This type includes both intact Douglas fir forest and Douglas fir forest influenced by logging [when contiguous logged areas are smaller than 247 acres (100 hectares)]. Total forest cover is greater than 25 percent. This type is primarily found in the Gros Ventre mountains east of the Study Corridor, but it also occurs near the Study Corridor in the foothills east of the highway near MP 146.
- ***Lodgepole Pine***: forests in which lodgepole pine (*Pinus contorta*) dominates the canopy, with a canopy closure greater than 25 percent. Engelmann spruce (*Picea engelmannii*) and subalpine fir (*Abies lasiocarpa*) may be mixed with the canopy trees or important in the understory, but not the dominant canopy tree type. Logging activity is not significant in this land cover type. In the Study Corridor, lodegpole pine is primarily found at higher elevations, especially on north-facing slopes.
- ***Spruce/Fir***: spruce-fir forests not significantly affected by logging. Engelmann spruce and/or subalpine fir are dominant or co-dominant in the canopy and the total canopy coverage is greater than 25 percent. This type is not found in the immediate vicinity of the Study Corridor, however this type is mapped in the Gros Ventre mountains east of the highway on north-facing slopes.
- ***Sub-alpine Meadow***: graminoid and forb dominated type occurring within and below upper treeline. Often found in mountain park situations. Trees or shrubs do not occupy more than 25 percent of the total vegetative cover. This type is not found in the immediate vicinity of the Study Corridor, however this type is mapped in the high-mountain areas east of the highway.
- ***Mixed Grass Prairie***: a "catch-all" type for grasslands that contain a mixture of short grass and tall grass prairie species, but they do not contain buffalo grass (*Buchloe dactyloides*). This type often occurs in patches intermixed with shrub species (*i.e., Artemesia tridentata*). When patchy, grasses occupy more than 50 percent of the landscape for the primary vegetation type. This type is not found in the immediate vicinity of the Study Corridor, but is found in the Hoback Canyon, east of the Study Corridor limits.

Sensitive Species

The USFWS, BTNF, and WYNDD were contacted for information on sensitive plant species in the Study Corridor. The USFWS did not include any federally listed plant species in the list of threatened or endangered species potentially occurring in the Study Corridor (USFWS letter, September 26, 2000, **Appendix A**). However, the threatened Ute ladies'-tresses orchid (*Spiranthes diluvialis*) is known to occur downstream on the Snake River in Idaho, and a survey was conducted for this species in the Study Corridor in August 2001 (WEST Inc., 2002); no individuals were located. Additionally, a survey was conducted on BLM-managed lands along the Snake River in 1999, which included portions of the Study Corridor; again, no individuals were located (Jones, 2000).

The USFS maintains a list of 18 sensitive plant species that occur in the BTNF (USFS, 1998). Several of these species occur in specialized habitats, such as high alpine habitats, that are not found in the Study Corridor (see **Table 3-25)**. However, six of these species occur in habitats that are found in the Study Corridor. WYNDD reported that two state plant species of special concern have been documented in the townships in the Study Corridor, boreal draba (*Draba borealis*) and large-flower clarkia (*Clarkia pulchella*). Although boreal draba has been found near the Study Corridor, it is found on moist, north-facing limestone slopes and cliffs and shady streamsides, habitat that does not occur along the highway. An additional species, Payson's milkvetch (*Astragalus paysonii*), has been documented in a neighboring township.

Table 3-25
Sensitive Plant Species Potentially Occurring in the Study Corridor

Species	Habitat	Occurrence
Soft aster *(Aster mollis)*	Sagebrush grasslands and mountain meadows in calcareous soils. 6,400 to 8,500 feet elevation.	No records in the WYNDD database for the Study Corridor townships. Has been observed in Hoback Canyon (Fertig et al., 1994).
Meadow milkvetch *(Astragalus diversifolius var. diversifolius)*	Moist, often alkaline meadows and swales in sagebrush valleys. 4,400 to 6,300 feet elevation.	No records in the WYNDD database for the Study Corridor townships. Historical report from the Green River basin in Wyoming (Fertig et al., 1994).
Payson's milkvetch *(Astragalus paysonii)*	Disturbed areas and recovering burns on sandy soils. 6,700 to 9,600 feet elevation.	Record in WYNDD database from adjoining township.
Large-flower clarkia *(Clarkia pulchella)*	Dry forests, usually at margins or in openings.	Single historic collection record from Study Corridor township.
Narrowleaf goldenweed *(Haplopappus macronema var. linearis)*	Semi-barren, whitish clay flats and slopes, gravel bars, and sandy lake shores. 7,700 to 10,300 feet elevation.	No records in the WYNDD database for the Study Corridor townships; limited habitat.
Payson's bladderpod *(Lesquerella paysonii)*	Rocky, sparsely-vegetated slopes, often calcareous substrates. 6,000 to 10,300 feet elevation	No records in the WYNDD database for the Study Corridor townships.
Greenland primrose *(Primula egaliksensis)*	Wet meadows along streams and calcareous montane bogs.	No records in the WYNDD database for the Study Corridor townships.

Source: WYNDD database search results (search conducted August 2002) and BTNF Sensitive Plant Species list dated December 16, 1998.

Noxious Weeds

Both the federal and state governments have regulations concerning noxious weeds. Executive Order 13112, signed in February 1999, requires federal agencies whose actions may affect the status of invasive species to prevent the introduction of invasive species, detect and control populations of such species, monitor invasive species populations, and restore native species and habitats that have been invaded to the extent practical and permitted by law. In addition, the USFS Manual (*National Policy: FSM 2080*) provides guidance to the USFS in prevention and control measures for noxious weeds. At the state level, the Wyoming Weed and Pest Control Act, 1973, establishes each Wyoming county as a Weed and Pest Control district to address specific weed or pest concerns in each county.

Teton County was contacted to identify known noxious weed concerns in the Study Corridor (**Table 3-26**). Spotted knapweed and houndstongue were mentioned as of particular concern. Others are more localized; for example, scotch thistle associated with a gravel operation is found near the north end of the project, and field bindweed occurs across from Game Creek Road between MPs 146 and 147. Dyer's woad is a weed that was previously found in the Study Corridor, but has not been observed in recent years. WYDOT contracts with Teton County for weed control in the Study Corridor. The primary method of weed control used in this area is through chemical means.

Table 3-26
Noxious and Invasive Species Found in the Study Corridor

Common Name	Scientific Name	Description
Black henbane	*Hyoscyamus niger*	Annual or biennial up to three feet tall. Common weed of pastures, fencerows, roadsides and waste areas.
Bull thistle	*Cirsium vulgare*	Biennial, reproduces by seed. Highly competitive in disturbed sites.
Canada thistle	*Cirsium arvense*	Colony-forming perennial from deep and extensive roots. Aggressive weed; reproduces asexually.
Common mullein	*Verbascum thapsus*	Large biennial, produces a large number of seeds. Occurs along river bottoms, pastures, meadows, fence rows, and waste areas.
Common tansy	*Tanacetum vulgare*	Perennial; reproduces by seed and rootstocks. Found along roadsides, waste areas, streambanks, and pastures.
Dalmation toadflax	*Linaria dalmatica*	Perennial up to three feet tall, reproducing by seed and rootstocks. Aggressive; found along roadsides and rangeland.
Dyer's woad	*Isatis tinctoria*	Tap-rooted annual to perennial; regenerate from the root. Found along roadsides and disturbed sites.
Field bindweed	*Convolvulus arvensis*	Perennial with an extensive root system found in fields and waste areas. Roots can penetrate to a depth of 20 feet. Seeds remain viable for up to 50 years.
Houndstongue	*Cynoglossum officinale*	Biennial up to four feet tall with prickly fruits. Found in ranges and pastures.
Musk thistle	*Carduus nutans*	Biennial up to six feet tall. Spreads rapidly forming extremely dense stands that crowd out desirable forage in pastures, rangeland, forests, and grain fields; is also found along roadsides, waste areas, ditch banks, and streambanks.
Scotch thistle	*Onopordum acanthium*	Biennial up to 12 feet tall. Aggressive plant that may form dense stands along waste areas and roadsides.
Spotted knapweed	*Centaurea maculosa*	Biennial that spreads by seed and can increase rapidly in just a few years. Readily establishes on disturbed soil, and early spring growth makes them competitive for soil moisture and nutrients.
Sulfur cinquefoil	*Potentilla recta*	Perennial with well-developed root stocks. Found in disturbed sites.
White top	*Cardaria draba*	Deep-rooted perennial, re-producing from root segments and seeds. Common on alkaline, disturbed soils. Highly competitive once established.
Yellow toadflax	*Linaria vulgaris*	Perennial up to two feet tall, reproducing by seed and root stocks. Aggressive invader of rangeland, and along road-sides, waste places, and cultivated fields.

3.20 Cultural Resources

3.20.1 Introduction

Cultural resources are protected under the National Historic Preservation Act of 1966 (as amended 1992) and other statutes, plus Section 4(f) as amended and codified in the U.S. Department of Transportation Act of 1966, 49 USC 303 (c).

For the purposes of this EIS, cultural resources include prehistoric and historic archaeological remains and historic resources.

3.20.2 Investigations Performed

Compared to other parts of Wyoming, the Snake River canyon has received little formal archaeological investigation in the past. Consequently, there are few known archaeological sites in the area. A file search was conducted of the State Historic Preservation Officer (SHPO) Cultural Records Office database in Laramie, Wyoming, on August 2, 2001. The results of the file search indicated that 26 accessioned surveys and 10 sites had been recorded in or near the Study Corridor. Of the 10 sites previously recorded in the Study Corridor, none are eligible for listing on the National Register of Historic Places (NHRP). The previously recorded sites that were determined as not eligible are not included in this evaluation of existing conditions.

Several studies were conducted to identify archaeological or historical sites in the Study Corridor and evaluate their potential for NRHP listing. **Table 3-27** lists the sites identified in the Jackson South study area. Investigations conducted include the following:

Table 3-27
Sites Evaluated for Eligibility to the National Register of Historic Places in the Study Corridor

Site Number	Site	Type	Previously Recorded?	NRHP Eligibility Determination
48TE1572	Lithic scatter	Prehistoric	No	Not Eligible
48TE1573	Game Creek Site (lithic scatter)	Prehistoric	No	Eligible
48TE1574	Trash scatter	Historic	No	Not Eligible
48TE1674	Old West Cabins	Historic	No	Not Eligible

- *A Class III Cultural Resource Survey, Hoback Junction Projects*, June 2002. The Office of the Wyoming State Archaeologist performed a Class III Cultural Resource survey of the Study Corridor in August and September, 2001. The survey covered a 600-foot-wide corridor along the present highway. Four new sites were located during the survey, of which three are located in the Jackson South Study Corridor. Of those three sites, one site (Site #48TE1574-trash scatter) was recommended as ineligible to the NRHP, and two sites (Sites #48TE1572 and #48TE1573, both lithic scatters) were recommended as unevaluated. The two unevaluated sites were recommended for test excavation to complete the NRHP evaluation. The SHPO concurred with the survey's recommendations on August 5, 2002 (see **Appendix A**).

- *Archaeological Testing at 48TE1572 and 48TE1573*, June 2004. The Office of the Wyoming State Archaeologist conducted the recommended evaluative test excavations on Sites #48TE1572 and #48TE1573 in July 2003. Site #48TE1572 was recommended as ineligible for the NRHP. Site #48TE1573 (referred to as the Game Creek site) was considered eligible for nomination to the NRHP, and data recovery was proposed. The SHPO concurred with these recommendations in a letter dated May 2, 2005 (see **Appendix A**).
- *Report of Historical Investigations*, October 2004. Rosenberg Historical Consultants performed a historic investigation of the Old West Cabins (Site #48TE1674) in August and September 2004. Their report indicated that the property should be considered ineligible for the NRHP. WYDOT sent a letter to the SHPO on October 27, 2004, stating that the site was recommended as ineligible for the NRHP (see **Appendix A**). Since a response was not received from the SHPO within the required timeframe, their concurrence is assumed per Section 106 regulations [36CFR800(c)4]. The Old West Cabins are no longer located on this site, and the area is being redeveloped as residential.

3.20.3 Archaeological Resources

The archaeological site located in the Study Corridor that was determined to be eligible for the NRHP is described in this section:

Game Creek Site (Site #48TE1573): The site is bisected by the existing highway. The exact location of the site is confidential to protect the site from vandalism. The highway currently occupies 1.5 acres of the site. Well preserved areas of the site occur on both sides of the highway and within the existing right-of-way. It consists of a scatter of chipped stone artifacts. Artifacts were found throughout the site. Shovel tests revealed artifacts and a Middle Archaic projectile point below the surface.

In the June 2002 investigation report mentioned earlier, this site was recommended as unevaluated. As documented in the June 2004 investigation report, preliminary archaeological and geomorphic investigations were performed that focused on landforms that contained buried cultural material, including items believed to be of Late Prehistoric and Late Archaic age, buried bone and stone artifacts, fire hearths ranging in age from about 650 radiocarbon years before present (BP) to about 8,500 BP, Paleoindian and Early Archaic projectile point fragments, and several foothill-mountain late Paleoindian projectile points. At least one Archaic occupation is represented by a fire hearth dating to about 3,800 BP. Taken as a whole, the landforms at the site contain a sedimentary and cultural record indicating that the site functioned as a location for human activity for the last 10,000 years. It is believed that the conditions under which the materials were buried favor contextual preservation. For these reasons, the site is considered eligible for nomination to the NRHP under Criterion D.

3.20.4 Historical Resources

No NRHP-eligible historical sites were identified in the Study Corridor.

3.21 Hazardous Materials

A hazardous materials survey was conducted to evaluate the potential of encountering soil and/or groundwater contamination along the Study Corridor (Carter & Burgess[2], 2006). The assessment was based on information obtained from an environmental records review, historical and current aerial photograph interpretation, and visual site reconnaissance of the project corridor.

An earlier hazardous material existing conditions was prepared in September 2001. According to Standard Practice E1527-00, a prior environmental assessment should not be used without a current investigation of conditions likely to affect *recognized environmental conditions* in connection with the subject property that may have changed since the prior environmental assessment was performed. To meet these requirements, Carter & Burgess obtained and reviewed updated environmental database records and reinspected the Study Corridor.

The purpose of the hazardous material survey was to detect the presence of hazardous materials or recognized environmental conditions in the Study Corridor. The term "recognized environmental conditions" is defined as the presence or likely presence of hazardous materials or petroleum products on a property under conditions that indicate an existing or past release.

The survey included:

- An overview of the Study Corridor and a summary of site background information.
- A description of the environmental setting of the Study Corridor, including site topography, drainage, flood potential, surface water, hydrogeology, and utilization of groundwater.
- Results of the site reconnaissance, including a visual inspection for indications of soil, groundwater, and surface water contamination and other hazards, and an evaluation of the environmental condition of the areas surrounding the Study Corridor.
- A review of federal, state, and local environmental regulatory records.
- Conclusion and recommendations.

[2] Carter & Burgess, Inc. was acquired by Jacobs Engineering in November 2007, but is referenced as Carter & Burgess in certain areas of this document for project tasks that occurred prior to November 2007, and in materials contained in the appendix that were prepared prior to November 2007.

3.21.1 Background Research

Current Ownership

Research into the ownership of property may reveal information about hazardous materials being used or stored on site. There are no owners known to be associated with the generation, use, storage, or transport of potentially hazardous materials or wastes in connection with the subject properties in the Study Corridor.

Review of Aerial Photographs

Historical aerial photographs from 1962 of the subject property were reviewed. Based on review of the aerial photographs, the Study Corridor and surrounding properties have historically been comprised of undeveloped, agricultural, and some residential land.

Historical topographic maps from 1963 and 1965 were reviewed. Based on review of these maps, the topography appears to be historically unchanged. The existing topography is described in the following sections (also see Section 3.1, *Land Use and Zoning*, and Section 3.22, *Visual Character* for description of current land uses and topography).

3.21.2 Site Reconnaissance

An area reconnaissance of the Study Corridor was conducted on August 29, 2001, and May 10 and 11, 2006. The Study Corridor inspection included:

- Visual inspection of the ground surface for signs of contamination.
- Inspection for other items of environmental concern.
- Evaluation of the environmental condition of adjacent properties.

The area reconnaissance did not reveal any obvious indications in the Study Corridor of aboveground or underground storage tanks (ASTs/USTs), landfills, fill piles, wells, or pipelines. No stained soils, distressed vegetation or other indications of contamination were observed in the Study Corridor. Also, no regulated or hazardous materials were observed.

The site reconnaissance revealed numerous commercial and residential properties that are not expected to be environmental risks because they are not within the proposed limits of construction.

3.21.3 Regulatory and Governmental Agencies Research—May 2006

An environmental database search of federal and state listed hazardous materials locations was conducted in coordination with Environmental Data Resources, Inc.(EDR), the results of which are included in the *Hazardous Material Existing Conditions Report,* dated May 2006.

A review of environmental regulatory records identified four properties near the Study Corridor that have faced, or are currently facing, regulatory actions, fines, or violations. The four listed sites are:

- 4000 South U.S. Highway 89—Lower Valley Power & Light (LVP&L) Jackson office
- 1935 North U.S. Highway 89—Flat Creek Motel
- 7255 South U.S. Highway 89—Evans Construction, Inc.

The LVP&L facility is listed as having two underground storage tanks (USTs) with no leaks reported that were both removed from the ground in 1991. The site is not considered an environmental risk to the project.

The Flat Creek Motel is listed as having one UST currently in use but, as verified during site reconnaissance, the motel is not present at the listed location and appears to have been incorrectly located in the EDR report.

Evans Construction, Inc. is listed as having four Leaking Diesel USTs that were removed in June 1991. The majority of the Evans site is far removed from the limits of the proposed action, and potential historical contamination from the removed USTs is not considered an environmental risk.

3.21.4 Lower Valley Energy Pipeline

Lower Valley Energy recently constructed a buried 6.625-inch steel natural gas pipeline that brings gas service to the Jackson area from a location near Merna, Wyoming (for more information, refer to the *Final Environmental Impact Statement, Lower Valley Energy Natural Gas Pipeline Project*, January 2008). Within the Study Corridor, the pipeline is located along the highway for approximately two miles, beginning at the existing Lower Valley Energy facility located at 4000 South Highway 89 (north of South Park Loop Road), and running south to approximately Game Creek Road, the location of a valve assembly facility. From there, the pipeline veers away from the highway to the east and continues south to US 189/191, following the highway alignment to the southeast. In the Study Corridor, the pipeline crosses the highway at two locations – MP 148.72 (South Park Loop Road) and MP 146.73 (Game Creek).

3.22 Visual Character

3.22.1 Existing Conditions

The Study Corridor is located at the western edge of the Gros Ventre Range and within the southern portion of the Bridger-Teton National Forest (BTNF). Portions of the land adjacent to the project corridor that are not a part of the BTNF include private residential and commercial lands of unincorporated Teton County, BLM lands, Wyoming Game and Fish Lands, lands within conservation easements, and other uses. The Study Corridor overlooks the southern end of Jackson, Wyoming, and is located south of the Teton Mountain Range. U.S. Highway 26/89/189/191 is the primary southern route to Jackson, Wyoming, and many travelers use this route to access the BTNF and travel further to the Grand Teton National Park and Yellowstone National Park.

The *Land and Resource Management Plan* (LRMP) for the BTNF (1990 and as amended) was used as a guideline in preparing the visual assessment. The *Wyoming Centennial Scenic Byway: Scenic Byway Corridor Management Plan* (Scenic Byway Plan) dated February 1999, was referenced for compliance to scenic byway prescriptions for U.S. Highway 26/89/189/191.

3.22.2 Landscape Character and Viewsheds

Wyoming Game and Fish—South Park Property

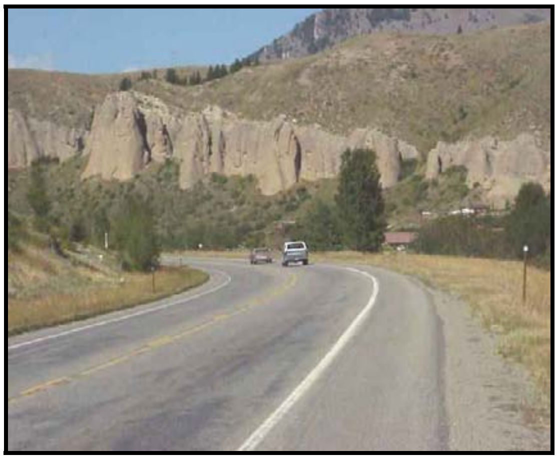
Landscape character can be broken down into landscape units containing similar landscape elements that are different from other distinct areas. The physical elements of a landscape form the visual patterns that strongly influence our response to the landscape. The physical elements include landform and vegetation, water and wildlife features, and other manmade modifications, such as residential and commercial development. Foreground landscape units are those immediately visible from the highway and define the local character of the area. The foreground is defined as the area within 0.0 to 0.5 mile. The middleground is defined as 0.5 mile to 4.0 miles. The background views are 4.0 miles or greater and include the Snake River and Teton Mountain Ranges.

The visual landscape units within the Study Corridor are defined as:

Valleys: Grassland and Meadows. Traveling south of Jackson, the highway views transition to an open valley surrounded by mountains. Vegetation in this area is a sagebrush-steppe community in the wider valleys west of Hoback Canyon. These areas are open, flat to rolling terrain, and often adjacent to the river. Many of these areas provide a wide viewshed that enhances the scenic quality. Vegetation consists mainly of a few evergreen trees, grasses, forbs, and other low plants. More detail is in Section 3.19.

Grazing activities are present within the Study Corridor, commonly occurring in the foreground and middleground. One unique land use within the Study Corridor valley is the South Park Big Game Winter Range managed by the Wyoming Game and Fish Department. The property includes interpretive displays describing the history of the refuge. Opportunities for photographing the elk are available at the refuge accessed from U.S. 26/89/189/191. Other wildlife and waterfowl are commonly found in the area of the refuge and enhance the scenic quality of this feature.

Mountains: Coniferous and Deciduous Forest and Rock Walls. The Jackson-Hoback Junction section is located within the canyon separating the Teton and Gros Ventre ranges. Steep slopes and flatter terrain along the Snake River characterize this area. The driving experience is described in the *Wyoming Centennial Scenic Byway, Scenic Byway Corridor Management Plan*, 1999 as "an intense and beautiful experience with the river rushing alongside the road, with its steep rock walls towering above." The Wyoming Centennial Scenic Byway (WCSB) traverses steep mountainous passes with avalanche zones and rock fall areas, and narrow winding canyons with limited sight distances.



U.S. Highway 89/191 Northbound

South view toward Hoback Junction

Other Development. Other development includes the highways and features common to highway corridors, such as signing, guardrail, pullouts, maintenance activities and yards, and remaining evidence of initial road construction. The highway is a dominant feature in the viewshed for much of the Study Corridor. Existing cut and fill slopes are often visible to the motorist and other corridor users. Revegetation has occurred in many areas, with some steeper areas remaining as impacted. Some areas have experienced landslides, some naturally occurring and some possibly affected by the road construction and/or maintenance. These areas are not only a visual consideration but also a safety issue.

View north toward Jackson-Snake River to the east

Water and Wildlife Resources: The Snake River and numerous tributaries follow many of the roadways through the Study Corridor. The South Park Bridge over the Snake River serves as an access to the river for boating, kayaking, rafting trips, and provides a fishing site. The Snake River has been nominated as a National Wild and Scenic River. The quality of the visual resource was a major factor in the decision to submit the Snake River for consideration. The waterway is both an aesthetic and functional asset as an aquatic and wildlife habitat. Riparian communities occur along the drainages.

The presence of wildlife adds to the scenic beauty and popularity by tourists and residents alike. Much of the surrounding area is considered habitat for numerous wildlife species. Refer to Section 3.18 for wildlife habitat range descriptions.

Viewsheds to the highway corridor and structures are possible from adjacent residential and commercial development along the highway. Other vantage points include lands in the BTNF used by hikers and recreationists, and by river users from the Snake River. Much of the foreground and middleground along the highway reflects landscape character that is typical of a rural mountain corridor. Middleground views of the natural-appearing landscape are of the wider valleys and are limited by the narrow canyons. These features are encompassed by large expanses of native vegetation consisting mostly of low grasses, forbs, and shrubs. Background views are of the Gros Ventre and Teton Mountain Ranges and are often confined to the narrow mountainous canyon, rock outcroppings, and dense tree stands surrounding the Snake River.

3.22.3 Visual Quality Objectives

The LRMP identifies visual quality objectives (VQO) for each Management Prescription Area or Desired Future Condition (DFC) for National Forest System (NFS) lands. Any alternatives planned with construction in the BTNF must set a goal to meet the visual quality objectives. The Study Corridor is located within Management Areas 41, 48 and 49. U.S. Highway 89/191 is a designated Scenic Byway in the *Bridger-Teton National Forest Management Plan*. This sensitive travel corridor must set a goal to meet the VQO standard of *retention* in the foreground and middleground. The *retention* VQO standard requires that the proposed action not be visible to the average visitor, even if landscape-altering activities occur. This includes all National Forest lands that are visible from highways. The following Prescription areas are located adjacent to the project corridor. They are described in Section 3.1.4 and shown on **Figure 3-6**.

The minimum standards for visual quality (*partial retention, retention*, etc.) describe the maximum degree of acceptable alteration (impact) of the natural landscape based on the importance of aesthetics to the management activity. The degree of alteration is measured in terms of visual contrast with the surrounding landscape.

- **2A Management Prescription Area:** Nonmotorized Recreation—*retention*.
- **3 Management Prescription Area:** River Recreation—re*tention*. The LRMP standard for managing an eligible recreation river is to meet the VQO standard of *retention* within the river corridor (0.25 mile on either side of the river). They are managed to protect or enhance their wild, scenic, and recreational values. Development or activities which would diminish free-flowing characteristics, water quality, and scenic, recreational, fish and wildlife, and other values of eligible segments will be prohibited.—*retention*.

- **10 Management Prescription Area:** Simultaneous Development of Resources, Opportunities for Human Experiences, and Support for Big Game and a Wide Variety of Wildlife Species—*partial retention*.
- **12 Management Prescription Area:** Backcountry Big Game Hunting, Dispersed Recreation, and Wildlife Security Areas—*partial retention*.

Partial retention activities may introduce form, line, color, or texture, but they should remain subordinate to the visual strength of the landscape. Mitigation measures to meet *partial retention* should be accomplished as soon after project completion as possible or at a minimum within the first year.

Retention activities are not evident and blend well with the natural landscape. Road construction may occur in this area but must be designed to appear natural and unnoticeable. This VQO is generally applied to areas that are in the foreground of sensitive viewing areas.

3.22.4 Wyoming Centennial Scenic Byway

The *Wyoming Centennial Scenic Byway Management Plan* (WCSB) identifies U.S. Highway 191/89/26 from Dubois to Pinedale as a National Forest Scenic Byway. The route also has been designated as a State Scenic Byway. The WCSB is quoted below:

WCSB Vision Statement

The outstanding scenic, natural, historic, and recreational resources of the corridor will be managed to enhance the experience of visitors, while protecting the natural resources of the area, and protecting the corridor residents' quality of life.

WCSB Goals that pertain to visual quality:

- The WCSB will enhance the visitor experience using interpretive and educational displays located throughout the corridor highlighting historic, scenic, natural, cultural, and recreational resources.
- Interpretive features will be developed to complement the scenic beauty, rich history, and cultural traditions of the corridor with information interpreting these resources as well as issues sensitive to communities along the corridor which impact their quality of life, environment, and safety.
- The natural resources associated with the WCSB corridor will be protected, and where necessary, enhanced and developed in a sustainable manner.

Scenic byway designation does not create any additional restrictions on the development of private land. The scenic byway corridor, as it passes through private land, encompasses only the extent of the Study Corridor right-of-way. Private property development beyond the highway right-of-way remains under the jurisdiction of local governing entities. Through National Forest, National Park, and BLM lands, the corridor width includes the viewshed as seen from the highway.

To ensure that the scenic resources of the scenic byway corridor are maintained, federal and local governments and agencies have measures in place. It is the intent of the WCSB to incorporate and implement these existing plans for the Study Corridor. Depending on the land management agency and ownership, the appropriate regulations and laws would be applicable.

3.22.5 Scenic Vistas and Visual Enhancement Areas

Teton County zoning information related to the Scenic Resources Overlay (SRO) is provided in Section 3.1.2 and **Figure 3-4**. The purpose of the SRO is to preserve and maintain the County's most frequently viewed scenic resources. In addition, there are a number of parcels protected under a land trust or scenic preserve trust. These parcels are described in Section 3.1.3 and identified on **Figure 3-5**. The purposes of these trusts are to manage use activities and ensure disturbance levels maintain scenic integrity.

3.22.6 National Scenic Byways Program

Through the National Scenic Byways Program, the FHWA allocates discretionary funds to undertake eligible projects along highways designated as National Scenic Byways, All-American Roads, or as State-designated Scenic Byways. In determining eligibility for grants, the FHWA emphasizes the importance of the relationship of a proposed project, the byway, and its intrinsic qualities. Detailed selection criteria are defined in the FHWA's *National Scenic Byways Program Guidance for FY 2004 Grant Applications*.

Chapter 4.0: Environmental Consequences

Landslides

WYDOT has monitored the two active landslide areas located just north of Hoback Junction (MP 141.7) and in the area around Munger Mountain (MP 144) (shown on **Figure 1-13**) for several years; however, more monitoring and investigation is required to identify mitigation measures specific to each site. At the final design stage, WYDOT will conduct this investigation, incorporate landslide corrections into the design for the Preferred Alternative and determine appropriate mitigation measures.

4.1 Land Use and Zoning

This section describes impacts to designated zoning and existing and planned land uses. Right-of-way impacts are disclosed in Section 4.5. Also, for analysis of potential impacts to community character, refer to Section 4.25, Cumulative Effects.

Approximately 97 percent of county lands are owned and managed by public agencies, including national parks and forests. The remaining three percent within private ownership are subject to Teton County land development regulations, including zoning and subdivision restrictions, access regulations, and site plan review. The extent to which the county controls development along the Study Corridor will dictate any related effects to rural and community character.

4.1.1 No-Action Alternative

In general, the No-Action Alternative would have no effect on existing zoning designations, zoning overlays, land preserved through land trusts, or U.S. Forest Service (USFS) Desired Future Conditions (DFCs).

The No-Action Alternative would not be consistent with Goal No. 1 (to plan for future mobility that meets the needs of residents and tourists within the context of community character) or Goal No. 3 (to improve the safety and efficiency of the transportation system in Jackson and Teton County) in the transportation element of the *Jackson/Teton County Comprehensive Plan*, 2002. The No-Action Alternative would be consistent with the goals and objectives specified in the community character element of the comprehensive plan.

As discussed in Section 3.1, only a small portion of land in or near the Study Corridor could be developed, given the amount of land in public ownership, land trusts, or within overlay zones. Of the many variables considered in developing those few properties with potential for development, transportation access is not seen as a major consideration. Therefore, any effect the No-Action Alternative would have on current growth trends and development patterns would be negligible.

As described in Section 1.4.1, commuters from outlying towns such as Alpine or Bondurant use Highway 26/89/189/191 to travel to their jobs in the Jackson area. However, most commuters travel at least 30 miles to reach the Town of Jackson, and congestion on the seven-mile portion of the Study Corridor likely would not affect decisions to move to these areas and commute to Jackson. Therefore, the No-Action Alternative is not anticipated to affect growth trends in these outlying towns.

4.1.2 Build Alternatives

5-Lane Rural Alternative. The 5-Lane Rural Alternative would accommodate travel demand from anticipated development within the towns of Jackson, Alpine, and Bondurant and would alleviate the traffic congestion this development will generate.

Because of the predominate pattern of development on private lands along the corridor, the USFS has determined that the retaining walls as proposed for this project would be consistent with the USFS' scenic quality standard of *retention* Please refer to Section 4.22 for discussion of visual impacts and mitigation.

The 5-Lane Rural Alternative would improve the safety and efficiency of the highway, and in so doing would be consistent with Goals No. 1 and No. 3 in the transportation element of the comprehensive plan.

Approximately 17.3 acres of land along the highway would need to be acquired for right-of-way use with this alternative, which would displace a small amount of existing land uses and land currently within the Natural Resources Zoning Overlay District. In addition, cut and fill slopes associated with the construction of the 5-Lane Rural Alternative could impact two Teton County Scenic Preserve Trust parcels west of the highway; one near South Park Loop Road and the other south of Evans Road. The South Park Loop Scenic Area that is incorporated into the Teton County Scenic Resource Overlay District would not be affected by the proposed 5-Lane Rural Alternative. See Section 4.5 for right-of-way impacts associated with each alternative.

Although the 5-Lane Rural Alternative would provide additional capacity as well as other transportation benefits, it would have a negligible effect on current growth trends and development patterns. As discussed above, growth in surrounding towns and counties is anticipated to occur whether or not highway improvements are made, and the seven-mile Study Corridor represents a small portion of the overall commute from surrounding areas into Jackson. Also, the improved transportation access this alternative would provide is not anticipated to greatly affect decisions to develop property in and near the Study Corridor.

Combination Alternative (Preferred Alternative). The Combination Alternative would have the same land use impacts as the 5-Lane Rural Alternative over the six-mile portion proposed for the 5-Lane Alternative.

The Combination Alternative would be partially consistent with Goal No. 3 in the transportation element of the comprehensive plan. Over the three-lane section of the Combination Alternative, the addition of a passing lane would provide modest improvements in the efficiency of the transportation system. Over the four-lane section of the Combination Alternative, the addition of travel lanes would improve the efficiency of the transportation system and provide modest improvements in safety. The three-lane section of the Combination Alternative would be consistent with the goals and objectives specified in the community character element of the comprehensive plan. The additional pavement associated with the four-lane cross-section would be a departure in character from the existing two-lane cross-section, but would represent less of a departure from existing character than would a five-lane section. For analysis of potential impacts to community character, refer to Section 4.22, Visual Character Impacts and Section 4.25, Cumulative Impacts.

Approximately 15.8 acres of land would need to be acquired for right-of-way use.

Pathway Options: Right-of-way impacts associated with both build alternatives include 1.5 acres of right-of-way impacts associated with Pathway Option 1 (Preferred Pathway Option). Pathway Option 2 would have 0.2 acre of right-of-way impacts, therefore reducing the right-of-way impacts associated with both build alternatives by 1.3 acres. Both pathway options would have a negligible effect on current growth trends and development patterns.

4.1.3 Mitigation

Because the build alternatives are generally consistent with future land use plans and would have a negligible effect on current growth trends and development patterns, no mitigation is necessary.

Mitigation for property acquisition is specified in Section 4.5, Right-of-Way and Relocations.

4.2 Farmland

Impacts to farmland, as defined by the Farmland Protection Policy Act (FPPA) of 1981, occur when land with soils classified as Prime, Unique, or of Statewide or Local Importance are paved with impervious surface, covered by fill, or removed to accommodate the installation of proposed improvements. Potential impacts to Prime and Unique Farmland can be either direct through purchase, or indirect through restricted access. Areas that are developed or planned for development are not considered Prime and Unique Farmland. This is under the assumption that lands designated for development or purchased for roadway right-of-way preclude the use of the area for agricultural purposes in the future.

4.2.1 No-Action Alternative

No Prime, Unique, or farmland areas of Statewide Importance are located in the Study Corridor.

4.2.2 Build Alternatives

5-Lane Rural Alternative. WYDOT confirmed through coordination with the Natural Resources Conservation Service Jackson Field Office and the Teton County Planning Department that no Prime, Unique, or farmland areas of Statewide Importance are located in the Study Corridor. In addition, coordination with the Teton County Planning Department confirmed that Teton County Land Development Regulations do not contain any provisions that designate specific locations within the county as being of local importance for crop production or grazing, and consequently there are no zones or areas restricted from development specifically to protect agricultural operations. Therefore, no protected farmlands would be impacted by the 5-Lane Rural Alternative, and requirements under the FPPA have been fulfilled.

An assessment of impacts to "unprotected" farmland was conducted. Land considered "unprotected" farmland includes land use designated as vacant/agricultural/ranching (see **Figure 3-1**). This alternative would impact approximately 1.91 acres of unprotected farmland, consisting of irrigated cropland, hayfields, and non-irrigated pastureland.

Combination Alternative (Preferred Alternative). Impacts to Prime, Unique, or farmland areas of Statewide Importance, as well as unprotected farmlands, would be the same as the 5-Lane Rural Alternative.

Pathway Options: Impacts to unprotected farmland for both build alternatives include impacts associated with both pathway options. Because unprotected farmlands exist only where both pathway options would be located adjacent to the highway, impacts to unprotected farmland would be the same for both pathway options.

4.2.3 Mitigation

Because no Prime, Unique, or farmland areas of Statewide Importance are located in the Study Corridor, no mitigation is required. Acquisition of unprotected farmland will comply with procedures and policies contained in the Uniform Relocation Assistance and Real Property Acquisitions Policies Act of 1970, as amended (see Section 4.5.4).

4.3 Social Conditions

4.3.1 No-Action Alternative

The No-Action Alternative would not alter population growth trends or development patterns within the area. Increasing population and commuters from Alpine and Bondurant would result in an increase in traffic, time delays, and safety concerns. Response times for emergency service vehicles would also increase. Residents along the highway could be adversely affected by increased traffic making it more difficult to travel and access property.

4.3.2 Build Alternatives

5-Lane Rural Alternative. The 5-Lane Rural Alternative would improve access for the growing populations of Jackson, Teton County, and the commuter communities of Lincoln and Sublette Counties. Reduction of traffic congestion, as well as improved accessibility, safety, system linkage, and other transportation needs, would benefit highway users. Improved mobility would result in better response times for emergency services.

Widening the highway to five lanes could result in a number of short-term adverse impacts for residents living adjacent to the highway. Construction in the Study Corridor would increase both air pollution and noise, as well as limit accessibility temporarily (see Section 4.23, Construction). One residential relocation would be required for right-of-way needs; no businesses would need to be relocated.

Combination Alternative (Preferred Alternative). Social impacts for the Combination Alternative are similar to those for the 5-Lane Rural Alternative, and relocations are the same. Accessibility would improve the same as the 5-Lane Rural Alternative over the six-mile portion proposed for five lanes. However, accommodations for increased travel demand and accessibility for the three- and four-lane portions of the Combination Alternative would not be as great as with the 5-Lane Rural Alternative.

Pathway Options. The addition of a pathway under both pathway options would allow for non-motorist commuters to travel directly between the town of Jackson and Hoback Junction. In addition to improving connectivity between Jackson Hole and the junction, the paths would provide a safer route for pedestrians and cyclists. A pathway could create more of a sense of community because pedestrians/cyclists would feel more comfortable traveling along the corridor.

4.3.3 Mitigation

Because there are no direct or indirect impacts to social conditions, no mitigation is required.

Short-term impacts would occur during construction (see Section 4.23, Construction). Good communication will be maintained with the communities, residents, and emergency service providers regarding road delays, access, and special construction activities. WYDOT will coordinate with agency/river outfitters as part of maintaining good communication during construction.

4.4 Environmental Justice

Identification of environmental justice impacts and potential mitigation measures involves analysis of whether disproportionately high and adverse effects to minority and low-income populations occur and, if so, how these impacts could be avoided, minimized, or mitigated. Environmental justice impacts are assessed in terms of potential property acquisitions or relocations, changes in access to employment areas, destruction or disruption of community cohesion or a community's economic vitality, and changes in low-income and minority communities/neighborhoods. Community impacts are measured by changes in the physical environment, such as increases in noise levels, air pollution levels, and the presence or introduction of hazardous materials.

Specialized outreach to low-income and minority populations was conducted as part of the public involvement process to gather comments and concerns regarding the project. Outreach efforts were made to ensure that low-income and minority populations had opportunities to comment upon and influence the development and assessment of corridor alternatives. These and additional public involvement efforts are detailed in Chapter 6.0 of this EIS, Comments and Coordination.

4.4.1 No-Action Alternative

The No-Action Alternative would not result in disproportionately high and adverse impacts to minority or low-income populations adjacent to the Study Corridor. Impacts from increased traffic, such as congestion, access, air quality, and noise, would be experienced equally by the overall community.

If the current growth and development of the resort area continues, it is likely that housing values under the No-Action Alternative could increase. Minority and low-income populations, as well as non-minority and higher income populations, would benefit from increased property values.

The No-Action Alternative would not introduce hazardous materials into minority and low-income areas. There would be no displacement of minority or low-income residents, businesses, or employees under this alternative.

4.4.2 Build Alternatives

5-Lane Rural Alternative. An assessment of environmental justice impacts was performed in accordance with Department of Transportation Order 5610.2 and Federal Highway Administration (FHWA) Order 6640.23. Specialized outreach to low-income and minority populations was conducted as part of the public involvement process. The results of this analysis indicate that the 5-Lane Rural Alternative would not result in disproportionately high and adverse impacts to minority or low-income populations adjacent to the Study Corridor. Also, there would be no displacement of minority or low-income residents and no businesses would be displaced.

This alternative would provide benefits to minority and low-income populations, and the community as a whole, by meeting transportation needs discussed in Chapter 1.0. Improvements in traffic congestion would facilitate access to housing, businesses, and community facilities and services for minority and low-income populations, as well as the overall community. Improvements in traffic congestion would reduce the concentration of vehicle emissions caused by idling vehicles in the Study Corridor. All communities (minority, low-income, non-minority, and higher income) would benefit equally. In addition, the 5-Lane Rural Alternative would not result in impacts due to the presence or introduction of hazardous materials into minority and low-income areas.

Anticipated traffic volumes would not result in noise levels above 65 dBA for any of the residents of the Evans Mobile Home Park. The 5-Lane Rural Alternative would actually result in lower than existing and No-Action noise levels because the roadway would be moved ten feet to the west of the existing alignment. In addition, a four-foot berm would be constructed east of the roadway, buffering the mobile homes from traffic related noise.

The indirect impact of the 5-Lane Rural Alternative on housing values for minority and low-income residents is difficult to assess, especially for an area adjacent to a popular resort town. If the current growth and development of the resort area continues, improvements in access and level of service would likely increase housing values. Minority and low-income populations, as well as non-minority and higher income populations, would benefit from increased property values.

Potential nuisance impacts (such as visual impacts, headlight glare, and highway lighting), as well as temporary construction related impacts (such as noise, dust, increased traffic, and detours), would not occur in a manner that would result in disproportionate impacts on minority or low-income populations.

Combination Alternative (Preferred Alternative). Impacts to minority and low-income populations associated with the Combination Alternative are the same as described for the 5-Lane Rural Alternative.

Pathway Options: Both pathway options would benefit all communities by providing a recreational amenity and improving safety for bicyclists and pedestrians.

EO 12898 Compliance

As discussed in Section 3.4, the purpose of EO 12898 is to ensure that minority and low-income populations and minority-owned businesses do not receive disproportionately high and adverse human health or environmental impacts as a result of federal actions as compared to the surrounding non-minority and non-low-income community (see Section 3.4 for more information). Because the Combination Alternative (Preferred Alternative) would not result in disproportionately high and adverse impacts to minority or low-income populations adjacent to the Study Corridor, requirements under EO 12898 have been fulfilled.

4.4.3 Mitigation

As discussed in Section 4.11, to avoid and minimize noise impacts to the Evans Mobile Home Park, designers shifted the proposed roadway alignment slightly to the west and included a four-foot-high earthen berm in the revised design. Elsewhere, because there would be no disproportionately high and adverse impacts to minority or low-income populations, no mitigation measures will be required.

4.5 Right-of-Way

Most of the proposed highway improvements would occur within existing WYDOT right-of-way. However, additional right-of-way would be required in certain locations, and several relocations are anticipated. In its preliminary design, WYDOT has attempted to minimize impacts to residences and businesses.

4.5.1 Methods

To estimate right-of-way impacts, WYDOT superimposed the preliminary construction limits from the build alternatives on top of aerial photographs showing existing right-of-way boundaries. Areas where the construction limits fell outside of existing WYDOT right-of-way were included in calculations for right-of-way needs. More detailed design and additional impact avoidance will likely result in modifications to these estimates.

4.5.2 No-Action Alternative

The No-Action Alternative would not result in displacements or require additional right-of-way.

4.5.3 Build Alternatives

5-Lane Rural Alternative. The 5-Lane Rural Alternative would require the relocation of one residence located approximately one mile north of Hoback Junction on the east side of the highway. This alternative would not require relocation of any other residences or businesses.

The 5-Lane Rural Alternative would require an estimated 17.3 acres of additional right-of-way. Right-of-way needs for this alternative would include approximately three acres of land within the Teton County Scenic Preserve Trust, located on the west side of the highway south of South Park Loop Road.

Overhead power lines would not be impacted. The Lower Valley Energy pipeline crosses the highway at MP 148.72 (South Park Loop Road) and MP 146.73 (Game Creek).

Combination Alternative (Preferred Alternative). Right-of-Way impacts associated with the Combination Alternative are the same as those described for the 5-Lane Rural Alternative. The only exception is that the Combination Alternative would require approximately 15.8 acres of right-of-way because of its reduced width in certain locations.

Pathway Options: Right-of-way impacts associated with both build alternatives include 1.5 acres of right-of-way impacts associated with Pathway Option 1 (Preferred Pathway Option). Pathway Option 2 would have 0.2 acre of right-of-way impacts, thereby reducing the right-of-way impacts associated with both build alternatives by 1.3 acres. The build alternatives would require the same number of relocations with either pathway option.

4.5.4 Mitigation

Under the Combination Alternative (Preferred Alternative), right-of-way acquisition will comply with the Uniform Relocation Assistance and Real Property Acquisitions Policies Act of 1970, as amended. The purpose of this act is to provide uniform and equitable treatment of all persons displaced from their homes, businesses, or farms. The Uniform Act requires that persons to be displaced be provided with information they will need to minimize the disruption of moving and maximize the likelihood of a successful relocation. Owners of property to be acquired will be compensated at fair market value for their property. Relocation assistance payments are designed to compensate displaced persons for costs that are the result of acquisition of the property upon which they reside.

All reasonable opportunities to avoid relocations and minimize the acquisition or impacts to private property will be taken during the final design stage.
WYDOT will coordinate with Lower Valley Energy regarding the recently constructed natural gas pipeline to try to avoid relocation of the pipeline during construction of the Preferred Alternative.

4.6 Economic

None of the alternatives would greatly affect economic growth trends in the Study Corridor or the larger Teton County area. Tourism and recreation would continue to serve as the economic base of the county. Employment and affordable housing needs would continue to increase. The rate and amount of growth in Teton County would largely be determined by local land development regulations and decision-making. Local and regional economic forces would also play a role.

Each of the build alternatives would temporarily boost the local economy by providing employment of construction workers and purchase of construction material. Benefits could include temporary increased wages and retail sales to local businesses, partially offsetting any lost revenue from construction related detours and delays.

4.6.1 No-Action Alternative

The No-Action Alternative would not directly affect regional or local economic conditions or development patterns. Since the No-Action Alternative would not meet existing or future transportation needs outlined in Chapter 1.0, travel between Jackson and points south would become more time-consuming and frustrating for commuters, residents, and tourists.

Worsening safety and traffic conditions would also hinder access to businesses and local services. This could detract from tourists' enjoyment of the area and may discourage some recreational pursuits. Although some visitors may change their travel plans due to increased congestion and travel times, most tourists who are intent upon going to Jackson, local resorts, or Grand Teton/Yellowstone National Parks would continue to do so. Therefore, retail sales, visitor days, and other economic activity related to tourism are expected to continue increasing under the No-Action Alternative, although at slightly reduced levels compared to the build alternatives.

The No-Action Alternative would not improve access to employment locations. Increased congestion and travel times would burden workers commuting to Jackson from Alpine, Bondurant, or other southern origins. This could create a hardship for the businesses that employ these workers in terms of employee reliability and desirability of employment.

Since the No-Action Alternative would not address safety issues, the number of accidents would continue to increase, as would the economic costs associated with those accidents.

4.6.2 Build Alternatives

5-Lane Rural Alternative. The 5-Lane Rural Alternative would improve traffic flow, safety, and access to commercial, recreational, and employment locations. Businesses in the Study Corridor would benefit from improvements in mobility, congestion, and travel time. The safety and mobility improvements associated with this alternative would also benefit regional tourism. As a result, tourist related retail sales are anticipated to be slightly higher than under the No-Action Alternative.

The 5-Lane Rural Alternative would require the relocation of one residence, located approximately one mile north of Hoback Junction on the east side of the highway. WYDOT anticipates that it can successfully relocate this residence to a nearby location.

Combination Alternative (Preferred Alternative). Impacts associated with the Combination Alternative are the same as those associated with the 5-Lane Rural Alternative.

Over the three- and four-lane portions of the Combination Alternative, improvements to capacity and safety would be more modest when compared to the 5-Lane Rural Alternative.

Pathway Options: Economic impacts for both build alternatives include impacts associated with Pathway Option 1 (Preferred Pathway Option). Impacts would be the same with both pathway options.

4.6.3 Mitigation

No mitigation is required.

4.7 Parks and Recreation Resources

There are no designated parks within the Study Corridor, therefore this section addresses impacts to recreation resources only. All Build Alternatives would improve traffic flow, safety, and accessibility for recreationists within the Study Corridor. These alternatives would improve river access points within the Study Corridor and would not affect activities such as camping, cross-country skiing, horseback riding, and hunting. WYDOT and FHWA would form an advisory committee to provide input on issues such as access in the final design phase of the project. This committee would work to consolidate informal access and select safe locations for pullouts, parking areas, etc.

4.7.1 No-Action Alternative

The No-Action Alternative would have no direct impact on recreational facilities in the Study Corridor. However, as air pollution and noise levels increase due to increased traffic, recreational facilities would be indirectly impacted. Pollution for local river recreational areas could potentially increase due to higher vehicular emissions. Furthermore, increased traffic congestion during peak hours and high tourism periods could impact the recreational experience.

4.7.2 Build Alternatives

5-Lane Rural Alternative. The 5-Lane Rural Alternative would improve access to recreational facilities in and near the Study Corridor by addressing transportation needs discussed in Chapter 1.0 of this EIS. As discussed in Section 4.10.1, this alternative is expected to improve air quality over No-Action conditions. The reconfigured access to the South Park boat launch area being developed by Teton County on land acquired from BLM will enhance safe ingress and egress. Access to the parcel would be provided as currently shown on the draft site plan depicted in the *Recreation Project Plan South Park River Access*, September 2004. Site access would be coordinated with the Snake River Fund and the Snake River Taskforce during final design. No impacts to that parcel would occur. During construction, temporary increases in turbidity and sediment may impact fishing opportunities in certain sections of the river.

Combination Alternative (Preferred Alternative). Impacts to recreation resources associated with the Combination Alternative are similar as those associated with the 5-Lane Rural Alternative. For the Combination Alternative, the narrower pavement width in the three- and four-lane sections would reduce adverse visual effects in those sections, thereby minimizing impacts for scenic driving.

Pathway Options. Both pathway option would enhance recreational opportunities for pedestrians and bicyclists (see Section 4.9.2). As discussed in Section 4.9.2, Pathway Option 2 (Old Henry's Road) would provide more scenic views than Pathway Option 1 (Preferred Pathway Option). However, Pathway Option 2 is less direct and less flat than the other option. Due to its location near and parallel to the highway, users of Option 1 would experience higher traffic noise levels.

4.7.3 Mitigation

To mitigate for unavoidable impacts to recreation resources, WYDOT will implement many of the mitigation measures suggested in the USFS White Paper on the Snake River Wild and Scenic River Eligibility Analysis (see **Appendix C**). These measures are discussed below.

Since the build alternatives would not directly impact recreation resources, mitigation is not required. The existing pathway will remain open for recreational use until the new pathway construction is completed, at which time use would shift to the new pathway. Use of existing pathway will not be interrupted during construction. As discussed previously, WYDOT and FHWA will review informal recreation access points during the final design stage and identify opportunities to improve safety, circulation, and coordinate recreation access. Parking needs at the Flat Creek/dike access area also will be considered, as well as signage for trailheads and the South Park boat access area. WYDOT will coordinate these issues with the design advisory group established during the final design phase. Also, WYDOT will require the contractor to provide at least one day of pre-notification before channel disturbing activities to allow anglers to avoid turbid sections of the river.

As of this writing, development plans for the BLM parcel have not been finalized. The Preferred Alternative will provide access to the parcel as currently shown on the draft site plan depicted in the *Recreation Project Plan South Park River Access*, September 2004. The plan retains the existing Highway 189/191 and Munger Mountain Road intersection as the main access point for areas planned on both sides of the highway. The plan includes construction of an underpass/tunnel north of the Munger Mountain Road intersection to provide vehicular movement between the east and west sides of the site. Although the Preferred Alternative will not include construction of the tunnel, highway improvements will not preclude construction of a tunnel by others in the future. The draft site plan also includes provision of safe entry to the site from proposed Teton County regional trail systems. FHWA and WYDOT will coordinate with the Snake River Fund and the Snake River Taskforce regarding site access during final design.

Mitigation for noise, air, and visual impacts are addressed in those respective sections. In its Snake River White Paper, the BTNF notes that, at bridge locations, replacing or supplementing mid-stream piers with larger piers could create hydraulic eddies. Bridges that would be widened would use a similar substructure type and material to that of the current structures. If bridges are replaced, the location, size and orientation of the piers will be designed such that there is minimal effect on the hydraulic characteristics of the stream flow.

4.8 Transportation

4.8.1 No-Action Alternative

The No-Action Alternative would not meet several goals outlined in the *Jackson/ Teton County Comprehensive Plan* (2002) (see Sections 3.1.4 and 3.8.1). It would not meet Goal No. 1 in the plan's transportation element since it would not provide "for future mobility that meets the needs of residents and tourists within the context of community character." It also would not meet Goal No. 3, which relates to improving the safety and efficiency of the transportation system, since it would not meet safety and efficiency needs outlined in Chapter 1.0.

The highway is classified as a Rural Principal Arterial and is on the National Highway System. The American Association of State Highway Transportation Officials (AASHTO) guidelines call for this type of highway to be designed to at least a Level of Service (LOS) C (see Section 3.8.3). Under the No-Action Alternative, the highway would operate at LOS D and E by the design year 2026. Transit operations could be affected to the extent that increasing congestion slows bus transit service.

The existing bridges across the Snake River would remain and bridge deficiencies discussed in Section 1.6 would not be addressed.

4.8.2 Build Alternatives

5-Lane Rural Alternative. Capacity analysis indicates that the 5-Lane Rural Alternative would operate at LOS A in 2026. This alternative would improve the efficiency of the transportation system and improve safety through the addition of lanes and a center turn-lane to separate oncoming traffic and accommodate turning movements. Therefore, the 5-Lane Rural Alternative would meet Goals No. 1 and 3 in the Transportation Element of the *Jackson/ Teton County Comprehensive Plan* (2002).

Consistent with AASHTO recommendations for facilities similar to the Study Corridor, the 5-Lane Rural Alternative would have an anticipated minimum design speed of 55 mph. During final design, WYDOT would hold meetings with Teton County to discuss ways to improve circulation through access management. The 5-Lane Rural Alternative would not adversely affect transit operations except to the extent that increasing congestion would slow bus transit service. To the extent practicable, this alternative would address bridge deficiencies identified in Section 1.6. Section 4.18.3, under Fisheries, provides details on bridge and culvert improvements.

Combination Alternative (Preferred Alternative). Impacts associated with the Combination Alternative are the same as those associated with the 5-Lane Rural Alternative. In the three- and four-lane sections, the Combination Alternative would provide adequate capacity as compared with the 5-Lane Rural Alternative, but would not accommodate turning movements to the same extent. This alternative would operate at LOS A-C in 2026.

Pathway Options: For impacts associated with both pathway options, please refer to Section 4.9.2.

4.8.3 Mitigation

No mitigation is necessary.

4.9 Bicycle and Pedestrian Facilities

4.9.1 No-Action Alternative

Under the No-Action Alternative, the Study Corridor would continue to lack a safe, connecting network of bicycle and pedestrian facilities, a condition that is inconsistent with area plans. No impacts to existing trails or pathways would occur.

4.9.2 Build Alternatives

5-Lane Rural Alternative. Overall conditions for pedestrians and bicyclists would be improved by implementation of the 5-Lane Rural Alternative. The addition of a separate pathway would improve pedestrian and bicycle safety and extend the pathway network throughout the corridor, which is consistent with area plans to expand the use of non-motorized multiuse pathways in Teton County. The 5-Lane Rural Alternative includes two options for a separated pathway (see “Pathway Options” below).

This alternative would require widening of the existing highway footprint. Construction would temporarily impact the existing Paul Merritt and Von Gontard trails where they are located within the existing WYDOT right-of-way. Both trails would be relocated and opened to recreational use before the existing trails are impacted so that recreational activities are not interrupted and use of the trails would be protected. No impacts would occur to trails located outside existing WYDOT right-of-way and within County-owned easements.

In the area across from Little Horsethief Lane (see **Figure 5-2**), the proposed footprint would encroach on the County-owned easement for the Von Gontard Trail, but not the trail itself. This is because WYDOT has determined that in this area, the existing pathway extends outside of the easement such that the existing pathway would not be impacted. This alternative would impact approximately 0.05 acre of the trail easement.

This alternative would impact the existing trail in one other location—approximately 0.5 mile south of the location described above, or about 1,000 feet north of WYDOT's south yard. In this area, temporary impacts would occur to the existing trail but not to the pathway easement. This is another area where the trail extends outside of its intended easement; however, the easement would not be impacted. WYDOT would reconstruct and reroute the trail to eliminate the conflict. If practicable, WYDOT would reroute the trail onto the easement.

FHWA has determined that impacts to the trail easement would not adversely affect the activities, features, and attributes of the trail. Based on this determination, and consideration of public input received, FHWA has concluded that the Preferred Alternative would have *de minimis* impacts to the Von Gontard Trail and that an analysis of feasible and prudent avoidance alternatives under Section 4(f) is not required. Refer to Chapter 5.0 of this document for detailed information concerning the Section 4(f) evaluation and FHWA's *de minimis* finding for the Von Gontard Trail easement.

Combination Alternative (Preferred Alternative). Impacts to bicycle and pedestrian facilities associated with the Combination Alternative are the same as those associated with the 5-Lane Rural Alternative.

Pathway Options: Both pathway options would fall within public right-of-way. Pathway design would accommodate wildlife crossings or fencing being considered by WYDOT at Flat Creek and north of Flat Creek.

Pathway Option 1 (Preferred Pathway Option) would provide a separated pathway along the west side of the roadway connecting to the existing pathway from South Park Road (MP 148.6) to approximately MP 141.0 near Hoback Junction, a distance of approximately 7.5 miles. The pathway would transition into a sidewalk near the approach to Hoback Junction. Since the pathway would be adjacent to the improved highway along its entire length, pathway users would experience more noise and visual impacts from the highway compared to Pathway Option 2. Pathway Option 1 addresses comments received from Teton County, citizens, and stakeholder groups, who voiced a preference for the pathway to be located adjacent to the highway throughout the Study Corridor. Option 1 would better serve the populations located along the highway and provide a more direct route than Pathway Option 2. As such, it is anticipated that Pathway Option 1 would experience a higher level of use and better serve the community than Pathway Option 2. Pathway Option 1 would also provide access to the

South Park boat launch area and the environmental justice community along the Study Corridor.

Pathway Option 2 would provide the same pathway as described under Pathway Option 1, except that it would cross the highway at Game Creek Road and follow the Henry's Road alignment south to the point where Henry's Road ends near Horse Creek Road. The path then would cross the highway and follow along the west side of the highway alignment into Hoback Junction. The pathway would connect from Henry's Road to the highway via grade-separated crossings. This pathway would use Henry's Road as a "shared facility," therefore no new pathway would be constructed. Bicyclists, pedestrians, and non-motorized users would share the road with motor vehicles. Since Henry's Road has low traffic volumes, no safety or access impacts are anticipated with this option. For the pathway section that follows along Henry's Road, pathway users would experience less noise and visual impact from the highway than with the Pathway Option 1.

Pathway impacts to environmental resources are discussed under the individual resource sections in this chapter. Impacts are the same for most resources evaluated. **Table 4-1**. summarizes resources anticipated to have different impacts under each pathway option.

Table 4-1
Summary of Pathway Option Impacts

Resource	Pathway Option 1	Pathway Option 2
Right-of-Way	1.5 acres	0.2 acre
Water Quality	6.4 acres	1.5 acres
Waters of the U.S.	120 linear feet	20 linear feet
Wetlands located between north and south cutoffs for Henry's Road	Type II wetland: 0.07 acre Type III wetland: 0.17 acre Type VI wetland: 100 sf.	No impacts to wetlands in that area.
Wildlife	Wider highway footprint between northern and southern terminus of Henry's Road, slightly increasing barrier effect for wildlife movement in that area	Narrower highway footprint between northern and southern terminus of Henry's Road, slightly decreasing barrier effect for wildlife movement in that area
Vegetation	Mountain Big Sagebrush: 0.78 acre Riparian Forest: 0.6 acre	Mountain Big Sagebrush: 0.2 acre Riparian Forest: no impacts

4.9.3 Mitigation

At locations where the Von Gontard Trail falls within public right-of-way, it will be replaced with the new pathway. The existing pathway will remain open for recreational use until the new pathway construction is completed, at which time use will shift to the new pathway. Pathway use will not be interrupted during construction. Since conditions for pedestrians and bicyclists would improve, and both pathway options fall within the existing right-of-way, no additional mitigation is necessary. Teton County representatives have stated that they are agreeable to closing either pathway option during periods of high wildlife migration/presence to minimize wildlife disturbance. Pathway/trail system closures to protect wildlife are common in the Jackson area. Temporary pathway closures to protect migrating wildlife would not be extraordinary. Mitigation measures for other environmental resources are discussed in the individual resource sections in this chapter.

4.10 Air Quality

4.10.1 Impacts

The Study Corridor is in attainment and has no regional emissions budget modeled for future levels of ozone, carbon monoxide, $PM_{2.5}$, or PM_{10}. Although traffic volumes are expected to increase approximately 46 percent by 2026, all future alternatives would experience the same increase in traffic volumes. Capacity increases afforded by the 5-Lane Alternative and Combination Alternative (Preferred Alternative) would allow a higher level of service to be maintained on the primary routes. The No-Action Alternative, in comparison, would experience less adequate levels of service, resulting in increased future emissions due to congestion and idling vehicles. The overall traffic levels are not expected to cause an exceedance of the National Ambient Air Quality Standards (NAAQS) for the No-Action Alternatives or any of the build alternatives. There are no proposed signalized intersections within the Study Corridor.

Mobile Air Toxics. A basic analysis of the likely mobile source air toxics (MSAT) emission impacts of the proposed action was performed. However, it should be noted that the available technical tools cannot yet accurately predict project-specific health impacts of the emission changes associated with transportation projects.

Project-Level Analysis. For each alternative in this EIS, the amount of MSATs emitted would be proportional to the vehicle miles traveled (VMT), assuming that other variables (e.g., fleet mix) are the same for each alternative. Through its traffic forecasting, WYDOT does not anticipate differences between future traffic volumes and vehicle mix for the No-Action and build alternatives. It is anticipated that the build alternatives would move traffic closer to sensitive receivers, thus increasing exposure to MSATs. However, the build alternatives would result in a free-flowing LOS, lowering overall MSAT concentrations, where congestion resulting from the No-Action Alternative would contribute to higher MSAT levels. According to EPA's MOBILE6 emissions model, emissions of all of the priority MSATs except for diesel particulate matter decrease as speed increases. The extent to which emissions would decrease cannot be reliably projected because of the inherent deficiencies of technical models.

Also, regardless of the alternative chosen, emissions would likely be lower in 2026 (the design year) than present levels as a result of EPA's national control programs that are projected to reduce annual MSAT emissions by 72 percent between 1999 and 2050. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the Study Corridor are likely to be lower in the future in nearly all cases.

4.10.2 Mitigation

Motor vehicle emissions in the Study Corridor are not expected to result in any exceedance of the NAAQS; therefore, no direct project air quality mitigation is necessary. Wyoming Department of Environmental Quality-Air Quality Division (WDEQ-AQD) concurrence is not required because the proposed action is located in an attainment area.

4.11 Noise

Evaluation of noise levels for all sensitive receivers along the Study Corridor used year 2026 projected traffic volumes. Future noise levels are predicted to increase an average 2.0 to 3.0 decibels over existing noise levels, primarily due to the effect of an approximately 46 percent increase in future traffic volumes. **Figure 4-1** shows the location and identification number of all noise sensitive receivers. The figure also shows the location of noise monitoring sites used in the noise modeling process. **Table 4-2** provides a summary of impacts along the corridor. Comprehensive noise level results are tabulated in the *Hoback Junction Noise Technical Report* (Carter & Burgess, 2007).

The original 1999 traffic volumes were updated with 2006 traffic volumes in the transportation section of this document. However, the noise analysis was not remodeled using the 2006 traffic volumes. Traffic is anticipated to increase by the year 2006 and beyond. The incremental increases in traffic would result in corresponding increases in noise levels along the corridor. However, the 1999 volumes provide a "worst-case" scenario for predicted noise impacts. This is because the differences in traffic from the existing year to the 2026 design year would be greater using the 1999 data, and therefore substantial increases in noise would be greater. Whether 1999 or 2006 traffic volumes are used, the predicted noise levels in 2026 would remain the same.

Figure 4-1
Noise Receivers and Monitoring Sites

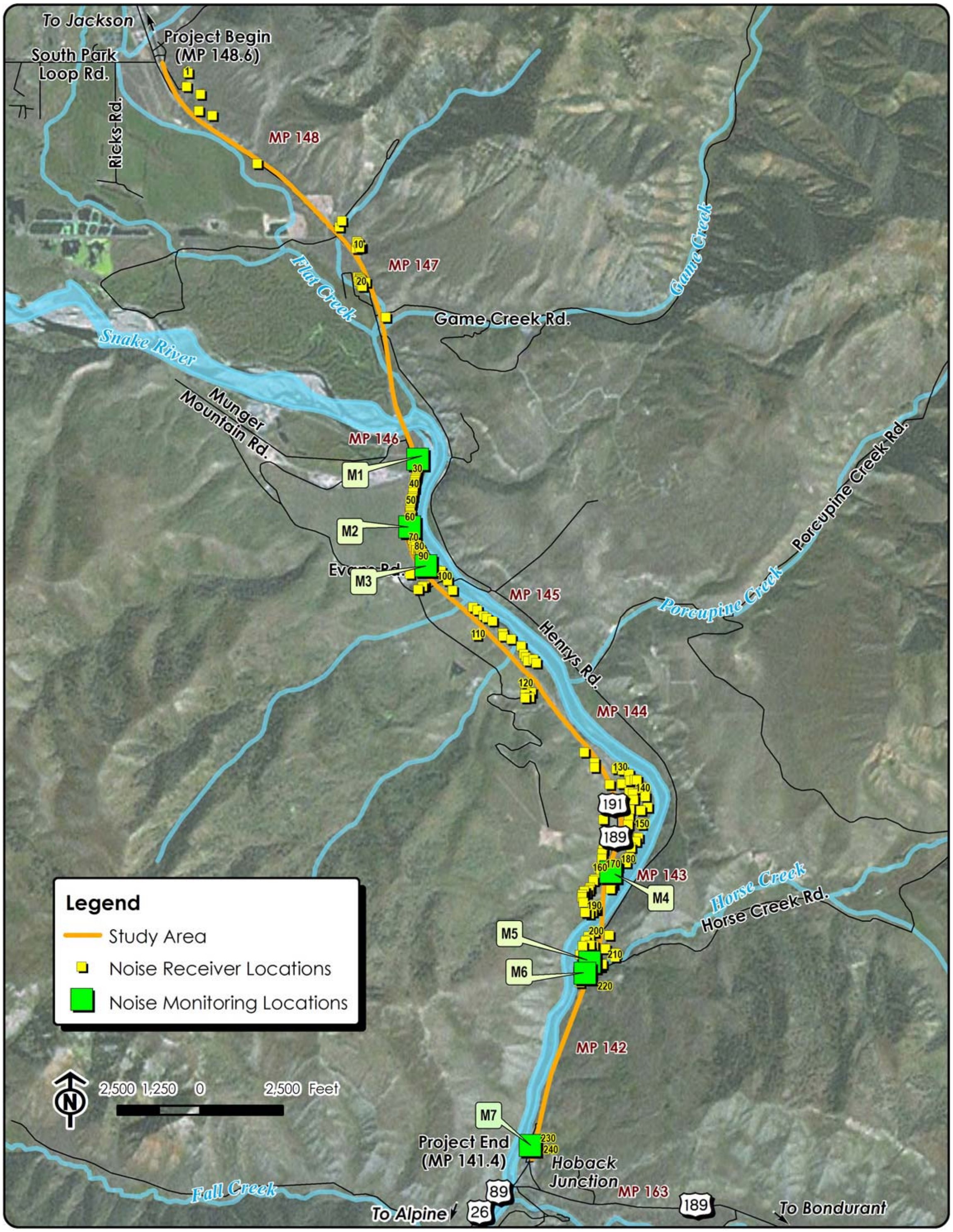


Table 4-2
Noise Impact Summary

Receiver ID (Number of individual dwellings represented)	NAC*	Average Noise Levels			
		Existing (dBA)	No Action (dBA)	Combination Alternative (Preferred Alternative) (dBA)	5-Lane Alternative (dBA)
4 (1)	B	61.7	64.4	**67.7**	**67.7**
6 (1)	B	65.2	**67.9**	**70.3**	**70.3**
20 (1)	B	63.4	65.9	**66.1**	**66.1**
25 (1)	B	63.2	65.7	**67.9**	**67.9**
26-68 (43)	B	**66.1**	**68.6**	63.7	63.7
69-95 (27)	B	60.7	63.2	60.5	60.5
125 (1)	B	60.6	63.3	**66.4**	**66.4**
128 (1)	B	60.7	63.4	**66.4**	**66.4**
158 (1)	B	63.0	65.7	**67.4**	**67.4**
207 (2)	B	59.4	62.0	**66.0**	**66.6**
222 (1)	B	**66.8**	**69.4**	**71.0**	**71.3**

- *Wyoming Noise Abatement Criteria
- **Bold numbers** indicate noise impact exceeds NAC of 66 dBA.

Shaded areas indicate receivers located at the Evans Mobile Home Park.

4.11.1 No-Action Alternative

The Evans Mobile Home Park (receivers 26 through 95), located very close to the existing roadway, would experience the largest noise increase with impacts between 63.2 to 68.6 decibels (dBA), some exceeding the Wyoming Noise Abatement Criteria (NAC) of 66 dBA. However, the existing noise levels are 60.7 to 66.1 dBA. The No-Action Alternative levels represent a 2- to 3-dBA increase, which is barely perceptible to the human ear. A 2- to 3-dBA increase in noise levels would be experienced by other residences along the Study Corridor Also, impacts to two isolated residential noise receivers (R6 and R222) would occur under the No-Action Alternative, ranging between 67.9 and 69.4 dBA and exceeding the NAC of 66 dBA (*Hoback Junction Noise Technical Report*, 2007). There would be no substantial increases of 15 or more decibels above existing noise levels.

4.11.2 Build Alternatives

5-Lane Rural Alternative. The original design for the 5-Lane Rural Alternative resulted in noise increases to the Evans Mobile Home Park similar to those described for No-Action conditions. To avoid and minimize these impacts, designers shifted the proposed roadway alignment slightly to the west and included a four-foot-high earthen berm in the revised design. Updated noise analysis indicated these changes would reduce noise levels such that no noise impacts would occur to the mobile home park.

Along the entire remaining corridor, impacts to nine residential noise receivers (R4, R6, R20, R25, R125, R128, R158, R207 and R222) would occur. Impacts range between 66.0 and 71.3 decibels and occur as exceedances of the Wyoming NAC of 66 dBA. The increases range from 2.7 to 6.6 decibels over existing noise. There would be no substantial increases of 15 or more decibels above existing noise.

Combination Alternative (Preferred Alternative). Impacts associated with the Combination Alternative are the same as those associated with the 5-Lane Rural Alternative.

Pathway Options: Both pathway options would not result in noise impacts.

4.11.3 Mitigation

Wherever the Wyoming NAC or increase criterion are met or exceeded, WYDOT guidelines require that a mitigation analysis be conducted and that the noise abatement measures must be reasonable and feasible. This analysis first determines if proposed mitigation meets these "feasibility" considerations: engineering constructability, access and line-of-sight safety, maintenance requirements, icing and snow drifting, presence of other noise sources, and the ability of the noise mitigation to achieve at least 7 dBA noise reduction.

For mitigation measures that are considered feasible, the analysis considers the following "reasonableness" criteria:

- Amount of noise reduction must be at least 7 dBA.
- Number of benefited receivers.
- Cost of abatement should be $15,000/residence or less.
- Residents' desire for noise barrier.
- Overall design year noise levels where greater consideration is given to impacts over 70 dBA or over 20 dBA increases over existing.
- Longevity of residence at that location relative to highway.

Noise barriers, either in the form of walls or earthen berms, are the most commonly employed highway noise mitigation measure. Noise walls are more common than berms because they require less space. Berms require approximately six feet of width for every one foot of height. Noise barriers typically achieve between 5 and 15 dBA of noise reduction, depending on height, topography (less reduction is achievable for receptors located above the highway), and proximity (barriers are most effective for receptors located within approximately 300 feet of the barrier).

A noise wall was evaluated for Receivers 206 and 207, which are located at a higher elevation than the highway. This area would require a 300-foot-long, 20-foot-tall noise wall to achieve a minimum 7 dBA noise reduction at one of the two impacted receivers. This wall would cost $139,150, at $27,830 per receiver. This is 85 percent above the reasonable cost criterion. Therefore, this wall is not a reasonable mitigation measure.

Remaining impacted receivers either are individual residences or are groups of widely spaced residences. Noise mitigation barriers that could provide the required noise reduction of 7 dBA would be cost-prohibitive, and therefore are not a reasonable mitigation measure.

4.12 Water Resources

Section 3.12 discusses the water resources located within the Study Corridor. This section discusses potential effects to these resources. Effects associated with highways on water resources may include sedimentation, loss of riparian habitat, channel modifications, and chemical contamination. These effects vary widely depending on factors such as proximity and use of the highway, type of stream affected, and surrounding topography and vegetation. These effects are discussed in more detail in other sections of this chapter: Section 4.13 (water quality), Section 4.14 (wetlands), Section 4.15 (floodplains), Section 4.16 (wild and scenic rivers), and Section 4.18 (fisheries).

4.12.1 No-Action Alternative

The No-Action Alternative would result in no new direct impacts to water resources identified in Section 3.12. Indirect impacts could result over time, as traffic and roadway related pollutants increase. These pollutants could include herbicides, road salts, and fertilizers intentionally placed in the environment to promote safety or roadside vegetation. Also, the incidental release of small amounts of petroleum products and metals from truck and car roadway use could occur. A major factor that determines concentrations of pollutants in highway stormwater runoff is the volume of traffic carried by a roadway. The No-Action Alternative would provide no additional improvements, protection measures, or new BMPs to reduce direct or indirect water resource impacts beyond what is currently employed.

4.12.2 Build Alternatives

5-Lane Rural Alternative. Direct impacts to water resources associated with the 5-Lane Rural Alternative would result from bridge and culvert reconstruction, encroachment due to highway widening, and an increase in impervious surface. (Note that the footprint used to calculate environmental impacts at bridge locations assumed structure replacement, since structure replacement would have more impacts than structure widening. This approach allowed for a conservative estimation of impacts.)

For the stormwater discharges that are considered point sources, coverage by a National Pollution Discharge Elimination System (NPDES) permit is required under Section 402 of the Clean Water Act. This requirement would apply to the 5-Lane Rural Alternative. As part of the permit compliance, WYDOT would design and implement Best Management Practices (BMPs) and stormwater controls to better manage runoff and excessive sediment loading from the highway. Section 4.13.3 provides details on BMPs.

Bridge construction over Flat Creek (MP 146.09) and the Snake River (MP 142.79 and MP 146.09), as well as culverts at Game Creek (MP 146.4) and Horse Creek (MP 142.22), could affect these water resources. Bridge reconstruction and culvert placement would result in short-term increases of sediment levels into the river during the construction phase. Bridge or culvert construction that includes in-stream work would generate additional sediment by stirring up the river bottom and re-suspending existing sediment in the water column. Construction of the piers for the bridges over the Snake River and Flat Creek, and the culverts at Game Creek and Horse Creek, would disturb sediment in the river/stream channel. Deposition would occur immediately downstream of the project site during the construction phase for pier placement and culvert replacement, and temporarily adversely impact fish and macroinvertebrate habitat. This sediment could also include sediment from the stream bank erosion caused by grading activities. The sediment load would be minor compared to the overall sediment load carried by Spring runoff. Deposition would be scoured by Spring runoff, so depositional impacts would not last longer than a single construction season. These temporary impacts would not harm the water use designation of Flat Creek, Game Creek or the Snake River, which is Class 2AB, waters known to support game fish populations or spawning or nursery areas at least seasonally.

Replacement of the bridges and Game Creek and Horse Creek culverts has the potential to modify the river channels through adjustments of the river banks, installation of riprap to prevent erosion, lengthening culverts (channelization), and changes in bridge pier shape and/or placement. The culvert lengthening at Horse Creek would result in greater impacts than the Combination Alternative, which would be four lanes at that location.

Standard WYDOT highway design practice includes channel stability assessment and mitigation. The stream channels in the Study Corridor receive very high flows from Spring runoff events, and increases in stormwater runoff from the build alternatives would be relatively minor. Therefore, changes to channel form and function are anticipated to be minor relative to the changes that occur during Spring runoff.

WYDOT would determine whether a bridge would be widened or replaced during the final design process. The method of replacement, whether on or off alignment (i.e., constructing a new bridge adjacent to the existing, then removing the existing bridge) also would be determined at that time. Bridges would be widened if feasible, based on analysis of considerations such as vertical and horizontal alignment and hydraulic characteristics. Impacts would vary depending on the structure type and size selected. At each of the crossings, work within the channel may be required, including excavation, pile driving, and/or bank stabilization. Foundations (abutments and piers) would be placed parallel with the direction of the stream flow at flood stage. When practical, intermediate supports, or piers, would be placed on the stream banks outside of or above the ordinary high water, rather than in the main channel. This would lessen the undesirable impacts, as noted above, to the stream bed, and thus limit the potential for detrimental water quality issues. Additional discussion of water quality impacts associated with the build alternatives can be found in Section 4.13.2. Impacts to free-flow conditions are also discussed in Section 4.16, *Wild and Scenic Rivers*.

WYDOT would evaluate the Snake River bridges at MP 142.79 and MP 146.09 to determine whether they can be feasibly widened and rehabilitated to current standards.

At this time, WYDOT anticipates that the Flat Creek bridge at MP 146.39 would need to be replaced.

South of the South Park bridge (MP 146.09) the existing highway generally parallels the Snake River. Except perhaps at bridge locations, highway widening and construction of the adjacent pathway would not directly encroach on the Snake River. However, the potential for other impacts to water resources (e.g., sedimentation, chemical contamination) would exist (this is discussed further in Section 4.13.2, Water Quality, Build Alternatives). At its closest point (near MP 142), the 5-Lane Alternative would be located approximately 75 feet from the river (25 closer to the river than the Combination Alternative). The potential for the 5-Lane Alternative to affect water resources generally would increase with its closer proximity to the river (compared to the Combination Alternative). This is because locating the highway closer to the river would reduce the amount of land between the highway and river, resulting in less filtering of sediment and pollutants from highway runoff.

Combination Alternative (Preferred Alternative). Impacts to water resources associated with the Combination Alternative are similar to those associated with the 5-Lane Rural Alternative, because replacement and/or widening of bridges would occur in the five-lane sections of this alternative. The Horse Creek culvert reconstruction would occur in the four-lane section, thereby reducing the impacts to Horse Creek with the Combination Alternative.

South of the Snake River bridge that is located south of Henry's Road, the Combination Alternative would have a narrower width than the 5-Lane Rural Alternative. At its closest point (near MP 142), the Combination Alternative would be located approximately 100 feet from the river (25 feet farther from the river than the 5-Lane Alternative). This increase in the amount of land between the river and the highway could result in slightly more filtering of sediment and pollutants from highway runoff than the 5-Lane Alternative. Therefore, the Combination Alternative would have fewer impacts to water resources in that area than the 5-Lane Alternative.
BMPs, including erosion controls such as seeding, mulching, blankets and check dams, and sediment controls such as bales, logs, silt fence and basins, would reduce the potential for adverse impacts.

Pathway Options: Impacts for both build alternatives include impacts associated with Pathway Option 1 (Preferred Pathway Option). Pathway Option 1 would result in more impacts to water resources than Option 2 because it would require wider crossing structures.

4.12.3 Mitigation

WYDOT has attempted to avoid and minimize impacts to water resources during the preliminary design stage. WYDOT will continue to seek opportunities to avoid and minimize impacts to water resources during final design of the Combination Alternative (Preferred Alternative). Also, the final design will incorporate BMPs to mitigate unavoidable adverse effects to water resources (see Section 4.13.3). Mitigation measures for impacts to free-flow conditions are also discussed in Section 4.16, *Wild and Scenic Rivers*.

WYDOT will prepare a hydrology report during final design. The report will evaluate the character of each channel affected by the Preferred Alternative and address effects to channels in the detailed design of the drainage structures.

4.13 Water Quality

4.13.1 No-Action Alternative

The No-Action Alternative would result in no new impacts to water quality. Indirect impacts could result over time, as traffic and roadway related pollutants increase. These pollutants could include herbicides, road salts, and fertilizers intentionally placed in the environment to promote safety or roadside vegetation. Also, the incidental release of small amounts of petroleum products and metals could occur from trucks and cars due to roadway use. A major factor that determines concentrations of pollutants in highway stormwater runoff is the volume of traffic carried by a roadway. The No-Action Alternative would provide no additional improvements, protection measures, or new BMPs to improve water quality beyond what is currently employed. Incremental increases in traffic volumes and congestion would result in associated increases in nonpoint source pollutant loadings entering water bodies from highway runoff.

4.13.2 Build Alternatives

5-Lane Rural Alternative. The highway widening associated with the 5-Lane Rural Alternative would increase the amount of impervious surface along the highway. Impervious surfaces do not allow for filtration of rainfall, resulting in rainfall running off these surfaces as stormwater. Without mitigation, runoff from the highway would increase following construction of the alternatives. The amount of runoff from the highway reaching the streams or rivers is subject to the effectiveness of BMPs, the amount and intensity of rain events, the proximity of water bodies, topography, and vegetative features. The 5-Lane Rural Alternative would increase the amount of impervious surface from approximately 31.4 acres under existing conditions to an estimated 71.4 acres (see **Table 4-3**).

Table 4-3
Future Impervious Surface Estimates by Alternative

Alternative	Acreage
No Action	31.7
5-Lane Rural	71.4
Combination	68.8

Stormwater runoff from highways and associated rights-of-way typically contains a specific suite of pollutants that can occur in widely varying concentrations. Pollutants of concern associated with highway construction and use include a variety of substances from common organic materials to toxic metals. Some pollutants, such as herbicides, road salts, and fertilizers, are intentionally placed in the environment to promote safety or roadside vegetation. Other pollutants, such as the incidental release of small amounts of petroleum products and metals from trucks and cars, are the indirect effect of roadway use. A major factor that determines concentrations of pollutants in highway stormwater runoff is the volume of traffic carried by a particular segment of roadway.

Most stormwater pollutant loading attributed to a particular construction activity, along with the proximity of that activity to water bodies, can factor into water quality. Under a build alternative, the effects of pollutant loadings would vary along the Study Corridor. Primary factors that would influence the effect of highway runoff pollutant loading within any particular surface water body include the type and size of the receiving water body, the potential for dispersion, the size of the catchment area, the biological diversity of the receiving water body, and relative effectiveness of proposed mitigation measures.

To varying degrees, the 5-Lane Rural Alternative would also result in the introduction of certain pollutants normally associated with vehicular traffic (a function of vehicle miles traveled, or VMT). With respect to highway projects, stormwater pollution loading is the quantity of pollutants that are transported off the road surface before they reach vegetated ditches or other BMPs. If not addressed through appropriate stormwater management, the combination of these factors could contribute to degradation of water quality through increases in nonpoint pollutant loading.

Since the 5-Lane Rural Alternative would increase the number of highway lanes, the use and volume of sand/gravel/deicing salts during the winter months would increase. Sand/gravel/deicing salts applied to the highway have the potential to be deposited into the rivers via runoff or side-casting from the road. The use of these materials on the highway is dependant on weather and is expected to be variable over time. After successful reclamation of the highway right-of-way has occurred, the migration of off-stream sediment (including sand/gravel/deicing salts) to the rivers would be slowed; however, the overall long-term effect would be an increase in sediment in the rivers. Sediment that enters the rivers over the winter months would be moved farther downstream during the spring runoff when the volume of sediment in the river is high.

With respect to short-term effects, clearing and grubbing, earth moving and grading, and other construction-related activities can lead to erosion of soils. As discussed in Section 4.12.2, replacement or widening of the bridges and culverts could require in-stream construction, and short-term water quality impacts would depend on the degree of this construction. Section 4.23.2 discusses potential construction effects on water quality.

The degree of sediment generated and delivered to a water resource depends on the number and intensity of precipitation events and the subsequent need for sand/salt application, density and type of adjacent vegetation (which provides filtering), topography (runoff in steeply sloped areas collects into channels reducing efficacy of vegetative filtering), the installation and maintenance of BMPs, and the distance from waterways. The areas of greatest concern would be at crossings, such as bridges and culverts, at which point design considerations will include water quality control measures. Research shows that amount of logs, vegetation, etc. on slopes below roads that would slow surface runoff was the most important variable associated with reducing sediment transport distance.

With implementation of appropriate mitigation measures and BMPs (as discussed below), operation of the 5-Lane Rural Alternative would not result in measurable degradation of water quality or affect surface water use designations discussed in Section 3.13.2.

Combination Alternative (Preferred Alternative). Because of its reduced width in the three- and four-lane sections, the Combination Alternative would have slightly less impervious surface than the 5-Lane Rural Alternative. It would increase impervious surface amounts over existing conditions from 31.4 acres to approximately 68.8 acres. The alternative would result in water quality impacts similar to those described for the 5-Lane Rural Alternative.

Pathway Options: The increase in impervious surface associated with both build alternatives includes 6.4 acres of impervious surface associated with Pathway Option 1 (Preferred Pathway Option). Pathway Option 2 would represent a 1.5-acre increase in impervious surface, resulting in a reduction of 4.9 acres of impervious surface compared to Pathway Option 1. It should be noted that both pathway options would not increase the use of sand/gravel/deicing salts or contribute to highway pollutants associated with both build alternatives.

4.13.3 Mitigation

WYDOT has attempted to avoid and minimize water quality impacts during the preliminary design stage. For example, north of Hoback Junction, WYDOT investigated widening the highway to the east, farther from the Snake River. However, that option was determined to be infeasible due to an existing landslide at MP 141.7. WYDOT will continue to seek opportunities to avoid and minimize impacts to water resources during final design of the Combination Alternative (Preferred Alternative).

As part of construction of a build alternative, WYDOT will require preparation and implementation of a Stormwater Management Plan (SWMP). This plan will describe and list the BMPs necessary to improve stormwater quality while meeting the following goals:

- Control and minimize erosion and sedimentation during and after the construction phase of a project.
- Minimize the potential for contaminants entering stormwater and receiving waters during construction activities.
- Reduce pollutants in post-construction stormwater runoff (stormwater quality management).
- Implement permanent erosion control and stormwater measures to address cut and fill slope erosion and highway runoff.
- Continue BMPs during maintenance.
- Develop a spill prevention and emergency response plan for use during construction concerning the storage, handling, and use of chemicals and other such products.

SWMPs are developed during the design phase of a project and implemented during construction. The temporary erosion control and stormwater management measures are included in the SWMP for use during construction and removed either by the contractor or WYDOT maintenance. In addition to SWMP requirements, WYDOT and its contractors will adhere to criteria set in WYDOT's Standard Specifications for Road and Bridge Construction, 2003 (see Section 4.23).

WYDOT will incorporate BMPs into a Stormwater Pollution Prevention Plan to minimize runoff to the Snake River and tributaries during bridge and highways construction. The Stormwater Pollution Prevention Plan will include inspection requirements to maintain compliance pursuant to state and Teton County stormwater regulations. These inspections ensure the performance and adequate maintenance of water quality BMPs.

BMPs common to WYDOT roadway projects that will be used for the proposed improvements include the following:

- Limiting land disturbance and preserving existing vegetation
- Vegetative stabilization through seeding and mulching
- Periodic monitoring of revegetation efforts for two years after land disturbance.
- Silt fence
- Erosion bales
- Rock berms, channels, diversion or check dams
- Inlet and outlet protection
- Erosion control blankets

Additional BMPs will be identified during project design and will be based upon site-specific characteristics, such as adjacent vegetation type and density, proximity to waterways, topography, and physical constraints. These BMPs could include, but are not limited to:

- Compost berms
- Slope drains
- Ditch checks
- Geotextiles
- Sediment traps
- Basins
- Bituminous and burlap bag curbs

Following are the average efficiency rates of a few common BMPs. It is important to note that the efficiency rate of sediment removal is affected by proper installation and maintenance of BMPs. Therefore, higher or lower efficiency rates are possible based on site-specific conditions (*Urban Erosion and Sediment Control Best Management Practice*, Definition and Nutrient and Sediment Reduction Efficiencies, Andrew H. Baldwin).

- Silt fence – 70 percent
- Straw bale – 70 percent

- Basins – 70 percent
- Vegetative filter strip – 70 percent
- Temporary mulching – 87 percent

Actual effectiveness of BMPs will also depend on site conditions (steeper slopes and higher silt content lead to lower effectiveness). Related research indicates the need to install protection measures as soon as possible after construction since most material is eroded in the first few years after construction. In fact, about half of the total fillslope sediment production measured over two years in one study took place in the first summer and fall after construction. Therefore, measures that are put in place immediately after construction have a greater chance of reducing sediment production when compared with measures that are installed later. Therefore, WYDOT will implement erosion and sediment BMPs as soon after ground disturbance as practical. Also, monitoring of revegetated areas will occur as specified in the revegetation plan that will be developed through coordination with the USFS, WGFD, USACE, and BTNF (see Section 4.19.4).

State-of-the-art erosion and sediment control BMPs will also be considered as they become available.

When the WDEQ proposes a total maximum daily load (TMDL) for Flat Creek, maintenance requirements for the improved highway will support the waste load allocated to stormwater flow off the highway and into Flat Creek.

4.14 Waters of the U.S., Including Wetlands

4.14.1 Methods

The area of wetland impact was determined by measuring the area of wetland within proposed encroachment areas. Impacts to non–wetland waters of the U.S. were expressed as the length of each drainage encroached upon.

4.14.2 No-Action Alternative

The No-Action Alternative would result in no new impacts to wetlands or waters of the U.S.

4.14.3 Build Alternatives

5-Lane Rural Alternative. The highway widening associated with the 5-Lane Rural Alternative would impact 13 wetlands and result in approximately 0.94 acre of permanent wetland impact, including an estimated 0.42 acre of shrub swamp, 0.18 acre of shallow marsh, and 0.34 acre of wet meadow. The impacts would result from the unavoidable filling of wetland areas during construction. The category, functional value, and impacted acreage of each wetland impacted are provided in **Table 4-4.** The total number of wetland functional units lost would be 8.272. In addition to permanent impacts, there will be 0.07 acre of temporary impact to wetland #15, a wet meadow adjacent to the bridge over the Snake River.

This alternative would also result in impacts to approximately 1,200 linear feet of waters of the U.S. Most of this impact would involve small intermittent drainages, although there would be impacts to 26 linear feet of Game Creek, 76 linear feet of Flat Creek, and 76 linear feet of the Snake River. (Note that the footprint used to calculate environmental impacts at bridge locations assumed structure replacement, because structure replacement would have more impacts than structure widening. This approach allowed for a conservative estimation of impacts.)

Table 4-4
Description and Functional Value of Wetland Impacts

Wetland #	Wetland Type	Wetland Category	Functional Score [a]	Area Impacted (ft^2) [b]	Functional Units Lost [a x ba]
Wetlands Associated with Snake River					
16	wet meadow	IV	2.0	174	0.008
17	wet meadow	II	4.7	9	0.001
18	wet meadow	III	2.9	1,742	0.116
21	shrub swamp	I	10.1	436	0.101
28	shallow marsh	I	10.4	7,684	1.835
29	wet meadow	I	9.9	575	0.131
30	shrub swamp	I	9.9	17,729	4.029
			Subtotal	28,349 (0.65 ac.)	6.221
Wetlands Associated with Flat Creek					
9	wet meadow	IV	2.6	2,614	0.156
10	wet meadow	III	4.5	22	0.002
11	wet meadow	I	9.8	5,820	1.309
12	wet meadow	I	9.8	1,830	0.412
14	shrub swamp	III	5.9	87	0.012
31	wet meadow	IV	3.2	2,178	0.160
			Subtotal	12,551 (0.29 ac.)	2.051
			TOTAL	**40,900 (0.94 ac.)**	**8.27**

Source: WEST, Inc., 2005

As noted in Section 4.18.3, bridge construction at Flat Creek and Snake River and culvert construction at Game Creek and Horse Creek would require work within the channel, including excavation, pile driving, and bank stabilization within waters of the U.S. As discussed in Section 4.15.2, WYDOT would attempt to minimize stream and river impacts by keeping bridge piers outside of waterways if bridges are replaced (if bridges are widened, piers would not be moved). Therefore, these bridge impact estimates are conservative (toward the higher range of future impacts) for purposes of this document.

Combination Alternative (Preferred Alternative). Wetland and waters of the U.S. impacts associated with this alternative would be identical to those associated with the 5-Lane Rural Alternative.

Pathway Options: Impacts to waters of the U.S. described for both build alternatives include 120 linear feet of impacts associated with Pathway Option 1 (Preferred Pathway Option). Pathway Option 2 would have 20 linear feet of impacts, and would therefore reduce impacts to waters of the U.S. by 100 linear feet compared to Pathway Option 1.

Wetland impacts associated with Pathway Option 1 are included in impacts presented for both build alternatives. For wetlands located between the north and south cutoffs for Henry's Road, Pathway Option 1 represents impacts to 0.07 acre of Type II wetland, 0.17 acre of Type III wetland, and 100 square feet of Type VI wetland. Pathway Option 2 would avoid wetland impacts where it would be located along Henry's Road.

EO 11990 Compliance

As discussed in Section 3.14, EO 11990 calls for avoiding to the extent possible the long- and short-term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative. Based on the analysis presented above, FHWA has determined that there is no practicable alternative to the proposed new construction in wetlands, and that the proposed project includes all practicable measures to minimize harm to waters of the U.S., including wetlands, which may result from such use. Therefore, requirements under EO 11990 have been met.

4.14.4 Mitigation

WYDOT has attempted to avoid and minimize impacts to waters of the U.S. and wetlands during the preliminary design stage. WYDOT will continue to seek opportunities to avoid and minimize impacts to waters of the U.S. and wetlands during final design of the Combination Alternative (Preferred Alternative). If bridges are replaced, this could include, but not be limited to, design of bridge lengths to span the wetland areas, bridge span lengths to minimize number of piers in the river, placement of abutments outside of wetland areas, and slight shifts in highway alignment.

Total wetland impacts for the project would be 0.94 acre, with a total of 8.272 wetland functional units. A permit from the U.S. Army Corps of Engineers (USACE) will be required for all project-related wetland and waters of the U.S. impacts. Wetland mitigation will include creation or restoration of 1.41 to 1.88 acres (1.5:1 to 2:1 mitigation ratio) of wetland. The mitigation wetland(s) will be designed such that the total functional units lost as a result of the highway construction project will also be replaced at a ratio of 1.5:1 or 2:1. The Montana Department of Transportation (MDT) method will also be used to assess the functional value of the mitigation wetland(s) based on design plans for the wetland. The mitigation wetland(s) will include the same types of wetlands impacted by the project and will be located near the highway corridor; therefore, mitigation wetlands will be considered on-site and in-kind. The wetland(s) will be created or restored by excavating to the groundwater level, placing muck from impacted wetlands, seeding, and planting willow sprigs throughout portions of the site.

4.15 Floodplains

4.15.1 No-Action Alternative

The No-Action Alternative would result in no new impacts to the 100-year floodplains, and would not affect the floodplains' natural and beneficial values.

4.15.2 Build Alternatives

5-Lane Rural Alternative. Construction of the 5-Lane Rural Alternative would require either bridge replacement or widening at the floodplain crossings shown in **Table 3-16**. Although a structure selection and detailed structural design has not been initiated, if bridges are replaced, WYDOT would attempt to place the intermediate supports, or piers, on the stream banks rather than in the main channels. However, due to the topography, and the nature of the channel, pier locations may be placed within the limits of the ordinary high water. Some piers would be placed within the 100-year floodplain. The Fisheries subsection of Section 4.18.3 contains assumptions regarding the bridge and culvert improvements required for the 5-Lane Rural Alternative.

A Letter of Map Revision (LOMR) is required for fill material placed in the floodway portion of the floodplain. As mentioned in Section 3.15, a 1989 Flood Insurance Study for Teton County shows the regulated floodway limits where Flat Creek and the Snake River cross the Study Corridor at MP 146.5. The existing bridge substructure is located within the regulated floodway. Bridge replacement or widening may require additional bridge substructure that could extend into the floodway depending on where the detailed study begins (the study appears to begin immediately upstream of the bridge). If bridges are replaced, WYDOT would attempt to locate any piers outside of regulated floodways. If piers are needed within the floodway and additional bridge substructure is found to produce an unacceptable increase in the water elevation, WYDOT would create additional floodway conveyance to avoid an increase in flood elevation. No other floodways would be affected.

New bridges constructed as part of the 5-Lane Rural Alternative would be set above the 100-year floodplain elevation and would remain operational during a 100-year flood. WYDOT would design the bridges to result in no net increase in water surface elevation or decrease in conveyance. The Horse Creek and Game Creek box culverts would be designed for a 100-year flood event. Therefore, this alternative would not appreciably change or modify floodplain hydraulics or increase flooding risks. Any encroachment on the floodplain would not support incompatible development in the floodplain. In sum, the 5-Lane Rural Alternative would not result in a significant floodplain encroachment as defined by 23 CFR 650.105(q).

Combination Alternative (Preferred Alternative). This alternative would have the same impacts as the 5-Lane Rural Alternative because the floodplain impacts would occur in the five-lane section.

Pathway Options: Both pathway options would not significantly increase floodplain elevations and would have no impacts. In areas where Pathway Option 1 (Preferred

Pathway Option) would cross the floodplain near the Snake River, Flat Creek, and Game Creek crossings, the path would require wider crossing structures.

EO 11988 Compliance

As discussed in Section 3.14, EO 11988 requires federal agencies to avoid to the extent possible the long- and short-term adverse impacts to floodplains, and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative. WYDOT has attempted to avoid adverse impacts to floodplains to the extent possible during this stage of preliminary design. As discussed above, WYDOT would attempt to place intermediate piers on the stream banks rather than in the main channels. If bridges are replaced, WYDOT would attempt to locate any piers outside of regulated floodways. If piers are needed within the floodway and additional bridge substructure is found to produce an unacceptable increase in the water elevation, WYDOT will create additional floodway conveyance to avoid an increase in flood elevation. New bridges constructed as part of the project will be set above the 100-year floodplain elevation and will remain operational during a 100-year flood. WYDOT will design the bridges to result in no net increase in water surface elevation or decrease in conveyance. The Horse Creek and Game Creek box culverts will be designed for a 100-year flood event. Further, the project would not directly or indirectly support floodplain development.

WYDOT will coordinate with the Teton County Floodplain Administrator during final design to ensure compliance with local regulations and include appropriate mitigation measures in the construction plans. Based on the above steps that WYDOT will undertake to avoid adverse floodplain impacts, FHWA has determined that the requirements under EO 11988 have been met.

4.15.3 Mitigation

As discussed above, WYDOT will coordinate with the Teton County Floodplain Administrator and include appropriate mitigation measures in the construction plans. Designs and recommendations will comply with 23 CFR 650 A and Executive Order 11988.

WYDOT will attempt to minimize impacts to the 100-year floodplain and any regulatory floodways. Specific impact avoidance, minimization, and mitigation measures will be determined during final design. Impacts to floodplains will be minimized by following standard stream crossing design criteria, avoiding direct encroachments on the river channel where possible, and adjusting the stream crossing alignment where possible.

4.16 Wild and Scenic Rivers

Section 3.16 discusses the potential eligibility of the Snake River for designation as a Wild and Scenic River. A presidential directive requires that each federal agency, as part of its normal planning and environmental review process, must take care to avoid or mitigate adverse effects on rivers identified as Wild and Scenic Rivers in the Nationwide Rivers Inventory (NRI). Furthermore, all agencies are required to coordinate with the National Park Service prior to taking actions that could impact the status of the rivers on the NRI.

4.16.1 Methods

To assist in preparing this EIS, the USFS assessed the alternatives' potential effects to the eligibility of the Snake River for Wild and Scenic designation. An Analysis Group comprised of USFS resource specialists pertinent to each outstandingly remarkable value (ORV), a Wyoming Game and Fish Department fisheries biologist, a National Park Service river conservation Specialist, and a WYDOT environmental specialist, reviewed the Snake River ORVs, reviewed the proposed alternatives, and identified natural resource impacts associated with the alternatives. Three ORVs were identified for the Snake River: scenic quality, fish and wildlife resources, and recreation. The results of these analyses were documented in White Papers provided to WYDOT on July 18, 2007 (see **Appendix C**). FHWA and WYDOT coordinated with the USFS in meetings held in February and March 2010. Subsequently, the USFS reassessed the alternatives' potential effects based on new information provided by WYDOT, and provided results of their analysis in correspondence dated April 29, 2010 and June 5, 2010 (see **Appendix C**).

4.16.2 No-Action Alternative

The USFS determined that the No-Action Alternative would have no effect on the free-flowing character of the Snake River or the three eligibility ORVs.

4.16.3 Build Alternatives

5-Lane Rural Alternative. The USFS indicated the only effect on the free-flowing character of the Snake River could occur if mid-stream piers are replaced or supplemented with larger piers that create hydraulic eddies. Pier design could mitigate this effect.

Potential effect to the three Wild and Scenic ORVs from this alternative include:

Scenic Quality: The USFS indicated in the July 2007 Whitepaper that two proposed retaining walls would have a visual impact on river users and in some areas would be inconsistent with the Forest's scenic quality standard of *retention*. However, one of those retaining walls is proposed near Hoback Junction, which is outside the Jackson South study area. That retaining wall was evaluated in the *Hoback Junction Environmental Assessment* (2007).

The second retaining wall is proposed along the west side of the highway farther north of Hoback Junction (approximately MP 142). At its closet point, the wall would be located approximately 3,500 feet (0.66 mile) north of the confluence of the Snake and Hoback rivers and outside the 0.25-mile buffer for the portion of the Snake River designated in the Headwaters Legacy Act (see Section 3.16). The northern 700 feet of the approximately 1,200-foot wall would be located on USFS land. The wall's average vertical distance from the river would be approximately 50 feet, and it would be approximately 75 feet (horizontally) from the river at the closest point and be visible from the Snake River. However, because of the developed nature of adjacent private lands, the USFS has determined that this retaining wall would not have an adverse effect on the Scenic Quality ORV for the Snake River if mitigation techniques discussed in Section 4.22.4 are employed (see correspondence dated April 29, 2010 and June 5, 2010 in **Appendix C**). However, if other retaining walls are added during final design, they may not meet the current Forest Plan scenic quality standards.

In addition, two retaining walls are proposed at the Munger Mountain landslide area (approximately MP 144) on the east side of the highway. The northern wall would be located on USFS land and would be approximately 1,600 feet long. The wall's average vertical distance from the river would be approximately 72 feet, and it would be approximately 110 feet (horizontally) from the river at the closest point, and would be visible from the Snake River. However, the USFS determined that the retaining walls would be consistent with their Scenic Quality ORV if mitigation techniques discussed in Section 4.22.4 are employed (see correspondence dated April 29, 2010 and June 5, 2010 in **Appendix C**).

Figure 4-2 shows the location of the proposed retaining walls. Refer to Section 4.22 for more information.

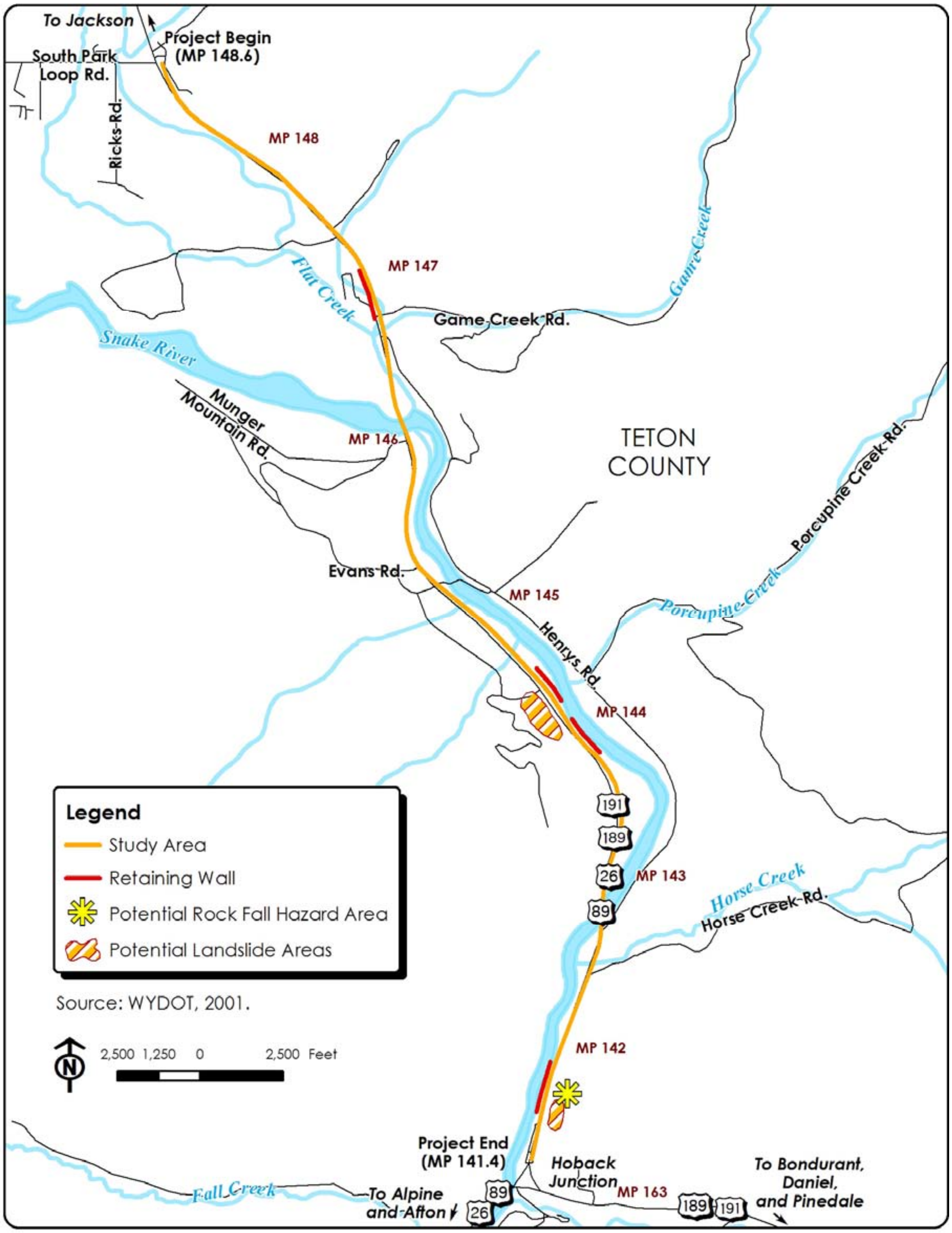
- **Recreation:** A possible effect of this alternative could be the elimination of some existing access points along the highway.
- **Fish and Wildlife Resources:** The USFWS has determined that the proposed project will have no effect on Canada lynx or critical lynx habitat, will not jeopardize the continued existence of the gray wolf, and is not likely to adversely affect the grizzly bear (refer to discussion in Section 4.18.3). Potential species of concern include the fine-spotted Snake River cutthroat trout, the blue headed sucker, trumpeter swan, and the bald eagle. Two active bald eagle nests have been identified in the Study Corridor; one nest is located on Ross Plateau on Munger Mountain adjacent to the highway, and the other nest is located just north of Hoback Junction on the west side of the Snake River. The large pavement width would impact wildlife attempting to cross the highway.

In its analysis, the USFS determined that the 5-Lane Alternative would have an effect on several ORVs and resource values that could be partially mitigated by following the design criteria and mitigation strategies discussed in Section 4.17.4. The USFS determined that this alternative would not affect the classification of the Snake River if mitigation measures listed in Section 4.22.4 are employed. FHWA and WYDOT will employ those mitigation measures.

Combination Alternative (Preferred Alternative). Effects from this alternative to the Snake River's ORVs and resource values would be similar to those described for the 5-Lane Rural Alternative, except there would be fewer effects where the highway transitions to four lanes and three lanes because of the reduced road width. The USFS determined that this alternative would not affect the classification of the Snake River.

Pathway Options. Inclusion of either Pathway Option 1 (Preferred Pathway Option) or Pathway Option 2 would enhance the variety of recreation opportunities available. In areas where existing primitive roads provide access to the river, there may be insufficient room to provide parking and safe areas to pull off the highway.

Figure 4-2
Location of Proposed Retaining Walls



4.16.4 Mitigation

Free-Flowing River Character: For new structures, WYDOT will attempt to locate piers outside of the ordinary high water where practical. WYDOT will consider the pier shape and the alignment of the intermediate supports or piers to minimize the potential for hydraulic eddies and impacts on the river's free-flowing character. Widened structures will have the same intermediate support shape and alignment as the existing structure.

Scenic ORV: Because of the developed nature of adjacent private lands, the USFS has determined that the proposed retaining walls would not have an adverse effect on the Scenic Quality ORV for the Snake River if mitigation techniques discussed in Section 4.22.4 are employed.

Recreation ORV: FHWA and WYDOT will coordinate with Teton County, Snake River Fund, and Snake River Taskforce on access management for the South Park area. WYDOT also will coordinate with BTNF during the design stage to manage access points immediately north of Hoback Junction. This plan will include eliminating informal access roads and seasonally gating formal access roads to prevent resource degradation and protect wildlife. WYDOT will attempt to locate piers outside of the ordinary high water where practical. For new structures, WYDOT will consider the pier shape and the alignment of the intermediate supports or piers to minimize the potential for hydraulic eddies and impacts on the river's free-flowing character. Widened structures will have the same intermediate support shape and alignment as the existing structure.

Fish and Wildlife Resources ORV: To mitigate for impacts to fish and wildlife resources, WYDOT will provide fish passage structures for Horse Creek and Game Creek where the highway crosses these waterways. WYDOT will provide wildlife crossings at five locations within the Study Corridor: Game Creek, Flat Creek, South Park Bridge over the Snake River in the north and Snake River Bridge, and Horse Creek. Also, a wildlife crossing will be considered in the area south of Horse Creek Wildlife fencing will be used to guide animals to these crossings. The exact design of wildlife crossing structures, wildlife fencing, and game trail benches adjacent to bridge abutments will be determined during final design.

4.17 Roadless Areas

4.17.1 Methods

Federal direction for the management of roadless areas (the 2000 Roadless Area Conservation Rule) identifies nine specific characteristics for Inventoried Roadless Areas. These include:

- Soil, water and air resources
- Sources of public drinking water
- Diversity of plant and animal communities

- Habitat for Threatened and Endangered Species and species dependent on large undisturbed areas of land
- Primitive and semi-primitive classes of recreation
- Reference landscapes for research study or interpretation
- Landscape character and integrity
- Traditional cultural properties and sacred sites
- Other locally unique characteristics

According to USFS guidance *Suggestions for analyzing the effects to wilderness potential from project activities within Inventoried Roadless Areas* (R. Welsh, USFS Region 4, October 2004), these characteristics are the best criteria to use to address the effects to Inventoried Roadless Areas and the roadless character of the area.

The analysis group was comprised of USFS Resource specialists relating to the nine characteristics; a Wyoming Game and Fish Department Fisheries Biologist, a National Park Service Rivers-Trails-Conservation-Assistance specialist, and a WYDOT environmental specialist.

4.17.2 No-Action Alternative

The No-Action Alternative would have no effect on the Gros Ventre or Munger Mountain Roadless Areas or Roadless Area characteristics.

4.17.3 Build Alternatives

5-Lane Rural Alternative. Minor amounts of the Gros Ventre Roadless Area intersect with the existing highway. Because these areas are already roaded and roadway improvements would require minimal right-of-way, the 5-Lane Rural Alternative would not affect these Roadless Areas or their Roadless Area characteristics. The 5-Lane Rural Alternative would have no effect on the Munger Mountain Roadless Area or Roadless Area characteristics.

Combination Alternative (Preferred Alternative). Impacts to Roadless Areas associated with the Combination Alternative are the same as those associated with the 5-Lane Rural Alternative.

Pathway Options: Both pathway options would not affect Roadless Areas or their Roadless Area characteristics.

4.17.4 Mitigation

Because both build alternatives would not affect roadless areas or their roadless area characteristics, no mitigation is necessary.

4.18 Wildlife and Fisheries

This section discusses the potential impacts from the alternatives to wildlife and fisheries resources, including threatened and endangered species.

4.18.1 Methods

Due to the nature of potential impacts, a mostly qualitative approach was taken to assess the impacts to wildlife and fisheries. Literature and expert opinion were reviewed to help determine potential impacts not directly related to habitat loss, such as potential for changes in disturbance, movement barriers, and vehicle-related mortality rates. To the extent possible, habitat losses to big game species, threatened and endangered species, and other sensitive or focal species were assessed quantitatively by estimating loss of vegetation communities and seasonal ranges from the various alternatives. The Wyoming GAP Analysis was used to define land cover (vegetation types) in and near the Study Corridor and this was used as an index to the suitability of the area for any particular species. The Wyoming Game and Fish Department big game seasonal range maps were used to define potential habitat for big game species (WGFD, 2002).

The calculation of impacts for the physical removal of habitat excludes the existing road and shoulder template. The proposed dimensions for the build alternatives (see Chapter 2.0 of this EIS) were used to calculate the total new area of roadway. The existing condition assumed a 28-foot top width (two 12-foot lanes with 2-foot shoulders). As discussed in Section 1.6, existing conditions throughout the Study Corridor vary (e.g., shoulder widths). However, this method allows equal comparison between alternatives for broad impacts, such as potential habitat losses. The assumption was made that the clear zones of the existing road generally matched the adjacent land cover as identified by the GAP Analysis. However, because of the existing highway and associated disturbances, the existing clear zones may generally only provide marginal habitat for some species of wildlife. The quantity of disturbance or loss to habitats presented thus overestimates true loss of habitat for any given species because it includes the existing clear zones (marginal habitat). This approach ensures a conservative estimate of the direct impacts (i.e., the actual impact would be less than the estimates reported). A temporary impact to habitats (vegetation types) was based on disturbance area provided by WYDOT. The footprint used to calculate environmental impacts at bridge locations assumed structure replacement, because structure replacement would have more impacts than structure widening. This approach allowed for a conservative estimation of impacts.

The types of impacts to wildlife and fisheries for each of the build alternatives are similar and include:

- Loss of habitat (varies by alternative but is similar in the nature of the impact).
- Disturbance or displacement due to highway construction and operation.
- Potential movement barriers due to highway construction and operation.
- Potential mortality (i.e., road kills).

Project-related impacts to wildlife and fisheries include both short-term impacts due to construction of the project and long-term impacts due to operation and maintenance of the highway. Direct impacts are those resulting from the proposed alternatives, while indirect impacts are those caused by the alternatives that are reasonably expected to occur, and which may be further removed in distance and time (see **Table 4-5**.)

Table 4-5
Potential Impacts to Wildlife and Fisheries

Impact Duration	Impact Type	
	Direct	Indirect
Short-Term	• Loss of habitat to construction areas that would be reclaimed. • Mortality from construction or related activities.	• Affecting movement and distribution patterns due to construction activities. • Affecting or disturbing species behavior due to construction activities.
Long-Term	• Permanent loss of habitat to wider roadway and clear zones. • Potential mortality from improved roadway.	• Affecting movement and distribution patterns due to new roadway and associated infrastructure (e.g., retaining walls, guardrails, pathway). • Affecting or disturbing species behavior due to new roadway and associated infrastructure. • Reduction in habitat connectivity due to difficulties with crossing a wider roadway.

Habitat Loss

The short-term habitat losses associated with the build alternatives would include those areas disturbed during construction, but later reclaimed to native vegetation (see Section 4.19.3 for estimates of temporary disturbances areas). Short-term disturbance includes the loss of habitat as a result of construction activities, including the removal of vegetation and topsoil required for road and slope construction. It is assumed that short-term habitat losses are temporary in nature, and over time vegetation would recover and provide similar habitat to that prior to construction. The duration of short-term losses would largely depend on the success of reclamation and natural vegetation recovery. Short-term habitat loss would affect any species that currently occupy or use the affected habitat.

Long-term habitat losses associated with the build alternatives would include those areas converted from native vegetation to pavement or other permanent features or infrastructure (e.g., bridges, pathway). Long-term habitat loss would affect any species that currently occupy or use the affected habitat. Additionally, if wildlife movements are affected and the roadway is no longer permeable to some species, indirect habitat losses may occur because areas of suitable habitat are no longer available to those species. Quantifying indirect habitat losses of this nature is difficult. However, due to the general surrounding landscape and land cover (vegetation), and while the new highway may create a barrier to movement for some individuals of a species, access to habitat on either side of the highway would not be affected on a species level. For example, the species distribution (range) for small animal species, for which the highway could create a movement barrier, encompasses habitat on either side of the highway.

Displacement/Disturbance/Avoidance

Increased levels of human disturbance (e.g., traffic, noise, equipment) associated with the build alternatives would likely cause some wildlife species or individuals to avoid the project corridor during the construction phase. While animals can and do become accustomed to human activity, they are generally sensitive to human encroachment. The presence of the construction work force, heavy machinery, and construction traffic would likely lead to temporary wildlife displacement for individuals that occur in the vicinity of the project. The area in which wildlife is affected varies depending on the type of activity (e.g., blasting versus surveying), surrounding topography, physiographic and vegetative features (e.g., open meadow versus forested slope), and sensitivity of the species. Some species may be more susceptible to displacement than others, but all species inhabiting adjacent areas may periodically be disturbed or displaced by construction traffic and other human activity. For the purposes of this analysis, the area of effect is the construction zone and the area encompassed by a 0.5-mile buffer. It is assumed that wildlife within this buffer would be subject to disturbance from the project. Due to the mobility of many species, they are generally capable of avoiding activities causing disturbance and thus may minimize disturbance impacts.

Recreational use of the project area and surrounding areas by humans also can displace wildlife. The build alternatives would support current recreational use and increase recreational opportunities with the extension of the pathway from Jackson. Although future increases in recreation would likely occur regardless of the project, increases associated with the pathway part of the project would be considered an interrelated effect.

Movement Barriers

The build alternatives could create both short- and long-term barriers to wildlife movement due to construction, the increased size of the highway, and additional permanent features, such as bridges or guardrails. However, the build alternatives include features to facilitate wildlife movement across the highway at five locations and WYDOT is considering an additional crossing designed specifically to support wildlife movement (see Section 4.18.5 for more information about wildlife crossings).

Movement of wildlife across the roadway during the construction phase of the project is expected to be reduced because of the human disturbances (e.g., noise, equipment, dust, etc.) associated with construction. Following construction, the build alternatives may have a greater effect on wildlife movement compared to pre-construction levels, due to the wider highway sections. This barrier effect would vary depending on the alternative width, location, traffic patterns (volume, distribution, and speed), species mobility, and distribution. For example, the physical presence of the highway may be a movement barrier to small terrestrial animals, but would not be a barrier to highly mobile aerial species such as birds or bats. Wider roadways are generally believed to be more difficult for wildlife to cross and, for smaller species (e.g., amphibians, rodents, etc.), multi-lane roads may be impassable without adequate crossing structures (e.g., culverts, bridges) in place. Following construction, the long-term effect of the project is expected to be reduced overall permeability of the roadway to wildlife, except at bridges, designated crossing structures, or culverts, provided they are compatible to wildlife movement.

Wildlife-Vehicle Collisions

The Study Corridor supports a variety of wildlife species that frequently or seasonally cross the roadway. In particular, big game species, such as deer, elk, and moose often congregate during winter along lower-elevation habitats adjacent to the roadway. The short-term risks of wildlife-vehicle collisions associated with the build alternatives are expected to be minimal because traffic speeds would be reduced during the construction phase and the presence of the construction activity is expected to displace wildlife away from the highway. However, because wider road widths, increased traffic volumes, higher traffic speeds, and increasing species populations are generally believed to increase the potential for wildlife-vehicle collisions, the long-term risk of wildlife-vehicle collisions is expected to increase in areas where safe highway crossing is not available. The risk of wildlife-vehicle collisions is expected to decrease near the bridges over Flat Creek and the Snake River, and near the wildlife underpasses (crossings).

4.18.2 No-Action Alternative

Under the No-Action Alternative, no additional impacts to wildlife and fisheries from a highway construction project would be expected. Impacts to wildlife that occur in the project area would be expected to remain. Existing conditions, including increasing traffic volumes and recreational use of the area, would remain and continue to affect these species.

Construction activities in the corridor would include future maintenance projects and would not be expected to cause substantial displacement of wildlife from construction zones. Removal of vegetation for clear zones or outside the highway right-of-way would not occur unless dangerous conditions existed that could affect operation of the highway. In general, no wildlife habitats would be disturbed or lost, and construction activities that could produce a disruption of normal behavior (e.g., nesting activity, foraging, etc.) would be limited to the minimum necessary for maintaining the highway in its current condition.

The level of disturbance or displacement related impacts from the highway would continue to increase as traffic volume increases. This incremental change in impacts is difficult to measure because it is a gradual continual change and many wildlife species have the capacity to habituate to disturbances and changes in disturbance levels.

The effects from the vehicle-related mortality of wildlife would be expected to increase over time as traffic levels continue to increase. The current 55 mph posted speed limit for much of the project would remain; however, due to the increasing traffic volumes, the actual vehicle speed would likely be regulated by slower moving vehicles creating long platoons (groups) of cars. Over time, conditions may result in a less permeable highway to wildlife as fewer opportunities for crossing without vehicles present become available.

The highway is expected to become a greater barrier to wildlife movement because of expected increases in traffic.

The overall increase in traffic on the road may increase the potential for traffic accidents, which could increase the potential for oil or gas to enter streams, thereby affecting fisheries. Otherwise, fisheries would not be affected above existing impacts from the No-Action Alternative.

4.18.3 Build Alternatives

5-Lane Rural Alternative

Long-term habitat losses for wildlife were based on impacts from the alternatives to vegetation types identified in the Wyoming GAP Analysis. Vegetation impacts associated with the 5-Lane Rural alternative are approximately 63.2 acres of Mountain Big Sage, 1.6 acres of Douglas Fir, and 41.7 acres of Forest/Riparian habitat (see also Section 4.19, Vegetation).

Threatened and Endangered Species (Including Recently Delisted Species): The authority for determining effects to threatened and endangered species rests with the USFWS. Coordination with the USFWS has occurred throughout the course of this project. The most recent meeting occurred on August 29, 2008 and involved discussion of effect determinations for threatened and endangered species. Impacts associated with the 5-Lane Rural Alternative are presented in this section. FHWA submitted a Biological Assessment (BA) to the USFWS for review on September 21, 2009. The BA determined that the proposed project will have no effect on Canada lynx or critical lynx habitat, will not jeopardize the continued existence of the gray wolf, and is not likely to adversely affect the grizzly bear. The BA was amended on November 4, 2009 to reflect relisting of the grizzly bear. The USFWS concurred in their Biological Opinion dated April 9, 2010.

The bald eagle was removed from the list of threatened and endangered species in 2007. However, because it remains a sensitive species, the results of impact assessment performed for the bald eagle conducted prior to its delisting are included in this EIS.

- **Habitat Loss**: Impacts to threatened and endangered species associated with the 5-Lane Rural Alternative would vary by species (see **Table 4-6**). Gray wolf, grizzly bear, and lynx could potentially occur in the project area based on species range. However, due to the relatively developed nature of the project corridor (when compared to the surrounding area), high traffic levels, and human presence, these species are not expected to occur frequently or in large numbers. Habitat for these species in the project area is considered marginal and habitat losses would not be substantial.

Table 4-6
Approximate Long-Term Habitat Loss for Threatened and Endangered Species.

Species	Habitat	Habitat Disturbance (acres)		
		No Action	5-Lane	Combination
Gray wolf *(Canis lupus)*	Variety of conifer forests and open meadows	0	106.5	102.5
Grizzly bear *(Ursus arctos)*	Variety of conifer forests, talus slopes, alpine plateau, riparian areas, and mountain meadows	0	1.6	1.6
Canada lynx *(Lynx canadensis)*	Dense coniferous forest with moderate slope	0	1.6	1.6
Whooping crane (Grus americana)	wet meadows, grasslands, marshes, shallow open water	0	0	0
Bald eagle * (*Haliaeetus leucocephalus*)	Mixed coniferous forests and cottonwood riparian near water	0	43.3	43.3
Black-footed ferret *(Mustela nigripes)*	Short-grass prairie	0	0	0

*The bald eagle was delisted in 2007.

Bald eagle (delisted in 2007) is the most likely species to occur in the project area. It is important to note that although the Bald eagle was removed from the threatened and endangered list, it is still protected under the Bald and Golden Eagle Protection Act (BGEPA) and the Migratory Bird Treaty Act (MBTA). There are monitored nests along the Snake River adjacent to the highway, and bald eagles likely use much of the river riparian corridor as they travel, forage, and roost. Loss of the forest riparian habitat and spruce/fir forest habitat would be considered impacts to potential bald eagle habitat.

The USFWS has proposed critical habitat for lynx that would border a portion of the east side of the project area. The Snake River is effectively a barrier in the area where the critical habitat is designated (between Hoback Junction and Horse Creek). Critical habitat occurs in areas that are considered occupied by lynx and contain the physical and biological features essential to conservation of lynx. The area and habitat surrounding the project area are not considered prime lynx habitat by researchers in the GYE (B. Oakleaf, WGFD, and N. Berg, pers. comm.) and does not contain the Primary Constituent Elements that comprise lynx critical habitat. Important physical and biological features essential to lynx are absent from the project area, including abundant prey (snowshoe hare), winter snow conditions, and secluded undisturbed areas with appropriate forest conditions for denning. The proposed project will primarily result in loss of habitat immediately adjacent to the highway, which does not qualify as critical habitat.

- **Disturbance/Displacement**: The likelihood of gray wolf, grizzly bear, or lynx occurring in the project area is considered very low. Disturbance or displacement impacts to these species associated with the 5-Lane Rural Alternative are considered immeasurable.

Bald eagles do occur in the project area and could potentially be subject to disturbance related impacts from construction and operation/maintenance of the highway. Adult eagles are highly mobile and it is believed that they could remove themselves from areas with disturbance. However, if construction occurs during the nesting period and eagles associated with an active nest are disturbed enough that they do not continue their normal breeding activity, loss of eggs, nestlings, or juvenile eagles could occur. Such impacts could be avoided if construction occurs farther than 660 feet from bald eagle nests *(National Bald Eagle Management Guidelines*, USFWS, May 2007). All bald eagle nests in the study area are located more than 660 feet from the roadway.

The level of disturbance associated with the highway following completion of this alternative is expected to increase over time with increases in traffic. Traffic volume is not expected to change because of the project, but the alternative is designed to accommodate increased traffic. Forecasted traffic volumes are the same for all alternatives. The extent to which this increasing level of disturbance affects bald eagles is difficult to quantify; however, the increase would be gradual over time and it is expected that bald eagles in the area would continue to habituate to the highway disturbance and may likely continue to increase in numbers in the project area.

- **Movement Barrier:** The 5-Lane Rural Alternative is not likely to create a barrier to gray wolf, grizzly bear, or lynx movement because they are not expected to occur in the project area regularly or in great numbers. The alternative should not create a barrier to the movement of bald eagle, which is a highly mobile aerial species.

- **Mortality**: The 5-Lane Rural Alternative is not likely to increase the potential for mortality of gray wolf, grizzly bear, or lynx because they are not expected to occur in the project area regularly or in great numbers. In addition, WYDOT is considering providing wildlife crossing areas under the bridges in the project area and constructing a dedicated wildlife crossing structure in the vicinity of the South Park Wildlife Habitat Management Area (SPWMA). These structures would help minimize impacts to these listed predators by providing opportunity for them to cross the highway where other wildlife could be concentrated.

  Bald eagles will forage on carrion, and may use road-killed wildlife as a food source. Bald eagles foraging on road-killed wildlife may be at greater risk of a vehicle collision; however, such an event is considered rare and, provided WYDOT Maintenance crews continue normal operations and remove road-killed wildlife from the highway, collision risk would be minimized. In addition, the construction of the wildlife crossing underpasses will likely result in reduced wildlife roadkills, in particular near the structures, further reducing the possibility of a bald eagle feeding on carrion in the project area.

Migratory Birds: In general, highway projects are not expected to have large impacts on migratory birds. While vehicle-bird collisions can be common, this direct impact on migratory birds is difficult to quantify. Typically, habitat loss impacts associated with highway widening are not considered substantial enough to cause population declines of migratory birds. In addition, the habitat loss associated with the 5-Lane Rural Alternative is confined to areas adjacent to the existing highway that are not considered prime nesting habitat or stopover habitat for migratory birds. The most likely impacts to migratory birds would be from construction during the breeding or migration seasons causing disturbance or displacement related impacts on migratory birds nesting or migrating near construction areas. Also, grubbing and clearing during the nesting season can cause direct loss of nests and nesting birds.

Impacts to Bald eagle are discussed above. Of the *Migratory Birds of Conservation Concern* that potentially occur in or near the Study Corridor, trumpeter swan, northern goshawk, and Brewer's sparrow are the most likely to occur in the area based on the habitat, abundance, and distribution of these species in Wyoming. Potential impacts to these species as a result of the 5-Lane Rural Alternative are also included in the following USFS Management Indicator Species section. The other *Migratory Birds of Conservation Concern* are not expected to occur commonly or in large number in the project area, and potential impacts from the project on these species will be minor and temporary.

Big Game: This section describes impacts to big game associated with the 5-Lane Rural Alternative.

- **Habitat Loss**: Impacts to big game species associated with the 5-Lane Rural Alternative were estimated based on losses to seasonal ranges as identified by the WGFD (see **Table 4-7**). Impacts to different range types are specific to individual species and should not be considered cumulative; range for all species overlap within the project area. For example, mule deer and moose crucial winter ranges overlap, so the total loss of crucial winter range is not the sum of the loss for both species. As with the threatened and endangered species, much of the range within the project area is considered marginal habitat for big game species due to the relatively developed nature of the project corridor and the high human presence (when compared to surrounding areas). Acres of habitat loss are approximate because some of the area included would not be suitable for big game occurrence (e.g., housing or developed areas).

- **Disturbance/Displacement**: Disturbance related impacts to big game species as a result of the 5-Lane Rural Alternative are expected to vary by season. Most of the highway corridor falls within spring/summer/fall range for several species of big game (see **Table 4-7**). During these seasons, big game animals tend to be more widely dispersed and may not be subjected to disturbance levels in great numbers. In addition, due to the high human presence in the project area associated with the highway and adjacent development, big game animals are not expected in the project area in great numbers during the spring/summer/fall periods. During the winter period, big game animals tend to be more concentrated as they congregate in winter yearlong or crucial winter range. During the winter, it is expected that disturbance related impacts could be greater. The WGFD defines the winter season as November 15 to April 15. Construction during this period would be expected to have greater disturbance related impacts. If disturbance is great enough that it displaces animals from the winter habitat, impacts could be exacerbated by forcing animals to areas with insufficient resources for winter maintenance.

Table 4-7
Approximate Acres of Impact to Big Game Seasonal Ranges

<table>
<tr><th colspan="2">Seasonal Range</th><th>Mule Deer</th><th>Bighorn Sheep</th><th>Mountain Goat</th><th>Moose</th><th>Elk</th></tr>
<tr><td rowspan="4">5-Lane Rural</td><td>Spring, Summer, Fall</td><td>33</td><td>106</td><td>46</td><td>-</td><td>100</td></tr>
<tr><td>Crucial Winter Yearlong</td><td>50</td><td>-</td><td>-</td><td>51</td><td>-</td></tr>
<tr><td>Winter Yearlong</td><td>23</td><td>-</td><td>-</td><td>56</td><td>7</td></tr>
<tr><td>Total (acres)</td><td>106</td><td>106</td><td>46</td><td>107</td><td>107</td></tr>
<tr><td rowspan="4">Combination</td><td>Spring, Summer, Fall</td><td>33</td><td>102</td><td>46</td><td>-</td><td>96</td></tr>
<tr><td>Crucial Winter Yearlong</td><td>46</td><td>-</td><td>-</td><td>48</td><td>-</td></tr>
<tr><td>Winter Yearlong</td><td>23</td><td>-</td><td>-</td><td>55</td><td>7</td></tr>
<tr><td>Total (acres)</td><td>102</td><td>102</td><td>46</td><td>103</td><td>103</td></tr>
</table>

- **Movement Barrier**: Construction of the 5-Lane Rural Alternative and the completed highway could create a barrier to big game movement if individuals cannot cross the highway. During the spring/summer/fall season, when big game animals tend to be more widely dispersed and when construction activity would be the greatest, the potential to create a barrier to movement would be reduced. During the winter season, when big game animals are concentrating in winter habitat, construction of the larger highway could elevate the potential for creating a movement barrier.

For big game animals that could physically negotiate a large highway, permeability of the highway is affected to a large extent by the traffic volume and speed and obstructions (e.g., guardrail, retaining walls, median walls, etc.). Increasing traffic levels could create a larger barrier to movement than existing conditions. The 5-Lane Rural Alternative is not expected to cause an increase in traffic volume but may result in an increase in traffic speed as cars are not confined to slower platoons (strings of vehicles). Increased traffic speed during peak travel times may increase the potential for creating a barrier to movement because big game species have less opportunity (less time between vehicles) for crossing the highway.

Bridges being widened would maintain a similar span configuration to the existing bridges, and therefore would not increase wildlife movement restriction over the current condition. At structures that would be replaced, wildlife movement can be accommodated by increasing the bridge length and possibly raising the road grade to provide a dry land passage under the bridge with an appropriate width and height for the anticipated wildlife. WYDOT is committed to lengthening the bridges that would be replaced to provide additional area to accommodate wildlife movements. In addition, WYDOT has identified five locations in the Study Corridor where wildlife crossings will be provided: Game Creek, Flat Creek, South Park Bridge over the Snake River in the north and Snake River Bridge, and Horse Creek. WYDOT will also evaluate a wildlife crossing in the area south of Horse Creek. Elk-proof fencing will be used to guide animals to those crossings. WYDOT is also evaluating options, such as retaining walls, and placement of boulders, to guide big game (and other wildlife) to these crossings. Fencing, in conjunction with wildlife crossings, has been shown to be very effective at reducing wildlife/vehicle collisions. However, fences can increase the barrier effect of the road, trap (on either side of the fence) or entangle animals, or block access for people. Furthermore, access roads disrupt the wildlife fencing, resulting in an opening that has to be mitigated in order to avoid animals getting caught inside the fences along the highway. WYDOT is evaluating further how fencing can be used effectively. The crossings should ensure some permeability across the highway for big game species (see WGFD letters dated March 13 and April 5, 2006 in **Appendix A**).

- **Mortality**: Construction of the 5-Lane Rural Alternative and the completed highway could affect big game through mortality primarily from vehicle-animal collisions. In general, construction activity is not believed to create a risk of vehicle collisions because wildlife are likely to avoid the disturbance associated with construction. The 5-Lane Rural Alternative has the potential to increase wildlife mortality because it would result in a larger roadway that would require more time for wildlife to cross (i.e., their exposure on the road would increase).

  To a large degree, traffic volume and speed influence highway related mortality of wildlife. If this alternative improves the flow of traffic to allow more evenly spaced vehicles, the opportunities for wildlife to cross between vehicles may be reduced. The 5-Lane Rural Alternative is not expected to cause an increase in traffic volume but may result in an increase in traffic speed as cars are not confined to slower platoons. Increased traffic speed may increase risk of collision. If big game animals learn to use (or are forced to use them via fencing) the crossing areas planned for the bridges and other areas, it may offset the potential increase in vehicle related mortality in other areas (i.e., not in the vicinity of the crossings).

USFS Management Indicator Species: Impacts to USFS Indicator Species and Sensitive Species as a result of the 5-Lane Rural Alternative are similar in nature to those for threatened and endangered species (see previous section). The potential habitat loss impacts vary by species (see **Table 4-8**). Many of the sensitive species are not expected to occur in the project area and would not be affected. For those species inhabiting coniferous forest vegetation types, impacts would be minimal. Species that inhabit sagebrush or shrub type habitats would be affected most by loss of habitat impacts.

Table 4-8
U.S. Forest Service Ecological Indicator or Sensitive Species for the Bridger-Teton National Forest.

Species	Habitat	Habitat Disturbance (acres)		
		No Action	5-Lane	Combination
Ecological Indicator Species				
American marten *(Martes americana)*	mature forest	0	1.6	1.6
Brewer's sparrow *(Spizella breweri)*	Sagebrush meadows	0	63.2	59.2
U.S. Forest Service Sensitive Species				
Wolverine *(Gulo gulo)*	Dense coniferous forest, Alpine tundra	0	1.6	1.6
Fisher *(Martes pinnanti)*	Dense coniferous forest with high canopy closure	0	1.6	1.6
Townsend's Big-eared Bat *(Plecotus townsendii)*	Coniferous and deciduous forests, foothill shrubs and caves	0	43.3	43.3
Spotted Bat *(Euderma maculatum)*	Low deserts to coniferous forests; cliffs over perennial water	0	0	0
Common Loon *(Gavia immer)*	Lakes above 6,000 feet	0	0	0
Harlequin Duck *(Histrionicus histrionicus)*	Fast, turbulent rivers in high mountains	0	0	0
Trumpeter Swan *(Cyngus buccinator)*	Marshes with open water, rivers, lakes	0	Refer to wetland impacts	Refer to wetland impacts
Boreal Owl *(Aegolius funereus)*	High-elevation spruce/fir forests	0	0	0
Flammulated Owl *(Otus flammeolus)*	Open, mixed coniferous forest, Ponderosa pine	0	1.6	1.6
Three-toed Woodpecker *(Picoides tridactylus)*	Lodgepole and spruce/fire forests, burns	0	1.6	1.6
Northern Goshawk *(Accipiter gentilis)*	Mature coniferous forest and aspen stands	0	1.6	1.6
Great Gray Owl *(Strix nebulosa)*	Mixed coniferous forest with open areas	0	1.6	1.6
Peregrine Falcon *(Falco peregrinus)*	Mountainous zones or cliffs near large lakes and rivers	0	0	0
Spotted Frog *(Rana pretiosa)*	Marshy ponds/lakes and slow moving streams	0	Refer to wetland impacts	Refer to wetland impacts
Colorado River Cutthroat Trout *(Oncorhynchus clarki pleuriticus)*	Cold, clear water in rocky, steep gradient streams	0	0	0
Snake River Fine Spotted Cutthroat Trout *(Oncorhynchus clarki spp.)*	Native of Snake River Drainage, mainly above Palisades Reservoir	0	0	0

Disturbance and displacement impacts associated with the 5-Lane Rural Alternative depend largely on the presence of a species near the construction or highway. Most of the USFS species are not expected to occur or only occasionally occur near the project. Disturbance related impacts are expected to be low.

Similarly, the potential for the 5-Lane Rural Alternative to create a barrier to movement or change mortality is believed to be low for many of the species because they are not expected to occur in the project area or are highly mobile aerial species. This alternative should not create a barrier to movement for birds or bat species. Three of the USFS species are terrestrial members of the mustelid family, wolverine, pine marten, and fisher. The 5-Lane Rural Alternative could create a barrier to movement for these species if they are confined to crossing over the highway surface because of the increased size of the highway and the expected change in traffic patterns. However, potential habitat for these species in the project, based on the Wyoming GAP Analysis, is minimal; therefore, they are not expected to occur in great numbers. At least one of the species, pine marten, is known to utilize culverts to cross under roads (Young and Sawyer, 2006). The 5-Lane Rural Alternative is not expected to create a barrier to movement or increase the potential for mortality over existing conditions for these species.

Nongame Species and Other Wildlife: In general, potential impacts to other wildlife, such as nongame species, raptors, waterfowl, furbearers, etc., are common to all the build alternatives (see above). Habitat loss impacts would vary based on species. There would be habitat losses that would affect wildlife species that inhabit mountain big sagebrush, Douglas fir, and riparian habitats. For species that are habitat generalists and may move to nearby areas, these impacts would be minor. For species that are more habitat specific, local impacts could be greater if there is no suitable habitat nearby for dispersal.

Disturbance and displacement impacts from the 5-Lane Rural Alternative are expected to be greater than the No-Action Alternative. Outside the construction period, disturbance related impacts from highways are based largely on the traffic volume and speed, and depend largely on the presence of wildlife near the highway and the disturbance threshold for species and individuals. Most species of wildlife that currently live near the highway have likely habituated to some level of disturbance. Highway construction creates an added level of disturbance above highway traffic, and thus would increase the level of disturbance during the life of the construction, potentially displacing more wildlife. For more mobile species, such as raptors or waterfowl, individual animals have the capacity to minimize these impacts by moving out of the zone of disturbance. For less mobile or terrestrial species, the ability to minimize disturbance impacts is less.

The potential to create a barrier to movement or change mortality would be greatest for the 5-Lane Rural Alternative. This alternative should not create a barrier to movement or significant threat of mortality for birds or bat species over the existing conditions. Terrestrial wildlife would likely have a more difficult time crossing the five-lane highway than the current highway, and for some species they may not be physically capable of crossing over the surface (e.g., rodents, amphibians). The 5-Lane Rural Alternative could create a barrier to movement and increase vehicle related mortality for these species if they are confined to crossing over the highway surface because of the increased size of the highway and the expected change in traffic patterns.

Fisheries: Work near or within streams, whether it involves bridge widening, bridge replacement, or culvert installation, could impact fisheries. The impacts associated with the structure work included with the 5-Lane Rural Alternative would be minor and temporary in nature, and are expected to be localized near the areas of construction. In addition, the highway and proposed pathway generally parallel the Snake River and Flat

Creek. For the impact analysis, it was assumed the following bridge construction or culvert construction activities would occur with this alternative.

- **Flat Creek (MP 146.39)**—The bridge replacement would include a three-span structure. The piers would be located outside of the ordinary high water and additional upland (dry land) area adjacent to the creek would be considered to accommodate wildlife movement.

- **Snake River (MP 146.0)**—The bridge would be investigated during the final design process to determine if it could be widened. This would minimize the short-term impacts to fisheries and provide for a comparable level of wildlife movement to that which presently exists. If the bridge is to be replaced, the structural constraints may require that piers be placed within the limits of the ordinary high water. The span across the main channel would be such that the placements of the piers would not have an adverse impact on recreational activities. A replacement structure may also span additional upland (dry land) area adjacent to the north river bank to accommodate wildlife movement under the highway.

- **Snake River (MP 142.79)**—The bridge would be investigated during the final design process to determine if it can be widened. This would minimize the short term impacts to fisheries and provide for a comparable level of wildlife movement to that which presently exists. If the bridge is to be replaced, the structural constraints may require that piers be placed within the limits of the ordinary high water. The span across the main channel would be such that the placements of the piers would not have an adverse impact on recreational activities. A replacement structure may also span additional upland (dry land) area adjacent to the north river bank to accommodate wildlife movement under the highway. Refer to Section 4.12.2 for additional information on impacts associated with bridge widening or replacement.

- **Game Creek (MP 146.4)**—This culvert would be replaced to accommodate the five-lane highway. The end of the culverts would be extended beyond the clear zone to minimize the use of guardrail, thereby enhancing the safety of the roadway and minimizing potential barriers to wildlife crossings. The culvert openings would be oversized and the bottom of the culvert placed below the stream bed. Granular material would be placed within the culvert to facilitate fish passage, spawning, and the movement of aquatic organisms. WYDOT will attempt to simulate the natural streambed with natural materials.

- **Horse Creek (MP 142.22)**—This culvert would be replaced to accommodate the five-lane highway. The ends of the culvert would be extended beyond the clear zone to minimize the use of guardrail, thereby enhancing the safety of the roadway and minimizing potential barriers to wildlife crossings. The culvert openings would be oversized and the bottom of the culvert placed below the stream bed. Granular material would be placed within the culvert to facilitate fish passage, spawning, and the movement of aquatic organisms. WYDOT will attempt to simulate the natural streambed with natural materials.

At each of the above-noted crossings, work within the channel would be required, including excavation, pile driving, and/or bank stabilization. This would result in some short-term increases in turbidity levels or the temporary loss of usable habitat. However, the long-term effects of this work are not expected to impact fish populations. The impacts associated with the structure work included with the 5-Lane Rural Alternative are expected to remain within close proximity of the area of construction. WYDOT will use BMPs to control sediment and prevent erosion. These controls will include, but not be limited to, silt fencing, straw bales, and erosion control blankets. Additional BMPs will be identified during final design. In addition, existing vegetation will be maintained and preserved where practical, and all disturbed soils will be seeded and revegetated. Further, any instream construction activities will be minimized during spawning periods, conducted when water levels are at their lowest, and controlled so that fish passage is maintained.

- **Sedimentation**: Construction of the 5-Lane Rural Alternative would likely introduce sediment into Game Creek, Flat Creek, the Snake River (two locations), and Horse Creek. Factors influencing sediment transport to a stream or sedimentation include soil type and condition; slope or topography; magnitude, intensity, duration, distribution, and season of rainfall; vegetal cover; surface erosion; and bank cutting. Sediment that does reach the rivers would be transported downstream, and the distance that it travels would be influenced by a number of factors, including gradient, flow velocity, turbulence, existing sediment loads, and channel condition.

  Sediment from the project construction site entering one of the streams or rivers would depend primarily on the effectiveness of erosion control practices, proximity of exposed soils to the water, and weather conditions, such as precipitation and wind. Heavy rains and winds during construction would result in a worst-case scenario in terms of sediment washing into the rivers. Bridge or culvert construction that includes in-stream work would generate additional sediment by disturbing the river bottom and re-suspending existing sediment in the water column. Construction of the piers for the bridges over the Snake River and the culverts at Game Creek and Horse Creek would disturb sediment in the river/ stream channel. Sediment introduced to the stream or existing sediment disturbed during construction would be washed further downstream by the volume and velocity of water being transported and during periods of high flows (spring runoff) when sediment loads in the river are typically high.

  Sedimentation has been shown to be detrimental to trout by filling the interstitial (small, narrow) spaces in the gravel stream bottoms where eggs are laid, limiting oxygen supplies to the eggs and larval fish. High levels of sediment are also detrimental to juvenile trout growth and survival. Neither Flat Creek nor the Snake River in or downstream of the project area are known spawning areas for trout. Trout potentially spawn in the upper or middle reaches of Game Creek and Horse Creek and are not expected to spawn in the lower reaches of these creeks near the highway. Typically, juvenile trout will rear for one to two years in the spawning streams before migrating downstream as sub-adults. Sedimentation from the 5-Lane Rural Alternative would not affect spawning trout or rearing juveniles. Generally, adult migratory trout in the Snake River are subject to high sediment loads annually during spring runoff or other runoff events. Sediment from the project would not affect adult trout or migration to the spawning streams.

Sedimentation associated with the 5-Lane Rural Alternative has the potential to indirectly affect trout in the Snake River by reducing food availability if it adversely affects invertebrate or fish prey supplies. Juvenile cutthroats are typically planktivorous and insectivorous. As they mature, they generally move downstream and continue to be insectivorous; however, some larger cutthroats may include smaller fish in their diet. The trout population inhabiting the Snake River downstream of the project area consists of adult and sub-adult fluvial (river) fish.

Studies of invertebrates performed upstream of the study area within Grand Teton National Park by the National Parks Service (NPS) describe the Snake River as "relatively productive," with 170 species identified and an average invertebrate density of 11,399 milligrams of invertebrates per square meter (mg/m^2). The bulk of the invertebrates collected consisted of caddisflies (Order *Trichoptera*) , mayflies (Order *Ephemeroptera*), stoneflies (Order *Plecoptera*), and dipterans (Order *Diptera*), with caddisflies being the most abundant (Hayden, 1976). *Ephemeroptera*, *Diptera*, *Plecoptera* and *Trichoptera* are fed upon by trout species, particularly by young trout (Matousek, 2007).

The Snake River carries large volumes of sediment during the spring runoff (approximately May through July). Resident fish and invertebrates in the river are subjected to these sediment loads on an annual basis. Temporary or periodic sediment loads from construction of this alternative are not expected to affect trout prey availability. Once the construction is complete and successful reclamation of disturbed areas has occurred, sediment from the construction area would be greatly reduced.

- **Chemical Contamination**: Construction of the 5-Lane Rural Alternative near the rivers may result in oil/gas from construction equipment directly entering the water either from equipment working in the stream or as a result of a spill or accident. Oil and gas contamination, as with sediment, has the potential to affect the downstream aquatic ecosystems and may affect prey availability for fish in and downstream of the project area. Petroleum products have been shown to be toxic to trout and aquatic invertebrates in varying concentrations and conditions.

- **Channel Modification:** Replacement of the bridges and culverts associated with the 5-Lane Rural Alternative has the potential to modify the river channels through adjustments of the river banks, installation of riprap to prevent erosion, lengthening culverts (channelization) and changes in bridge pier shape and/or placement. Foundations (abutments and piers) would be placed parallel with the direction of the stream flow at flood stage. When practical, intermediate supports, or piers, would be placed on the stream banks outside of the ordinary high water, rather than in the main channel, and when possible, the number of piers would be reduced. This provides a more effective flow of water beneath the bridge and minimizes the temporary construction impacts to the stream. The culverts would be lengthened to accommodate the wider highway section, resulting in a more channelized stream with potentially constricted flows through the culvert. Channel modifications would be minimized by limiting the culvert length to only that necessary to meet the safety standards for the alternative.

- **Loss of Riparian or Wetland Vegetation**: Wetland impacts associated with the 5-Lane Rural Alternative are discussed in Section 4.14. Functions of fringe wetlands and riparian areas include riverbank stabilization and sediment storage. The highway does not closely parallel the Snake River or Flat Creek, therefore removal of wetlands and riparian vegetation due to highway construction would be minimal (see wetlands impacts above). However, the widened highway at the river or stream crossings would result in some loss of wetlands and riparian vegetation at these locations. Loss of riparian and wetland vegetation may affect trout and other fish by increasing runoff and sedimentation potential and by reduction of large woody debris recruitment in trout habitat. Under current conditions, cottonwoods and other riparian vegetation within the highway corridor are assumed to be only a minor source of large woody debris for the Snake River system; the 5-Lane Rural Alternative is not expected to affect large woody debris recruitment to a measurable degree.. Provided riparian and wetland areas impacted by bridge and culvert construction are reclaimed to pre-project conditions, the project would have minimal long-term impacts on increased runoff and sedimentation potential from loss of riparian/wetland vegetation.

- **Mortality and Fish Passage:** The 5-Lane Rural Alternative has the potential to cause direct mortality of individual fish if they occur in the area of construction during in-stream work, or to block fish passage in smaller tributaries if culverts do not allow continual water flow. Neither the Snake River nor Flat Creek are known spawning areas for trout. Spawning likely occurs in the upper or middle reaches of Game Creek and Horse Creek. The highway crosses these two creeks in their lower reaches near their confluence with the Snake River; therefore, damage to spawning beds is unlikely. Seasonal migration of adult trout to spawning streams likely reduces the abundance of adult fish in the project area at certain times of the year. Generally, cutthroat trout spawn from April to June and migrate to the spawning streams in late winter or early spring. Cutthroat trout abundance in the project area would be lowest from mid-winter to spring (January through May). Construction of the new bridges and demolition of the old structures would likely require some construction in the river, particularly near the pier locations and channel banks. In-stream construction activity could possibly result in the death of adult trout, although this is unlikely because adult trout mobility enables them to move out of the area of reconstruction disturbance for more sheltered areas. Construction of culverts is more likely to result in adult or sub-adult trout mortality if the culverts are used for cover. However, in all instances, instream construction activities would be minimized during spawning periods, conducted when water levels are at their lowest, and controlled so that fish passage is maintained. The new culverts at Game Creek and Horse Creek should benefit fish passage and be an improvement over existing conditions.

- **Runoff**: Without mitigation, runoff from the highway would increase following construction of the 5-Lane Rural Alternative. This alternative would more than double the area impervious to water over current conditions. The amount of runoff from the highway reaching the streams or rivers is subject to the effectiveness of BMPs and topographic and vegetative features, but can be expected to increase as a result of the project. The overall net result would be increased flows in the Snake River, although it is expected that this would be periodic, nearly immeasurable given the volume of water in the river, and negligible over the long term.

  Because the 5-Lane Rural Alternative would increase the number of highway lanes, the use and volume of sand/gravel/deicing salts during the winter months would increase. Sand/gravel/deicing salts applied to the highway have the potential to be deposited into the rivers via runoff or side-casting from the road. The use of these materials on the highway is dependent on weather and is expected to be variable over time. After successful reclamation of the highway right-of-way has occurred, the migration of off-stream sediment (including sand/gravel/deicing salts) to the rivers would be slowed; however, the overall long-term effect would be an increase in sediment in the rivers. Sediment and sand/gravel/deicing salts from the highway reaching the river via runoff should have negligible effects on trout (see sediment discussions above). The long-term effects from an increase in sand/gravel/deicing salts use in the area is also considered negligible. Sediment that enters the river over the winter months would be moved further downstream during the spring runoff when the volume of water and sediment in the river is high.

  Because the existing highway crosses the Snake River and tributaries, it is likely that some petroleum products associated with vehicular traffic on the highway would enter the streams and river. The 5-Lane Rural Alternative is not expected to directly affect the level of contaminants in the streams; however, increases in traffic on the highway may cause future contaminant levels to rise. Storm runoff from highways generally contains sediments, hydrocarbons (oil, grease, and fuel), litter, deicing salts and minerals, and heavy metals. Concentrations of these pollutants are considered significant on roads where AADT counts exceed 30,000 (FHWA, 1981). This level of traffic is roughly three times greater than the projected AADT of 11,000 for the year 2026. Concentrations of these pollutants in the study area are expected to remain insignificant unless traffic levels increase significantly.

- **Accidents and Random Events**: As with the No-Action Alternative, the overall increase in traffic on the road may increase the potential for traffic accidents under the 5-Lane Rural Alternative. In the event of an accident occurring on or near a stream or river crossing, oil/gas (or other) contamination may occur. Additionally, during the construction period, there is the potential for an oil/gas spill or accident from construction equipment entering the rivers. This indirect effect is considered immeasurable and the increase in highway safety would help offset the potential for this type of random event affecting fish populations in the Snake River and tributary streams.

Combination Alternative (Preferred Alternative)

The primary difference between the 5-Lane Rural Alternative and Combination Alternative is that the width of the highway from approximately MP 141.3 to 142.5 (~1.2 miles) would be narrower. This difference only slightly affects habitat loss impacts and only within the Mountain Big Sagebrush type. The Combination Alternative would reduce impacts to Mountain Big Sagebrush vegetation by approximately 4.0 acres.

Disturbance/displacement, movement barrier, and potential mortality impacts would be the same for both the Combination Alternative and the 5-Lane Rural Alternative for all wildlife and fisheries, including threatened and endangered species. The only slight difference may be that between MP 141.3 and 142.5 where the highway would be narrower (three-lane or four-lane), the highway may be easier for wildlife to cross; however, the slight change in this potential from the 5-Lane Rural Alternative is essentially immeasurable.

Pathway Options

Wildlife and fisheries impacts associated with Pathway Option 1 (Preferred Pathway Option) are included in the impacts described for both build alternatives. The difference in impacts between the two pathway options is negligible.

4.18.4 Avoidance and Minimization Measures

The following measures would be employed to avoid or minimize potential impacts to natural resources:

WYDOT would continue to coordinate with the USFS, WGFD, USFWS, and USACE throughout the course of the project development and design phases and throughout the construction phases to ensure that appropriate measures to minimize and mitigate impacts are implemented and that any unforeseen impacts or circumstances that arise are addressed.

Vegetation and Wetlands: Project design would include measures to avoid placing turnouts, access roads, pathway, and other existing or proposed facilities in or adjacent to wetland or aquatic habitats and riparian forests and/or old-growth coniferous forest areas to minimize impacts to bald eagles.

Wherever possible, project design would minimize removal of snags, mature trees, and old growth trees, especially in or near riparian areas.

Fisheries: For new bridge structures, foundations (abutments and piers) would be placed parallel with the direction of the stream flow at flood stage. When practical, intermediate supports, or piers, would be placed on the stream banks outside of the ordinary high water, rather than in the main channel and minimize the creation of hydraulic eddies and alterations of down stream flows.

4.18.5 Mitigation

The following measures will be employed to mitigate potential adverse impacts to natural resources.

Wetlands: An USACE Section 404 permit will be required for the project. Wetland impact avoidance, minimization, and mitigation measures that will be implemented for the project will be defined in the Section 404 permit. Measures to compensate for unavoidable loss of riparian areas will be addressed during final design.

Threatened and Endangered Species: Because no threatened and endangered species would be impacted by either build alternative, no mitigation is necessary. Although not expected to occur frequently or in large numbers within the Study Corridor, species such as Canada lynx could use wildlife passages being evaluated by WYDOT for use under all new bridges and culverts to facilitate wildlife movement.

Bald and Golden Eagle Protection Act: Bald eagle is no longer protected under the ESA, but is protected under the BGEPA. Because of the potential for adverse impacts from the project on nesting bald eagles, FHWA has conducted informal consultation with the USFWS, and will comply with USFWS's *National Bald Eagle Management Guidelines*, May 2007. In January 2010, the USFWS issued Wyoming Guidelines for Bald eagles. The guidelines refer to the *Bald Eagle Working Group Guideline for the Yellowstone Ecosystem*, 1982.

FHWA and WYDOT will comply with the Wyoming Guidelines for the two bald eagle nests located over 0.5 mile outside the Study Corridor (the Munger Mountain 1 and Munger Mountain 2 nests). Two other bald eagle nests (the Porcupine nest and the Hoback nest) are located within 0.5 mile of the Study Corridor. Because of the potential for adverse impacts from the project on the Porcupine and Hoback nests, project-specific conservation measures were developed based on informal consultation with the USFWS, in lieu of mitigation measures outlined in the Wyoming Guidelines for Bald Eagles (see April 9, 2010 letter in Appendix A). FHWA and WYDOT will employ these measures, which include:

- Removal of vegetation within 0.5 mile of nests, including all tree cutting, will be conducted outside of the entire nesting season (approximately February 15th through July 15th).
- After the first season of project implementation, WYDOT, FHWA, and the USFWS will review the Jackson South project reconstruction activities and the status of the bald eagle's nests to discuss whether any project modifications might be necessary to reduce impacts to the eagles.

Migratory Birds: Large trees near the roadway will be preserved where feasible. A qualified biologist will conduct a survey for active migratory bird nests, including nesting trumpeter swans, prior to construction activities (including clearing and grubbing). If no active nests are found, construction activities can proceed. If active nests are found, WYDOT will coordinate with USFWS to determine an appropriate course of action, which may include, but is not limited to, a delay in construction to avoid the breeding season. Active nests found during construction will also require coordination with the USFWS.

Wildlife: As shown on **Figure 1-12**, vehicle/animal collisions occur throughout the corridor, with deer being the most common animals affected. Two wildlife conflict hotspots exist The main area of concern is a mile-long segment starting north of Game Creek, to Flat Creek, to the South Park Bridge over the Snake River (this will be referred to as the north zone). The second, slightly longer segment, is farther south, starting at Hoback Junction to Horse Creek, to the bridge over the Snake River at MP 142.79 (referred to as the south zone).

The bridges and culverts at these drainages provide the best opportunities for wildlife crossings. WYDOT will ensure that the design of new bridges, or the widening of existing bridges, will accommodate all manner of wildlife movement. Long bridges provide physical separation of vehicles and animals, and at the same time allow for connectivity at the landscape level for a wide array of species. This will provide for safe wildlife movement under the two bridges in the north zone and one bridge in the south zone.

WYDOT's standard box-beam or W-beam guardrail will be used at bridge ends and at isolated steep fill areas. In general, WYDOT will attempt to minimize guardrail usage in the Study Corridor. All installations will meet standard guardrail heights commensurate with industry standards. At the Snake River Bridge near South Park and at the Flat Creek structure, wildlife fencing will most likely be used to channel wildlife underneath the road eliminating issues with the guardrail.

WYDOT designers have also evaluated replacing the culverts at Game Creek (north zone) and Horse Creek (south zone). Both of these tributaries are identified as spawning tributaries for Snake River Cutthroat trout. WYDOT is committed to provide fish-friendly structures at these two locations. WYDOT will also size the structures to allow other wildlife movement, including deer, to cross under the highway. These structures may not be large enough for elk or moose crossings due to issues with highway grade and culvert size.

WYDOT will provide these five wildlife crossings (three in the north zone and two in the south zone), and has investigated two additional locations. There is potential for an underpass south of Horse Creek (south zone). National Forest ownership, topography, and the three-lane highway section proposed as part of the Combination (Preferred) Alternative favor a crossing at this location. WYDOT will use an advisory committee to further evaluate future design plans at this location. WYDOT also studied the area near the former Old West Cabins (north zone) for both an underpass and overpass wildlife crossing. Both were found to be problematic. The topography favors an overpass, but impacts to nearby private property would be unavoidable. An overpass could also result in higher visual impact. Placing a large culvert under the highway at this location is possible, but it is doubtful that animals would use the structure because of the culvert length and steep topography on the east side.

WYDOT and FHWA also are committed to using wildlife fencing to guide animals to the crossings described above. The fencing would encourage use of these crossings while preventing animals from crossing over the highway in these locations.

These mitigation measures are expected to reduce the number of vehicle/animal collisions in this corridor. During the final design process, WYDOT will coordinate with the Wyoming Game and Fish Department, Bridger-Teton National Forest, and other ID Team Members and interested parties on the design of the wildlife crossings. Also, the following measures will be evaluated during the final design stage:

- Using retaining walls to help funnel wildlife to crossing locations. WYDOT has identified some locations where a retaining wall could serve several functions, including preventing wildlife from entering the highway and directing them to crossing locations.
- Increasing visibility of wildlife to drivers. There are several measures that could be implemented, such as maintaining the 30-foot clear zone, as proposed, and moderating steeps side slopes to improve visibility for drivers.
- Influencing driver behavior by posting advisory signs, and/or using dynamic signs that can warn drivers during high wildlife use periods, such as migration season.

In addition, WYDOT will perform an amphibian survey prior to construction at all wetlands adjacent to the roadway that will be impacted by construction and coordinate with WGFD on their concerns.

Teton County representatives have stated that they are agreeable to closing either pathway option during periods of high wildlife migration/presence to minimize wildlife disturbance. Pathway/trail system closures to protect wildlife are common in the Jackson area. Temporary pathway closures to protect migrating wildlife would not be extraordinary.

Fisheries: WYDOT will incorporate Best Management Practices (BMPs) into the project design to help mitigate impacts to fisheries. WYDOT will obtain a National Pollution Discharge Elimination System (NPDES) permit that will contain contract provisions for construction areas to minimize construction sedimentation effects until the project is complete and disturbed areas are successfully reclaimed. Also, with implementation of BMPs and compliance with the NPDES permit, the potential for chemical contamination from the alternative will be minimized. WYDOT will coordinate with the WGFD during final design of drainage structures.

Additional mitigation measures include:

- Fish passage will be allowed at all times during construction. In-stream construction at bridges and culvert will be conducted at times of the year when spawning and fish passage will not be restricted. WYDOT will coordinate with the WGFD on these activities. WYDOT will include either fish passage structures or will ensure that culvert design at Game Creek and Horse Creek will not impede fish passage.
- Consideration will be given to installation of instream habitat, such as placement of boulders, overpour structures, etc. to enhance fish habitat within the disturbed area of this project, in consultation with the WGFD.
- All disturbed stream banks will be returned to their original or better degree of stability and contour.
- WYDOT will require contractors to clean, inspect, and wash all equipment and vehicles making contact with any area waters before and after contact to minimize the possible spread of noxious/invasive plant and animal species.
- Construction standards and safety precautions that follow approved BMPs and design criteria will be employed to minimize the potential for an accidental spill or discharge of any chemical or petroleum product that may be hazardous to fish and wildlife.
- Construction equipment fueling and servicing areas will have appropriate pollution prevention measures and will be located a minimum of 300 feet away from surface water, riparian zones and/or slopes that lead directly to water, riparian, or aquatic habitat.
- Rip-rap material will be obtained from a non-stream source and be free of fine sediments.
- Sediment-reduction practices will be applied within all construction areas to minimize excessive sedimentation and reduction of aquatic and fisheries habitat quality (see Section 4.23.4, Water Quality). These will include:
    - Instream construction activities will be minimized to the greatest extent possible to minimize sedimentation and channel instability impacts to fish habitat.
    - Accepted BMPs will be implemented to ensure that all sediments and other pollutants are contained within work area boundaries. Disturbed areas that contribute sediment to surface waters as a result of project activities will be promptly revegetated to maintain water quality.
- WYDOT construction specifications for control of soil erosion and water pollution will be strictly followed.
- Any riparian canopy or bank stabilizing vegetation removed as a result of construction activities will be reintroduced and protected from grazing until well established (typically rested for a minimum of two grazing seasons).

- To the extent practical, buffer zones of undisturbed vegetation along water bodies will be maintained to inhibit transport of contaminated runoff to surface waters.

4.19 Vegetation

This section discusses the potential impacts to vegetation types, including threatened and endangered species, and noxious weeds, potentially affected by the alternatives.

4.19.1 Impact Assessment Methodology

Impacts to vegetation types were assessed quantitatively. The calculation of impacts for the physical removal of habitat excludes the existing road and shoulder template. The proposed dimensions of the build alternatives (see Chapter 2.0 of this EIS) were used to calculate the total new area of roadway. The existing condition assumes a 28-foot top width (two 12-foot lanes with 2-foot shoulders). While the existing conditions throughout the project may vary, this method allows equal comparison between build alternatives for broad impacts, such as vegetation type losses. The assumption was made that the clear zones of the existing road generally matched the adjacent land cover identified by the GAP Analysis. The quantity of disturbance or loss of vegetation types presented is an overestimate of true loss of vegetation types because it includes the existing clear zones. This approach ensures a conservative (over) estimate of the direct impacts.

Impacts due to noxious and invasive plant species were assessed qualitatively. It is difficult to assess the impacts of these species quantitatively due to the large number of variables that could affect the establishment and spread of noxious weeds. Therefore, literature and expert opinion were reviewed to help determine the potential impacts due to noxious and invasive plant species.

Impacts to vegetation that are similar in nature for each of the build alternatives include:

- Loss of vegetation types (long-term and short-term).
- Potential loss of sensitive species.
- Potential increase in noxious and invasive plant species.

Loss of Vegetation Types: Long- and short-term potential impacts to vegetation types are associated with each of the build alternatives. Long-term impacts include conversion of native vegetation to pavement or other permanent features (e.g., bridges, pathway). Short-term impacts include the disturbance of areas due to construction activities, such as vegetation and topsoil removal, to construct the road and slope. These areas typically would recover over time and provide similar vegetation types to that prior to construction. The amount of disturbance to the vegetation types varies by alternative, and is discussed in the following sections.

Sensitive Species: Potential impacts on federally listed species or species listed by the BTNF would be similar with both build alternatives. If a listed species is present within the proposed roadbed, then that individual plant is in jeopardy of being impacted by the project. The impact of the loss of an individual plant or a small population to a species is dependent upon the rarity and distribution range for that species. A survey was conducted along the proposed project area to locate any Ute ladies'- tresses orchid, the only federally listed species with the potential to occur in the project area. No individuals were found during the survey (WEST Inc., 2002) and this species will not be affected by the build alternatives.

Noxious and Invasive Plant Species: Potential impacts from noxious and invasive species are not likely to vary substantially by build alternatives. However, the larger the area disturbed by construction, the greater the potential for noxious and invasive species to invade. Most noxious and invasive species are aggressive pioneers that have a competitive advantage over other species on disturbed sites. Additionally, disturbance to seed banks where these species exist can greatly increase seedling establishment, creating a potential problem in areas that are being reclaimed. Therefore, all areas disturbed by the project are potential habitat for these species, particularly for spotted knapweed and houndstongue that are currently found throughout the entire project area, scotch thistle near the north end of the project, and field bindweed between MP 146 and 147. Severity of impacts depends on the species, degree of invasion, and control measures employed. Adverse impacts from noxious and invasive species include:

- Loss of wildlife habitat
- Displacement of special status species
- Alteration of wetland and riparian functions
- Reduction in livestock forage and crop production
- Displacement of native plant species
- Reduction in plant diversity
- Change in plant community functions
- Increased soil erosion and sedimentation
- Reduction in recreational value and use
- Reduction in land value

Mitigation measures will be implemented to reduce potential impacts resulting from noxious and invasive plant species. Specific mitigation measures for the build alternatives are described in Section 4.19.4.

4.19.2 No-Action Alternative

Under the No-Action Alternative, the existing vegetation types adjacent to the highway would likely remain similar to the existing condition. Regular maintenance activities in this corridor would continue and include actions such as mowing and weed control. Noxious and invasive species would continue to be of concern due to occasional disturbances, such as landslides or the introduction of new species. Cars and trucks would continue to transport noxious weed seed from other areas into the region.

4.19.3 Build Alternatives

5-Lane Rural Alternative

Loss of Vegetation Type: The vegetation types identified in the Wyoming GAP Analysis and the associated maps were utilized to determine the approximate acreage of each vegetation type that would potentially be impacted by the 5-Lane Rural alternative (see **Table 4-9**). It is estimated that 63.2 acres of Mountain Big Sagebrush, 41.7 acres of Riparian Forest, and 1.6 acres of Douglas Fir would incur long-term impacts from this alternative. The Mountain Big Sagebrush would sustain most of the impact as it is the dominant vegetation type adjacent to the highway.

Table 4-9
Approximate Long Term Loss of Vegetation Type and Potentially Occurring Sensitive Species

Vegetation Type	Potentially Occurring Sensitive Species	Ground Disturbance (acres)		
		No Action	5-Lane	Combination
Mountain Big Sagebrush	Soft aster (*Aster mollis*)	0	63.2*	59.2*
Riparian Forest		0	41.7	41.7
Douglas Fir	Large flower clarkia (*Clarkia pulchella*)	0	1.6	1.6
	Total Ground Disturbance	**0**	**106.5**	**102.5**

*Commercial and residential development has occurred west of the highway between MP 144 and MP 146 since this data was developed; therefore, loss of Mountain Big Sagebrush would be less than shown.

Sensitive Species: A survey was conducted along the entire project corridor in 2002 for Ute ladies'- tresses orchid (WEST Inc. 2002). No individuals were located during the survey efforts; however, five locations were identified as potential habitat sites for the species. The five locations were all north of MP 143 outside of the existing right-of-way.

There are six BTNF Sensitive Plants that potentially occur in the project area based on range and general habitat type. However, the USFS lands within the project area contain limited habitat considered suitable for these species, and no records of their occurrence in the project area could be located. Three of the BTNF Sensitive plants are wetland species or occur in moist or wet areas. During the survey efforts for Ute ladies'- tresses orchid, no BTNF sensitive species were documented. Therefore, it is expected that the 5-Lane Rural Alternative would not impact Ute ladies'- tresses orchid or USFS sensitive species of the area.

Noxious and Invasive Plant Species: Spotted knapweed and houndstongue are currently found throughout the entire project area and scotch thistle and field bindweed have been identified at the north end of the Study Corridor. Therefore, it is probable that seeds from these plants occur in the seed banks and may need to be mitigated in areas that are disturbed and being reclaimed. Mitigation measures to minimize the impacts of noxious and invasive plants are presented in Section 4.19.4.

Combination Alternative (Preferred Alternative)

Loss of Vegetation Type: The Combination Alternative would result in less (four acres) ground disturbance compared to the 5-Lane Rural Alternative. The primary difference between the 5-Lane Rural Alternative and Combination Alternative is that the highway would be narrower between MP 141.3 to 142.5 (~1.2 miles) under the Combination Alternative. This difference occurs entirely in the vegetation type identified as Mountain Big Sagebrush.

Sensitive Species: No Ute ladies'- tresses orchid were located during a survey conducted along the project corridor (WEST, Inc., 2002). No BTNF sensitive species have been documented in the project area and there is limited habitat for their occurrence. Therefore, it is expected that the Combination Alternative would not impact Ute ladies'-tresses orchid or BTNF sensitive species of the area.

Noxious and Invasive Plant Species: Impacts from noxious and invasive species associated with the Combination Alternative would be the same as those for the 5-Lane Rural Alternative. Reclamation activities in this segment should follow the mitigation measures presented in Section 4.19.4.

Pathway Options

Vegetation impacts for both build alternatives described above include impacts associated with Pathway Option 1 (Preferred Pathway Option), which includes impacts to 0.78 acre of Mountain Big Sagebrush and 0.6 acre of Riparian Forest. Pathway Option 2 would only impact 0.2 acre of Mountain Big Sagebrush, and therefore would reduce impacts to Mountain Big Sagebrush by 0.4 acre and impacts to Riparian Forest by 0.6 acre.

4.19.4 Mitigation

The following mitigation measures will be employed to mitigate disturbance to vegetation.

A revegetation plan will be developed through coordination with the USFS, WGFD, USACE, and BTNF for use in the highway corridor, temporary construction permit areas, and other areas disturbed during project construction. Specific objectives of the revegetation plan will be identified, such as blending the reclamation vegetation with existing vegetation, use of native species similar to existing vegetation, and minimizing the spread of noxious and invasive weeds.

The revegetation plan will include, but not be limited to, methods for topsoil salvage (for available topsoil-B horizons), depth of topsoil salvage, stockpiling, and placement; site-specific seeding and planting mixes that meet EcoRegion requirements, timing, and application rates; types and application rates for fertilizer and mulch; success monitoring specifications and contingency plans if mitigation is unsuccessful; noxious weed control methods, including the identification of problem areas and equipment cleaning; and landscaping techniques, such as varied slopes, rough surfaces, terraces, and irregular forest edges.

The USFS has developed the five following mitigation measures to stop the spread of existing noxious weeds and to prevent the establishment of new noxious weeds. The basis for these prevention and control measures are National Policy: Forest Service Manual 2080.

- Remove seed source that could be picked up by passing vehicles and limit seed transport.
  - Before soil disturbance occurs on the project area, treat all seed-bearing noxious weed plants along existing USFS access roads leading to project area. New road construction must be revegetated.
  - The following clauses should be incorporated into construction contracts: *In order to prevent the potential spread of noxious weeds into a project area, the contractor shall be required to furnish the USFS and WYDOT with proof of noxious weed-free equipment.*
  - The contractor will be required to clean all logging and/or construction equipment prior to entry on to the project and/or sale area. This cleaning will remove all soil and plant parts and material that may carry noxious weed seeds into the project or sale area. Only logging and construction equipment inspected by the USFS and WYDOT will be allowed to operate within the sale and/or project area. All subsequent move-ins of logging and construction equipment will be treated the same as the initial move-in.
  - Prior to initial move-in of all equipment, and all subsequent move-ins, the contractor will make equipment available for USFS and WYDOT inspection at an agreed location.
  - All equipment will be cleaned prior to leaving the project site if operating in areas infested with new noxious weeds.
- Retain shade to suppress noxious weeds.
  - Minimize the removal of trees and other roadside vegetation during construction, reconstruction, and maintenance, particularly on southerly aspects.
- Minimize the movement of existing and new noxious weed species caused by moving infested gravel and fill material.
  - All gravel and borrow sources will be inspected before use and transport. If noxious weeds are present, they will be treated before transport and use.
  - If new noxious invaders (according to the Forest Weed Specialist) occur at a borrow site that are not found at the site of intended use, that site will not be used unless effective mitigation measures (according to the Forest Weed Specialist) are implemented.

- Minimize sources of noxious weed seed in areas not yet revegetated.
  - Keep active road construction sites closed to vehicles not involved with construction.
  - Use only noxious weed-free mulch on road stabilization and erosion control projects.
- Ensure establishment and maintenance of vigorous, desirable vegetation to discourage noxious weeds.
  - Monitor all seed sites. Re-fertilize and spot re-seed as needed. Include commercially available native, pioneer, and/or nurse crops. Select for low nutrient demanding species to reduce the need for follow-up fertilization.
  - Revegetate roadside drainage ditches after clean out when vegetation is removed.
  - Treat areas that are currently infested with noxious weeds in the project area prior to disturbance by construction.

4.20 Cultural Resources

4.20.1 No-Action Alternative

The No-Action Alternative would have no additional impacts to the National Register of Historic Places (NRHP)-eligible Game Creek Site. The existing road currently bisects the site.

4.20.2 Build Alternatives

One NRHP-eligible site was identified in the Study Corridor—the Game Creek Site (Site #48TE1573) (see Section 3.20.3). The following sections describe impacts to this site.

5-Lane Rural Alternative. WYDOT determined that construction of any build alternative would have an **adverse effect** on the Game Creek site. SHPO concurred with this determination in a letter dated May 2, 2005 (see **Appendix A**). Both build alternatives would require cutting into the terrace east of the highway, and stripping of topsoil and filling on the landforms west of the highway. These activities would occur within existing right-of-way. The roadway width would increase from 24 feet (plus variable shoulder widths on both sides of the highway) to 76 feet in width, with an additional 13 feet on one side of the highway to accommodate an eight-foot pathway separated five feet from the edge of the roadway shoulder. The construction zone for these alternatives would extend approximately 40 feet beyond the present road cut into the terrace east of the highway and to the right-of-way fence on the west side of the highway. As a result, a considerable portion of the terrace would remain outside of the construction zone and would not be directly affected by construction of this alternative (WYDOT letter dated July 26, 2004, see **Appendix A**). Either build alternative would impact an estimated 1.43 acres of the Game Creek Site.

Combination Alternative (Preferred Alternative). Impacts to cultural resources associated with the Combination Alternative are the same as those associated with the 5-Lane Rural Alternative.

Pathway Options. Impacts described for both build alternatives include impacts associated with Pathway Option 1 (Preferred Pathway Option), which would be located parallel to the highway. Therefore it would result in more impacts to the Game Creek site compared to Pathway Option 2, which would be located along Henry's Road.

4.20.3 Mitigation

In May/June 2005, FHWA, WYDOT, and the SHPO signed a Memorandum of Agreement (MOA) to mitigate adverse effects to the Game Creek Site (#48TE1573) The MOA (see **Appendix A)** includes a Data Recovery Plan for the site that consists of Chapter 6 of the report entitled, *Archaeological Testing at 48TE1572 and 48TE1573, Hoback Junction-Jackson, Snake River Section, WYDOT Project NHS-010-4(66), Teton County, Wyoming*, June 2004.

The MOA indicates that FHWA and WYDOT established the Area of Potential Effect (APE) to include site boundaries as well as potential indirect effects areas, consulted with the SHPO and notified the Advisory Council on Historic Preservation, and consulted with the Eastern Shoshone and Shoshone-Bannock Tribes. The MOA also indicates that no human remains, funerary objects, sacred objects, or objects of cultural patrimony are expected to be encountered in the archaeological work. The MOA outlines procedures required to minimize disturbance of the site and procedures to follow if intact cultural remains are discovered during construction.

4.20.4 Native American Consultation

On February 25, 2004, WYDOT sent letters to the Shoshone-Bannock Tribal Council and the Eastern Shoshone Business Council to solicit their input concerning cultural resources, data recovery at the Game Creek Site, areas of traditional spiritual and religious significance which may occur near the Study Corridor, and other issues which may be of concern (see **Appendix A**). No comment was received. A field visit of the Game Creek Site was held on May 11, 2004 with Mr. Haman Wise (Eastern Shoshone Tribal Representative), Dan Eakin (Project Director, State of Wyoming Parks and Cultural Resources), Jeff Weinstein (WYDOT Environmental Coordinator), and Julie Francis (WYDOT Archaeologist). Mr. Wise did not note concerns of a traditional spiritual or cultural nature regarding the site. However, he did stress the importance of minimizing impacts (see letter dated July 26, 2004 in **Appendix A**).

4.20.5 Section 4(f) Approval Requirement for Game Creek Site

Under 23 CFR 774.13(b), the FHWA has identified various exceptions to the requirement for Section 4(f) approval. These exceptions include, but are not limited to:

(b) Archeological sites that are on or eligible for the National Register when:
(1) The Administration concludes that the archeological resource is important chiefly because of what can be learned by data recovery and has minimal value for

preservation in place. This exception applies both to situations where data recovery is undertaken and where the Administration decides, with agreement of the official(s) with jurisdiction, not to recover the resource; and
(2) The official(s) with jurisdiction over the Section 4(f) resource have been consulted and have not objected to the Administration finding in paragraph (b)(1) of this section.

Based on the information provided in Section 4.20.3, the Game Creek site meets the requirements of 23 CFR 774.13(b)

4.21 Hazardous Materials

4.21.1 Impacts

Based on the results of the *Hazardous Material Existing Conditions Report,* Carter & Burgess, 2006, there is believed to be little or no potential of encountering contaminated soil and groundwater within the Study Corridor. The Lower Valley Energy pipeline crosses the highway at MP 148.72 (South Park Loop Road) and MP 146.73 (Game Creek). The pipeline is operated in accordance with US DOT Pipeline Safety Regulations contained in Title 49 CFR, and is not considered a hazardous materials threat to this project.

4.21.2 Mitigation

WYDOT will include containment and mitigation measures for hazardous materials, in accordance with WYDOT standard practice. If lead-based paint is found on bridges or other structures on the project that require demolition or renovation, measures will be taken to prevent the release of lead-based paint to the environment. WYDOT will coordinate with Lower Valley Energy regarding the natural gas pipeline.

4.22 Visual Character

4.22.1 Methods

Methods included field documentation of the existing visual character; an inventory of land use; referencing existing community plans; and identifying important viewsheds and areas of high scenic integrity for motorists, residents, and corridor users. Visual resources are not limited to elements or features that are of outstanding visual quality but all features regardless of their quality. Viewer sensitivity or local values can add visual importance to landscape features and areas that could otherwise appear unexceptional. [3]

The *FHWA Visual Impact Assessment for Highway Projects Manual* (FHWA-HI-88-054) and the *Land and Resource Management Plan (LRMP) for the BTNF,* 1990 (as amended, 1992) were used to develop methods to assess visual impacts. In addition, the *Wyoming Centennial Scenic Byway: Scenic Byway Corridor Management Plan* was referenced for compliance to scenic byway preservation. The BTNF Forest Supervisor and staff provided

[3] FHWA, USDOT (August 18, 1986) Esthetics and Visual Quality Guidance Information

direction for the assessment consistent with *FSM, Chapter 2380, Landscape Management* which provides direction for USFS landscape management including aesthetics and scenery. (Letter dated May 3, 2005 from Forest Supervisor Carole 'Kniffy' Hamilton to Jeff Weinstein.) Input from the white papers prepared by the USFS assessment workshop to evaluate the effects of the proposed action on the Snake River (June 2007), and results of the USFS re-evaluation as documented in their April 29, 2010 letter and June 5, 2010 email have been incorporated into this assessment.

4.22.2 No-Action Alternative

No construction would occur in the No-Action Alternative as part of this proposed action. Therefore the No-Action Alternative would result in no change to the existing visual character.

4.22.3 Build Alternatives

Scenic quality is one of the Outstanding Remarkable Values (ORV) for the Snake River's Wild & Scenic River eligibility. The Study Corridor is located within BTNF LRMP Prescription Areas 3 and 12, which have a visual quality objective (VQO) of *retention* and *partial retention*, respectively.

5-Lane Rural Alternative. Widened roadways would increase the motorist's and adjacent land use viewer's foreground view of the road. In addition to the pavement widening, there would be an expansion of the clear zone width and associated vegetation clearing. The magnitude of this change is such that the current "feel" of the road would be changed. The 5-Lane Rural Alternative typical sections are shown in Chapter 2.0 of this EIS.

The alternative would require construction of four retaining walls (see **Figure 4-2**). The first would be located near MP 147 and the former Old West Cabins (see **Photo 4-1**). The wall, needed to avoid impacts to new residences under construction and to the existing pathway, would extend approximately 1,100 feet. It would have an average exposed height of approximately 10 feet and an estimated maximum exposed height of 15 feet. This wall would not be visible from the Snake River. It would be noticeable from the roadway, but would not block important views.


Photo 4-1: Proposed Retaining Wall Location to protect adjacent residences

The second and third walls would be located 1,000 apart on the east side of the highway, at the Munger Mountain landslide area at approximately MP 144. The southern wall would be approximately 1,200 feet long with an average exposed height of approximately 8 feet and an estimated maximum exposed height of 11 feet. The northern wall would be approximately 1,600 feet long with an average exposed height of approximately 8 feet and an estimated maximum exposed height of 11 feet. Both walls would not be visible from the roadway; only the north wall would be visible from the Snake River.

The fourth wall would be located on the west side of the highway, just south of MP 142. It would extend approximately 1,200 feet with an approximate average exposed height of 16 feet and maximum exposed height of approximately 25 feet. This wall would be visible from the Snake River.

Because of the predominate pattern of development on private lands along the corridor, the USFS has determined that the retaining walls as proposed would be consistent with the USFS' scenic quality standard of *retention* if mitigation techniques discussed in Section 4.22.4 are employed (see April 29, 2010 letter and June 5, 2010 email in **Appendix C**).

The USFS indicated that if more retaining walls are added during final design, they may not meet the current Forest Plan scenic quality standards. WYDOT may include additional retaining walls near the South Park Bridge, near MP 146, to avoid wetlands and funnel big game underneath the bridge. However, if included in the design, these walls would not be within or visible to BTNF land. Therefore, they would not affect the BTNF's retention standards.

Scenic Resource Overlays are described in Section 3.1.2 and shown on **Figure 3-4**. Land Trust and Preservation Areas are described in Section 3.1.3 and displayed on **Figure 3-5** Widening associated with the 5-Lane Alternative would require approximately three acres from the Trust parcel west of the highway near South Park Loop Road. The South Park Loop Scenic Area that is incorporated into the Teton County Scenic Resource Overlay district would not be affected by the proposed 5-Lane Rural Alternative.

The 5-Lane Rural Alternative width in the area near Melody Ranch and much of the valley floor would be in scale with the broad valley and would not be visually out of place with the industrial and residential buildings and land uses in the corridor. The project valley areas adjacent to USFS land would be able to maintain a VQO of *retention* with mitigation. Road cut and fill slopes would be visible, however.

Photo 4-2: Highway 189/191 in valley area

Photo 4-2 shows a constrained valley area where the highway is adjacent to the Snake River on the west and steep slopes on the east. In this area, road widening associated with the 5-Lane Rural Alternative would create more of a visual impact due to cut and fill slopes and vegetation loss than in the wider valley area. The width of the proposed 5-Lane Rural Alternative would become more noticeable and visible as the roadway corridor narrows as a result of the adjacent terrain.

The width of the 5-Lane Rural Alternative would visually impact the valley and river corridor visual character due to grading. The proposed roadway template would be close to the Snake River near MP 144. The proposed roadway widening in this portion of the Study Corridor would change the current feel of the road.

During the construction period, short-term impacts would include the presence of construction equipment, signing, stockpiled and excavated material associated with construction in the staging areas, and dust and debris associated with construction activity. In addition, unvegetated slopes created by cuts to accommodate proposed improvements would be visible from the roadway.

Combination Alternative (Preferred Alternative). This alternative and visual assessment is the same as described above for the 5-Lane Rural Alternative for the segments between MP 142.5 to 148.6.

The four-lane section near Horse Creek (MP 142.0 to MP 142.5) would impact the narrow canyon feel of the portion of highway that closely follows the Snake River. The four-lane segment would be out of scale in the narrower canyon sections, as well as the area adjacent to private residences. Based on conceptual design, the cut and fill slopes and loss of dense vegetation would still be prominent, but to a lesser degree than the 5-Lane Rural Alternative.

The three-lane segment would more easily blend into the existing infrastructure. Some visual impacts would be necessary to off-set the benefits of safer driving conditions. The three-lane roadway would be more in scale with the surroundings. The three-lane segment would likely have similar impacts as the existing two-lane roadway. The proposed retaining wall would not be visible from the Snake River. This alternative would meet a *retention* visual quality standard for development in river corridors and the Prescription Area 12 standards for visual quality.

Pathway Options. Pathway Option 1 (Preferred Pathway Option) would require increasing the construction footprint to accommodate the ten-foot pathway. Therefore, it would add slightly to the visual impact associated with the cut and fill slopes discussed above.

Pathway Option 2 would have the same impacts as Pathway Option 1 north and south of where Old Henry's Road ties into the highway. Where Pathway Option 2 would be located along Old Henry's Road, it would not require additional grading and therefore would have less visual impacts than Pathway Option 1.

4.22.4 Mitigation

When revegetating impacted areas, WYDOT will use native trees, shrubs, and grasses. Species will be placed in appropriate sun exposure, soil and moisture conditions. Riparian vegetation will be planted at creek and wetland edges (see Section 4.14 for details on mitigation in drainages and wetlands). Trees and shrubs will be grouped in patterns similar to those of existing conditions where applicable. Treatment area edges and boundaries will be kept irregular to maintain natural mosaic patterns.

WYDOT will identify trees and/or large shrubs in the clear zone to be removed to accommodate the proposed cross-section. To establish a natural appearing edge, trees will be randomly removed beyond the clearing line, and new tree and shrub plantings will vary in size and height. Where proposed treatments abut densely forested areas, thinning will be transitioned from a dense canopy to a progressively more open forest to avoid a stark contrast along these edges.

Cut and fill slopes will be constructed to provide naturally appearing foreground views. Techniques include undulating finish grades, creating pockets for native shrubs and trees, studding with boulders as appropriate, and establishing large areas of native grass to reflect adjacent natural landscapes.

The length and use of retaining walls will be minimized, and retaining walls will be designed such that they blend into the environment. This will be accomplished with proper selection of color and material type and texture, using consistent wall design throughout the study corridor, and transitioning the end slopes into the adjacent landforms. Areas below and above the walls will be revegetated as practical and feasible. WYDOT will coordinate the aesthetic treatment of the walls during the final design phase with the design advisory group, which will include USFS representatives.

WYDOT will coordinate with Teton County during final design to discuss implementation of design recommendations contained in the *Teton County Comprehensive Plan*. The plan recommends limiting exterior colors to earth tones and controlling reflective surfaces and exterior lighting. It also recommends use of existing and supplementary native vegetation, planted in traditional patterns and of a scale capable of screening and softening structural mass; and discouraging major earth moving or building of berms to screen development or requiring such features to complement natural landforms.

During the final design, WYDOT will consider incorporation of measures identified in the *Wyoming Centennial Scenic Byway Plan*.

4.23 Construction

4.23.1 No-Action Alternative

The No-Action Alternative would involve no additional construction over what is currently scheduled, approved, and funded. Therefore, the No-Action Alternative would result in no construction impacts beyond what is currently planned for the study area.

4.23.2 General Build Alternative Impacts

Construction of either build alternative would result in short-term construction impacts throughout the construction period. The extent of these impacts would depend on the construction methods used, which would be determined during the design stage. However, highway construction generally would likely involve excavation, grading, paving, utility adjustments, and construction of retaining walls. At bridge locations, bridge reconstruction, widening, and demolition would likely occur. (Note that the footprint used to calculate environmental impacts at bridge locations assumed structure replacement, because structure replacement would have more impacts than structure widening. This approach allowed for a conservative estimation of impacts.) Sequencing of construction packages and the overall timeframe of construction have not been finalized and would depend on minimizing construction impacts to residents and traffic, funding, and coordination with local communities.

Construction associated with the build alternatives could impair travel mobility, increase traffic congestion, and temporarily restrict access to residences and businesses. Also, construction activities could temporarily increase dust, noise, runoff, and result in visual intrusions to motorists and residents. Temporary increases in turbidity and sediment may impact fishing opportunities in certain sections of the river. Construction would present the potential for exposure to, or accidental spill of, hazardous materials. The period of construction would most likely extend over several years.

The project would provide employment for construction workers throughout the duration of the construction period. Therefore, much of the economic benefit would go to communities where these workers reside. In addition, the project would provide greater retail sales within the study area from construction workers. Long-term camping or living in the forest by contractors will not be permitted unless a mutually agreed upon arrangement is made between the contractor and the BTNF Jackson District.

Air Quality

Without mitigation, excavation, grading, and fill activities could increase local fugitive dust emissions. Fugitive dust is airborne particulate matter, generally of a relatively large particulate size (greater than 100 microns in diameter). Because of the large size, these particles typically settle within 30 feet of their source. Smaller particles could travel as much as several hundred feet depending on wind speed. Vehicle emissions from construction vehicles and from delayed traffic also would impact air quality along the highways during construction activities.

Noise
Construction noise would present the potential for short-term impacts to those receptors located along the study area. The primary source of construction noise is expected to be diesel-powered equipment, such as trucks and earth moving equipment. Pile driving is expected to be the loudest single construction operation. Most noise receptors are located greater than 50 feet from areas where pile driving or other high-noise activities are expected. At this time, the substructure types are not known, but pile driving can be anticipated at all of the bridge locations and possibly the retaining wall location.

Vibration
Vibration caused by construction activities would present the potential for short-term impacts in areas where pile driving and compaction equipment are used. The potential for building damage from pile driving vibration is estimated to exist only within about 50 feet. Vibration from compaction equipment is less severe. Since no buildings are located within 50 feet of these activities, no impacts are anticipated.

Water Quality
Stormwater runoff from a construction site presents the potential for violations of water quality standards in adjacent waterways and groundwater. Without BMPs, stormwater runoff could cause erosion and sedimentation, and transport of spilled fuels or other hazardous materials. These potential impacts are important due to the proximity of the Study Corridor to the Snake River. Section 4.13.3 provides details on measures to avoid, minimize, and mitigate water quality impacts during construction.

If unchecked, construction activities can lead to the deposition of eroded sediments within nearby waterways and water bodies. Without implementation of appropriate mitigation measures, short-term effects to surface waters (i.e., during and immediately following construction) would include:

- A temporary increase in turbidity and sedimentation during and immediately following nearby land disturbances.
- An increased risk of contamination associated with the presence of heavy equipment fluids (fuels, lubricants, etc.) and construction-related chemicals (paints, concrete additives, etc.).

At this stage of project development, details such as location of piers and abutments have not been determined. However, WYDOT would comply with criteria contained in WYDOT's Standard Specifications for Road and Bridge Construction, 2003.

Traffic
Construction delays are expected to create short-term impacts to local and regional traffic circulation and congestion. Delays to the traveling public and emergency service vehicles would occur. Reduced speed limits and temporary lane closures and delays would impair travel mobility.

Visual
Short-term construction-related visual impacts would occur as a result of this project. These impacts include the presence of construction equipment and materials, temporary barriers, guardrail, detour pavement and signs, temporary shoring and retaining walls, lighting for night construction, and removal of vegetative cover.

Economic
Construction could affect business access at several locations, and result in short-term economic impacts. Positive economic effects would accrue from purchase of any local construction materials and equipment, as well as employment of construction workers from the area.

4.23.3 Build Alternatives

5-Lane Rural Alternative. Impacts associated with the construction of the 5-Lane Rural Alternative would be the same as those discussed under General Impacts in Section 4.23.2.

Combination Alternative (Preferred Alternative). Impacts associated with the construction of the Combination Alternative would be similar to those associated with the 5-Lane Rural Alternative, except in the three- and four-lane sections where construction impacts from grading and paving would be greater for the 5-Lane Rural Alternative.

Pathway Options: Impacts associated with construction of both build alternatives include impacts associated with Pathway Option 1 (Preferred Pathway Option). The difference in construction impacts associated with either pathway option would be negligible.

4.23.4 Mitigation

Air Quality
WYDOT's Standard Specifications for Road and Bridge Construction (2003), require contractors to provide and use methods to control air pollution (section 111.4 Air Pollution Control). Construction impacts to air quality will be reduced by using dust suppression methods, such as water and/or commercial dust control agents. Particulate emissions in the form of fugitive dust are regulated by the DEQ.

Noise/Vibration
The following measures will be used to mitigate noise and vibration due to construction:

- Combine noisy operations to occur during the same time period.
- Conduct pile-driving and other high-noise activities during daytime construction, where possible.
- These mitigation measures will likely increase the overall duration of construction while limiting the actual timeframe in which construction will occur during the day.

Water Quality
Contractors will be required to adhere to measures outlined in WYDOT's Standard Specifications for Road and Bridge Construction (2003) to protect water quality during construction. These measures require implementation of a Stormwater Pollution Prevention Plan (SWPPP) in compliance with the National Pollution Discharge Elimination System. Best management practices (BMPs) will be implemented to control sediment and prevent erosion. Existing vegetation will be maintained and preserved where practical, and all disturbed soils will be seeded and re-vegetated. Silt fences, as well as erosion bales and burlap bag curb, will be used to trap sediments, contain runoff, and protect from erosion.

WYDOT will require the contractor to provide at least one day of pre-notification before channel disturbing activities to allow anglers to avoid turbid sections of the river.

Traffic Control
WYDOT will implement the following measures to minimize impacts to traffic circulation during construction:

- Develop traffic management plans.
- Maintain traffic flow during peak travel times by minimizing lane closures, if possible.
- Coordinate with emergency service providers to minimize delays and ensure access to properties.
- Use of signage to announce/advertise timing of road closures.

Visual
WYDOT will implement the following measures to mitigate for construction-related visual impacts:

- Storage of equipment and materials in designated areas only.
- Removal of any unused detour pavement or signs.

4.24 Energy

4.24.1 Impacts

Anticipated impacts related to energy consumption were assessed qualitatively based on predictions of future traffic operations, construction operations, and requirements for ongoing maintenance.

Vehicular fuel consumption would continue to increase under the No-Action Alternative as traffic congestion increases. Also, this alternative is expected to result in ongoing and increased maintenance requirements, thus increasing maintenance energy consumption.

Energy costs associated with maintenance activities include energy used to clear, de-ice, patch, and otherwise provide a safe surface for transportation. The fuel consumption for long-term maintenance would increase with the build alternatives due to a greater area of roadway surface to clear and de-ice and otherwise maintain.

Energy consumed for construction includes the fuel used by construction vehicles and the energy required to produce construction materials. Alternatives that require more intensive construction activities (e.g., earthwork, paving) would expend more energy.

The Combination Alternative (Preferred Alternative) would improve level of service (LOS) (see Section 3.8.3), which would help reduce energy consumption through improved traffic operations. Vehicular fuel consumption would decrease with the Preferred Alternative due to a decrease in traffic congestion.

4.24.2 Mitigation

Procedures available to reduce energy consumption during construction include:

- Maximum use of on-site material to reduce haulage of materials.
- Design for repetitive dimensions to permit re-use of forms.
- Adequate construction vehicle maintenance.
- Adequate construction phasing and detour plan.
- Turning off equipment when not in use.
- Design of construction access roads and staging areas to limit distances traveled.

4.25 Cumulative

This section addresses the cumulative impacts associated with the No-Action and Build Alternatives under consideration for improvement of the Study Corridor. As part of the National Environmental Policy Act (NEPA) process, direct, indirect, and cumulative impacts must be identified and analyzed in sufficient detail to make an informed decision. A federal agency's responsibility to address these impacts in the NEPA process was established by the Council of Environmental Quality (CEQ) regulations. The CEQ regulations define a cumulative impact as:

> *"the impact on the environment which results from the incremental impact of an 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

To identify cumulative impacts, a baseline is established that includes development from a specified period of time for past actions, then that is added to present and reasonably foreseeable actions. This baseline establishes the impacts that have or would occur without the project.

The environmental resources addressed in the cumulative impacts analysis are those that have been identified as resources of particular concern that could potentially be impacted by the project. The direct and indirect impacts associated with the project are considered "incremental impacts" to the resources of concern. The additive effect of the incremental impacts to the baseline is used to assess cumulative impacts.

4.25.1 Methodology

Scoping

Meetings were held to conduct scoping, collect data, and obtain technical direction and input with the following state and federal agencies throughout the EIS process:

- Environmental Protection Agency
- U.S. Fish and Wildlife Service
- U.S. Army Corps of Engineers
- Bureau of Land Management
- U.S. Forest Service, Bridger-Teton National Forest
- Wyoming Game and Fish Department

In addition, an Interdisciplinary (ID) Team met at key points throughout the project to provide feedback on technical and environmental issues and participate in the NEPA process. The ID team included representatives of the U.S. Forest Service, Teton County, Lincoln County, Sublette County, Wyoming Game and Fish Department, the Jackson Hole Conservation Alliance, WYDOT, FHWA, local businesses, and Carter & Burgess, Inc.

The environmental resources to be addressed in the cumulative effects analysis include water resources and water quality, wetlands, wildlife, threatened and endangered species, and community character. These resources were derived from input received through the coordination efforts discussed above.

Geographic Area

The geographic resource boundary to be used for the cumulative effects analysis is based on the resources of concern and the potential impacts to these resources under a Build Alternative. The boundary for each resource is described below.

Water Resources and Water Quality/Wetlands: Because water resources, water quality, and wetlands are inextricably connected to the watershed in which they belong, the study area for these resources consists of the Greys-Hoback Watershed (hydrologic unit code 17040103) and the southernmost portion of the Snake Headwaters Watershed (hydrologic unit code 17040101).

Wildlife (Including Threatened and Endangered Species): Defining a study area boundary for wildlife resources is problematic because habitat ranges and migration patterns vary widely by species and can cross multiple political boundaries, making data collection and meaningful analysis difficult. For this reason, the approach for addressing cumulative effects to wildlife is project based. Past, present, and reasonably foreseeable future actions within the relevant areas of Bridger-Teton National Forest, Teton County, Sublette County, and Lincoln County, the Town of Jackson, and WYDOT District 3 area collected and evaluated for impacts to wildlife, migration corridors, wildlife crossings, and key habitat locations. This establishes the baseline against which the cumulative effect of incremental impacts from the No-Action and Build Alternatives are assessed.

Community Character: The study area for community character consists of a two mile buffer on either side of the roadway. A two mile buffer is based upon the constraints of property ownership and topography and captures the lands most likely to experience change as a result of the project.

4.25.2 Time Period

The time frame used for the analysis of cumulative effects includes historical actions from 1965 based on the construction of existing U.S. Highway 26/89/189/191 between 1964 and 1969 and the opening of the Jackson Hole Mountain Resort in 1965. It extends into the future to the year 2026 based on traffic growth and projections for the area.

4.25.3 Resource Data

Evaluation of cumulative effects requires the analysis of readily available data for the resources of concern. Documents utilized in the analysis of cumulative effects include the following:

- *Teton County Housing Needs Assessment*, 2001
- *Jackson/Teton County Comprehensive Plan*, 2002 (currently being updated)
- *Teton County Land Development Regulations*, 2002
- *The Bridger-Teton National Forest Land and Resource Management Plan and Final EIS*, 1990 (as amended).
- *Final Environmental Impact Statement for the Snake River Resource Management Plan*, 2003.
- *Wyoming's Draft 2006 305(b) State Water Quality Assessment Report and 2008 303(d) List of Waters Requiring TMDLs*

Additional data sources include the Jackson Hole Historical Society and Museum, Snake River Corridor Project, Wyoming Department of Administration and Information—Economic Analysis Division, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, and U.S. Geological Survey.

4.25.4 Reasonably Foreseeable Projects Within the Study Area

Reasonably foreseeable actions are those that are likely to occur or are probable, rather than those that are speculative or merely possible. Funded transportation projects, funded capital improvements, or land development projects that are approved, likely to be approved, or are in planning stages are considered. Reasonably foreseeable projects were identified through the *Wyoming State Transportation Improvement Program* (2008), *Town of Jackson Capital Improvement Plan* (2004-2009), *Jackson Teton Comprehensive Plan* (2002), *Bridger-Teton National Forest – Schedule of Proposed Actions* (2006), Bureau of Land Management, 2006, Wyoming Game and Fish, 2006, and coordination with the Bridger-Teton National Forest, Town of Jackson, and Sublette, Lincoln, and Teton County Planning and Development Departments.

Current and "reasonably foreseeable" land and transportation projects that are expected to occur without any improvements to the Study Corridor include highway reconstruction and improvement projects, oil and gas development, fuels treatment activities, residential and commercial development, and various grazing or recreation projects. These projects are listed below.

- Hoback Junction, replacement of bridge over Snake River, intersection modifications, highway widening (FHWA/WYDOT)
- Highway Reconstruction and Improvements: Dell Creek and Pfisterer near Bondurant; Alpine to Hoback Junction (WYDOT/FHWA)
- Roadway widening, reconstruction, and bridge replacements (Town of Jackson, and Teton, Sublette and Lincoln Counties)
- Three Creeks/Cottonwood Park, 36 units of affordable housing in Jackson (Town of Jackson/Teton County)
- Snow King Resort residential/commercial expansion (Town of Jackson/Teton County)
- Teton Village Master Plan expansion, construction of residential units and convention center (Town of Jackson/Teton County)
- Old West Cabins, residential development on approximately 9 acres on WY 89 (Town of Jackson/Teton County)
- Snake River Associates golf course development on 180 acres south of Teton Village (Town of Jackson/Teton County)
- Pine Glen Subdivision, 42 acres of residential on North Fall Creek Road (Town of Jackson/Teton County)
- Bar BC Ranch, 1,350 acres of residential on WY 22 (Town of Jackson/Teton County)
- Deadman's Ranch, 200 acre single-family residential subdivision (Lincoln County)
- Alpine Meadows, 80 acre residential/commercial development west of Alpine Junction (Lincoln County)
- Alpine Junction, LLC, 40 acre mixed-use development along Snake River (Lincoln County)
- Ross Plateau subdivision and access road; property zoned for up to 25 homes.
- Snow King East Communications Towers (BTNF)

- Hoback Ranches Fuels Reduction, thinning and burning of 975 acres in Teton County (BTNF)
- Monument Ridge Fuel Treatment Project, Hoback Guard Station to Clarke Butte Area (BTNF)
- Cottonwood II Integrated Projects, vegetation management and prescribed burning (BTNF)
- Wyoming Range Allotment Complex, sheep grazing (BTNF)
- Poison Creek Open Space Land Purchase, projected conservation of wildlife habitat (BTNF)
- Snake River Campground Projects, redesign and reconstruction (BTNF/WYDOT)
- J-Y Visitor Center, 5 miles south of Moose on Moose-Wilson Road (GTNP)
- South Park River Access/Site/Plan (BLM)
- Questar Year-Round Drilling Project, oil and gas development in northern Pinedale anticline area (BLM)
- Jonah Infill Drilling Project, oil and gas development in northern Pinedale Anticline area (BLM)
- Horse Creek Feedground Connector Road, construction of 500 feet of low service road on the Horse Creek Plateau (WGFD)
- Three proposed exploratory gas wells in the Upper Hoback area near Bondurant and the Hoback Ranches subdivision (Private)
- Snake River Sporting Club, 554-acre residential and golf course development along the Snake River south of Hoback Junction to include 130 homesites; development is 50 percent built-out.

4.25.5 Environmental Consequences

Water Resources and Water Quality

Prior to 1965, the majority of streams and lakes within the Greys-Hoback and southernmost portion of the Snake Headwaters watersheds were in pristine condition. Studies conducted in the 1970s on the Bridger-Teton National Forest indicated that forest development activities had had little effect upon the quality of surface water. Over the past forty years, water resources within the cumulative study area have been affected by agricultural activities, streamflow regulation (e.g., dams), rangeland grazing, land and road development, recreation, industrial and municipal wastewater treatment, fire suppression activities, mining, natural geologic processes, and resort development. Some of the more notable events that have occurred in the cumulative study area include the following:

Construction of the Jackson Lake Dam: The Jackson Lake Dam, originally constructed in 1910-1911 is approximately 30 miles north of Jackson within the Snake Headwaters watershed. Releases from the Jackson Lake Dam are largely determined by downstream agricultural water needs in the Snake River Valley of Idaho. The main effect of managing Jackson Lake Dam for downstream irrigation has been an altered flow pattern in the Snake River. This is especially apparent in the northern portion of the river corridor, where the river's water originates in Jackson Lake. Altered flows have impacted natural vegetation communities, wildlife, and aquatic species.

Construction of the Jackson Hole Federal Levee System: In 1950, Congress authorized the construction of the Jackson Hole Federal Levee System along the Snake River, beginning 4 miles below Moose and ending about 4 miles below Wilson Bridge. At that time, there were only a few short, unconnected levees along the Snake River. Between 1955 and 1964, about 13 miles of continuous levees were constructed by the U.S. Army Corps of Engineers. Since then, several non-federal levees have been added to the flood control system to address other problem flooding areas.

The major effect of the levee system has been the alteration of landforms between the levees, as well as changes in historic floodplain access and function. According to the Bureau of Land Management, prior to 1955 approximately ¼ of the land that is currently within the levee system consisted of wooded islands. By 2003, many of these islands had been completely removed and others were actively eroding. The leveed portion of the river is also steeper, which has resulted in the erosion of the stream channel. In 1994, the Snake River Restoration Project was formed to address these issues. The project is a collaborative effort between numerous federal, state, local, and private groups and individuals aimed at improving the environment of the Snake River within the bounds of the existing levee system.

Snake River Floodplain Gravel Extraction: Beginning in the 1950s, gravel was extracted from the Snake River floodplain of the Snake River about a mile south of the Flagg Ranch area between the Snake River and Highway 89/287 for construction purposes. Mining ceased in 1992, leaving 65 acres of steep-walled borrow pits and unvegetated mine waste. Restoration of wetland and riparian habitats consistent with adjacent floodplain communities was completed by the National Park Service in 2003.

Water resource/water quality issues specific to Jackson and Teton County include groundwater contamination caused by septic systems, land, road, and resort development in Jackson, upstream flood control, and sedimentation due to natural geologic processes (landslides). As a result of the activities and impacts discussed thus far, three waterways have been included on the 303d list for water quality impairments. They are a segment of Flat Creek that runs through the town of Jackson, the North Fork of Spread Creek in the eastern portion of the Snake Headwaters watershed, and the Upper Snake River, downstream of the study area in Idaho.

As discussed in Section 3.3, Social Conditions, Alpine, Bondurant, and Pinedale have experienced (and are expected to continue to experience) considerable population growth. Population forecasts and reasonably foreseeable development within the Snake Headwaters and Greys-Hoback watersheds indicate substantial growth with both watersheds. Residential development in Jackson, Alpine, Pinedale, and Bondurant and the expansion of Teton Village in Jackson would add considerable amounts of impervious surface to the watersheds. Prescribed fire and vegetation management would control most fires. Large intense fires would become more infrequent but could result in erosion and sedimentation where vegetative cover is lost.

Teton County and other local agencies have taken an aggressive approach toward improving and protecting water quality in the cumulative study area. Efforts that are helping to reduce cumulative impacts to water resources in the Greys-Hoback and Snake Headwaters watersheds include the following:

Bureau of Land Management and Bridger-Teton National Forest: The BLM and BTNF have addressed the impacts of agency activities to the local watershed and have identified mitigation for activities included in their management plans.

Town of Jackson/Teton County: Jackson/Teton County Land Development Regulations have been revised to reduce the amount of stormwater flowing directly into creeks from Town streets. One strategy has been to increase setback requirements for urban developments.

Teton County Conservation District: The Teton County Conservation District, along with the Town of Jackson, Teton County, and the Wyoming Department of Transportation, is in the process of developing a formal watershed plan that would be completed by the end of 2006. Additional efforts of the Teton County Conservation District include restoration, water quality monitoring, and habitat enhancement in the Flat Creek river system.

The incremental impacts of alternative highway improvements in the Study Corridor would result in minor physical changes to streams within the Greys-Hoback and Snake Headwaters watersheds. These impacts include sedimentation, loss of riparian habitat, channel modifications, chemical contamination, bridge and culvert reconstruction, encroachment due to highway widening, and an increase in impervious surface.

Wetlands

Impacts to wetlands in the watershed of concern likely began occurring in 1910 with the construction of the Jackson Lake Dam (see Section 4.25.5, Water Resources and Water Quality subsection). Further streamflow management projects, such as the Jackson Hole levee system, likely contributed to a major loss of wetlands along the Snake River riparian corridor. Other past actions that impacted the amount of wetlands in the watershed likely included land and road development, agriculture and grazing, and water development projects.

Since 1972, degradation of the nation's waters was recognized as a major problem, and Congress enacted what became the Clean Water Act. The Act established the basic structure for regulating discharge of pollutants into the nation's waters. Loss of wetlands on a national scale was recognized as a growing issue with major impact to the aquatic environment and further indirect impacts to other resources, such as wildlife and biological diversity, floodplains and riparian zones, water resources and water quality, flood water and pollution management, and habitat. Section 404 of the Clean Water Act gave the USACE regulatory control over the discharge of fill material in to the Waters of the U.S., including wetlands. The intent was to ensure that impacts to Waters of the U.S. and wetlands were avoided, minimized, or mitigated to slow further degradation of aquatic and wetland habitat. Because of this regulatory framework for wetland impacts, past and future projects under federal authority have, in theory, not contributed further to the decline in wetland habitat and, depending on the mitigation strategy or requirements, may have resulted in a net increase in wetland acreage in the watershed.

Direct loss of wetlands from the proposed alternatives are expected to be approximately 0.94 acres. This would be considered the incremental impact from the project in addition to the cumulative impacts. However, given the current policy of the USACE for mitigating wetland losses, the incremental impact would be offset with an effective mitigation plan that would occur within the same watershed. Over time, and provided the wetland mitigation plan is successfully implemented, the incremental impact from the proposed alternatives would be off-set and there would be an incremental gain in wetland acreage following completion of the project. This policy is also in effect for any foreseeable projects under federal authority, such as highway construction, public land development or land management, or streamflow management. In addition, other federal projects, such as the National Park Service wetland and riparian habitat restoration from previous gravel mining, have also contributed to a net increase in wetlands. Additional wetland losses in the watershed of concern would be primarily the result of on-going actions that are impacting wetlands (e.g., sedimentation from on-going and permitted activities) and may not be subject to mitigation requirements.

Wildlife (Including Threatened and Endangered Species)

General Wildlife Including USFS Management Indicator Species: Quantifying cumulative impacts from numerous past development and land management projects, as well as the reasonably foreseeable projects, is difficult at best. For most species, it is largely unknown what the current environmental baseline is in terms of population sizes, distribution, and habitat. It is likely that for some species in the Jackson and Hoback Valleys, cumulative impacts have been substantial, reducing a species' numbers and distribution. While many species of wildlife can and do habituate to human encroachment, most wildlife are likely sensitive to human-related disturbances. Loss of habitat from development further exacerbates impacts by forcing species into smaller areas or marginal habitat, particularly those species with minimal ability for dispersal or movement. Between 1960 and 2000, the Teton County human population has shown a 496 percent increase (see **Table 4-10**). This dramatic increase has undoubtedly had cumulative impacts on wildlife due to the associated development and infrastructure required to sustain such a growing human population.

While it is difficult to quantify impacts to general wildlife species, including USFS Ecological Indicator and Sensitive Species, it is believed that the proposed alternatives would result in habitat loss, disturbance/displacement, and mortality impacts. For some species, there is the potential that the alternatives would also create a barrier to movement. It is largely unknown whether or not the incremental increase in impacts from the project would create substantial cumulative impacts to wildlife in general. Measures to mitigate impacts from the alternatives would be implemented to minimize the long-term project related impacts. Also, many of the species of concern and for which cumulative impacts may be greater (e.g., USFS Sensitive Species), are not likely to be impacted by the alternatives, and therefore the project would not contribute to the cumulative impacts for those species.

Big Game: Historically, much of the Teton Valley was crucial winter range as big game moved from the high-elevation summer ranges to low-elevation areas for the winter. Private land development in the valley has resulted in direct loss of crucial winter range for a variety of species. Impacts to big game from development within the Jackson Valley have been substantial, as evidenced by the elk feedground program. The WGFD established feedgrounds to minimize damage to private property and reduce over-winter mortality of elk. The feedgrounds allow the WGFD to support a much larger number of elk than could be sustained on native ranges alone. There are four elk feedgrounds in the immediate project vicinity including the SPWMA, which borders the highway (see **Figure 3-21**).

Despite the substantial cumulative impacts to big game species by land development, land management, and human encroachment, it is believed that the elk herds in northwest Wyoming are maintained at artificially higher levels due to the feedgrounds. Most elk herd populations in the region are over-objective and the incremental increase in elk mortality from the larger road and other proposed projects is likely insignificant. Similarly, the loss of crucial winter range for elk due to cumulative impacts, while likely substantial, is difficult to quantify because elk are not encouraged to winter off of the feedgrounds. For example, over a recent five-year period, approximately 90 percent of the Fall Creek Elk herd (around the project area) wintered on the WGFD feed grounds and only ten percent wintered on native range. Because of the feedgrounds and the intolerance of private landowners to elk, the undeveloped crucial winter range around the project area does not receive substantial elk use.

Unlike elk, mule deer and moose are not fed by the WGFD and rely on native ranges to meet their winter habitat requirements. Both species utilize the Snake and Hoback Rivers for travel corridors and utilize winter habitats adjacent to the river corridors and highway. The ability for moose and mule deer to move back and forth across the highway to access a variety of habitats and adjust to environmental conditions as needed is likely a key component for them to best exploit their winter ranges. A wider highway, as well as other highway improvement projects, may make it more difficult for moose and mule deer to move around and may limit the winter habitats available to them. Because a specific amount of acres supports a specific number of animals, any reduction in the amount of winter range available to moose or mule deer may result in reduced numbers or population performance.

For both mule deer and elk the Sublette Herd unit (around the project) is very large ranging from the Green River basin to western Wyoming where the project is located. Sources of cumulative impacts to these herds range from land development and human encroachment in Teton County to oil and gas development near Pinedale. It is likely that, as with elk, there have been substantial cumulative impacts, particularly to winter range, that limit the overall size of these species populations. However, when looking at a five-year period, both the Sublette moose and mule deer herds have been at or exceeded WGFD population objectives (see Chapter 3.0). Despite the likelihood that these species are subject to substantial cumulative impacts, the populations appear to be stable.

The incremental impacts to big game species in the project area would include loss of habitat and increases in potential mortality due to a wider highway. Crucial winter range for moose, elk, and mule deer occurs in the project corridor and would be impacted by the build alternatives. Loss of crucial winter range is considered a critical impact because of the limited availability. Winter ranges are generally considered the limiting factor for moose, elk, and mule deer. However, the presence of elk feedgrounds complicates this assumption with elk.

Threatened and Endangered Species: No listed species are likely to be impacted by the project.

Bald and Golden Eagle Protection Act: Bald eagle was removed from the list of threatened species in August 2007. It is no longer protected under the Endangered Species Act (ESA) but is protected under the Bald and Golden Eagle Protection Act (BGEPA). There are four known bald eagle nests adjacent to or near the project that may be impacted through disturbance related impacts and loss of habitat. No nests would be taken by the project, but approximately 43.3 acres of suitable habitat in the form of riparian and spruce fir forest along the Snake River corridor would be lost.

Bald eagle was listed as an endangered species inn the lower 48 states in 1978, except in Michigan, Minnesota, Wisconsin, Washington, and Oregon, where it was listed as threatened. The decline of bald eagles was attributed to loss of habitat and impacts from pesticides, which affected bald eagle reproduction. However, efforts to prevent further impacts and promote recovery have been largely successful. In 1995, bald eagle was reclassified from “endangered” to "threatened” throughout its range and in 1999, the USFWS proposed de-listing bald eagle. The bald eagle was delisted in August 2007. The bald eagle population in North America continues to grow. Bald eagle has been doubling its breeding population every six to seven years in the lower 48 states since it was listed in the late 1970s.

Bald eagle numbers in Wyoming have been increasing steadily over the past few decades. Since the late 1970s, the number of pairs attempting to nest and monitored by the WGFD has increased from approximately 16-20 to 90-95 pairs (WGFD, 2002). There are believed to be substantially more breeding pairs than this because monitoring becomes more difficult as the population increases. In the 1970s and 1980s, bald eagles were primarily found in the northwest portion of Wyoming; however, today they are found throughout the state along all major river drainages due to the increasing population.

It is likely that bald eagles in Teton, Sublette, and Lincoln Counties have experienced a wide variety of past impacts and will be subject to continued impacts from reasonably foreseeable transportation and land development projects. Future projects under federal authority must maintain compliance with the BGEPA, and would be subject to implementing conservation measures to avoid, minimize, and mitigate any potential adverse impacts to bald eagles.

Cumulatively, projects under federal authority may have less long-term impact on bald eagles than other private, state, or local projects, which may not undergo such rigorous BGEPA compliance measures. Other private, state, or local development or land management activities would therefore be the largest source of cumulative impacts on bald eagles.

In Wyoming, the primary concern for occupied bald eagle habitat is disturbance related effects to nesting or winter areas. For example, in Teton County where there is a high concentration of bald eagle nests, private development actions may disturb nesting pairs. Other land management actions, such as grazing, may indirectly affect bald eagles by reducing suitability or displacing big game from winter range, which can be important food sources for eagles in the winter. Private development in riparian areas or actions that degrade water quality may also indirectly affect bald eagles. In most cases, potential cumulative effects are considered independent of the highway project and other federal actions, which presumably result in no net adverse impact to bald eagle. Also, while cumulative effects may be occurring on bald eagles, they are well on their way to recovery as a species (USFWS 1999b), which may indicate that overall cumulative effects are not significant. Bald eagle habitat throughout the northwest portion of the state appears to be stable and remains highly suitable despite the numerous past and current projects, as evidenced by the increasing bald eagle population. The bald eagle population in Wyoming is expected to continue to increase following completion of the highway project and the reasonably foreseeable projects contributing to cumulative impacts.

Migratory Birds: The Migratory Bird Treaty Act (MBTA) is a federal statute under the jurisdiction of the USFWS with the original intent to curtail international trade in birds and bird parts. The MBTA was originally passed in 1918 to stop the "indiscriminate slaughter" of migratory birds by market hunters targeting birds for the millinery and commercial food trade. The MBTA specifies that no one may take, possess, import, export, transport, sell, purchase, or barter, any migratory bird, or parts including nests and eggs unless authorized by permit. The MBTA provides protection to 861 species based on the most recent revised list.

The USFWS Office of Migratory Bird Management published a list of *Migratory Nongame Birds of Management Concern* in 1995. While the MBTA protects all migratory birds, the birds of concern list was intended to identify species, subspecies, or populations of migratory birds that are likely to become candidates for listing under the ESA in the absence of conservation measures. The overall purpose of the list was to identify those species of migratory nongame birds that are considered to be of concern in the United States because of population declines, small or restricted populations, and/or dependence on restricted or vulnerable habitats. The list has not been updated since 1995; however, the USFWS has since published *The Birds of Conservation Concern* list in 2002. With similar intent, the *Birds of Conservation Concern* list was formed to identify species that may be in need of conservation measures to prevent or remove the need for future ESA listings. The *Birds of Conservation Concern* list considers all bird taxa including species not protected under the MBTA.

Of the Migratory Birds of Conservation Concern that potentially occur in the project area, trumpeter swan, northern goshawk, and Brewer's sparrow are the most likely to occur in the area based on the habitat, abundance, and distribution of these species in Wyoming. The other Migratory Birds of Conservation Concern are not expected to occur commonly or in large number in the project area and potential impacts from the project on these species will be minor and temporary. The bald eagle, which is protected under the MBTA, is discussed previously in this section under "Bald and Golden Eagle Protection Act."

In general, highway projects are not expected to have large impacts on migratory birds. While vehicle-bird collisions can be common, this direct impact on migratory birds is difficult to quantify. Typically, habitat loss impacts are not considered substantial enough to cause population declines of migratory birds. In addition, the habitat loss from the project is confined to areas adjacent to the existing highway that are not considered prime nesting or stopover habitat for migratory birds. The most likely impacts to migratory birds would be from construction during the breeding or migration seasons causing disturbance or displacement related impacts on migratory birds nesting or migrating near construction areas, and grubbing and clearing during the nesting season causing direct loss of nests and nesting birds.

Future projects under federal authority must maintain compliance with the MBTA, and would be subject to implementing conservation measures to avoid, minimize, and mitigate any potential adverse impacts to migratory birds.

Cumulatively, projects under federal authority may have less long-term impact on migratory birds than other private, state, or local projects, which may not undergo such rigorous MBTA compliance measures. Other private, state, or local development or land management activities would therefore be the largest source of cumulative impacts on migratory birds.

Community Character

Community character is the image of a community or area as defined by such factors as its built environment, natural features and open space elements, type of housing, architectural style, infrastructure, and the type and quality of public facilities and services.

The 2002 Jackson/Teton County Comprehensive Plan describes community character as being "the most fundamental and pervasive growth and development issue facing Teton County" and states that a consideration of community character requires:

> *"Recognizing the value of areas which have little or no built environment, such as scenic vistas, or critical habitat which supports wildlife. It must also recognize the social and economic diversity of the local population and the*

types of social interaction which take place in active small town community life as equally important components of character."

The study area is primarily rural in character. According to the 2002 *Jackson/Teton County Comprehensive Plan*, rural areas are places dominated by landscape, including expansive open space, natural areas, wildlife habitat, ranchlands, panoramic mountain vistas, and agricultural lands. Structures are typically subordinate to the surrounding landscape in a rural area.

Historically, ranchlands have provided the powerful statement for the image and character of the County. The main structures in rural areas were ranch houses, farm houses, barns, out buildings, and fences. Since ranches were generally 1,000 acres or more and farms were 200 to 400 acres in size, the structures were surrounded by open land. The only resort influence was in the form of scattered dude ranches, and there was no suburban encroachment.

The establishment of Yellowstone and Grand Teton National Parks in 1872 and 1929, respectively, began to transform the ranching economy of the Jackson Hole Area to a tourism-based economy. The growth and development of the Jackson Hole and Grand Targhee ski areas over the past 25 years has increased tourism in the area and has made Teton County a year-round destination resort. Increasing visitation has led to rapid growth in both permanent and seasonal population. As **Table 4-10** shows, Teton County has experienced high rates of growth over the last 40 years (a 496 percent increase between 1960 and 2000). The greatest growth in Teton County occurred throughout the 1970s, which coincides with the opening of area ski resorts in the mid-1960s. It is important to note that these figures may be low due to the presence of seasonal residents that do not typically get counted during the decennial Census.

Table 4-10
Population Growth in Teton County, 1960 to 2000

Year	Population	Numerical Increase	Percentage Increase
1960	3,062	NA	NA
1970	4,823	1,761	57.5
1980	9,355	4,532	94.0
1990	11,172	1,817	19.4
2000	18,251	7,079	63.4

Source: U.S. Census Bureau; Jackson/Teton County Comprehensive Plan, 2002.

Rapid growth has resulted in suburban and urban development. Because conventional zoning districts and standards do not address the manner in which a particular land use relates to its surroundings and to community social values, this development has at times been insensitive to community character.

Another challenge to community character in Teton County arises from the lack of affordable housing within already established communities. In the mid-1980s, a significant second home and tourist market emerged for vacationers and other persons with substantially higher incomes than local workers, most of whom only spend a portion of the year in the County. The housing demand for persons with substantially higher incomes contributed to a dramatic increase in land and construction costs, and a rise in the price of all housing in the community. It is this rise in housing prices that has made private housing unaffordable to many working residents of the County, and has forced some residents to move elsewhere. When residents move out of the community, the social, economic, and political fabric is fragmented and the general sense of community declines. Also, many of these former residents continue to work in the Jackson community and are forced to commute, which has contributed to local traffic problems.

Teton County has recognized the challenge of protecting its small town, rural feel and has taken the following steps toward the goal of preserving community character:

- **Adoption of a Land Development Regulatory System based upon the key elements and components of community character.** This includes standards and criteria for regulating land development that will maintain and enhance desired community character.
- **Protection of Natural and Scenic Resources.** This is accomplished through the establishment of Scenic and Natural Resource zoning overlays. These overlays restrict development in order to preserve and maintain the county's most frequently viewed scenic and wildlife resources that are important Teton County's character and the economy.
- **Support for the Jackson Hole Land Trust and Teton County Scenic Preserve Trust.** These organizations restrict development by permanently protecting open space and the scenic ranching and wildlife area values of Jackson Hole.
- **Adoption of design guidelines and architectural standards.** These standards are part of Teton County's 2002 Land Development Regulations and provide models for development that are consistent with community character objectives.

In addition to regulatory restrictions on development, population distribution within Teton County is naturally restricted to the southern Jackson Hole area by Grand Teton National Park to the north, Caribou Targhee National Forest to the west, and the Bridger-Teton National Forest to the east. Approximately 97 percent, or 3,826,407 acres, of Teton County land is owned and managed by public agencies, including national park and forest, Bureau of Land Management, and State of Wyoming. The remaining three percent, or 114,792 acres, are within private ownership. Conservation easements on approximately 18,000 acres of private land restrict development on even more private land. This abundance of public land, with associated recreational opportunities, creates great pressure on the limited supply of developable land.

Approximately 75 percent of the land within two miles of the roadway corridor is privately owned. The majority of land outside of this two-mile boundary is publicly owned and managed by Teton County, the Bureau of Land Management, Wyoming Game and Fish, Bridger-Teton National Forest, the State of Wyoming, or is preserved through land trusts. These lands protect the scenic vistas and wildlife habitat that are crucial to community character. Reasonably foreseeable development in the study area indicates some development within two miles of the Study Corridor, most of which is associated with the Melody Ranch Planned Unit Development. This development specifically addresses the issue of affordable housing by providing small single-family units. Each phase of Melody Ranch has been and will continue to be subject to design guidelines that protect community character through clustering and urban design.

Changes to community character began with the establishment of tourism as a major industry in Teton County. Since this time, Teton County has implemented numerous land regulation strategies for protecting and preserving community character. In the Study Corridor, under both the 5-Lane Rural Alternative and the Combination Alternative (Preferred Alternative), a 5-lane rural cross-section would connect to the existing 5-lane cross-section south of Jackson. Although widening the roadway from three to five lanes would increase the amount of pavement in the viewshed, the land that travelers would see from the roadway would remain unchanged and would consist primarily of scenic vistas, open space, ranchland, and scattered rural development. The additional roadway capacity associated with the proposed improvements would not facilitate development that is inconsistent with community character because any development that would occur on private land adjacent to the roadway would be subject to existing zoning and land development regulations that have been designed to protect the rural character of the area and prohibit inconsistent uses. Finally, development beyond the roadway would be restricted by the presence of publicly held lands that protect the values that define community character.

Greenhouse Gases and Climate Change

The issue of global climate change is an important national and global concern that is being addressed in several ways by the Federal government. The Transportation section is the second largest source of total greenhouse gas (GHG) in the U.S. and the largest source of carbon dioxide (CO_2) emissions – the predominant GHG. In 2004, the transportation sector was responsible for 31 percent of all U.S. CO_2 emissions. The principal anthropogenic (human-made) source of carbon emissions is the combustion of fossil fuels, which account for approximately 80 percent of anthropogenic emissions of carbon worldwide. Almost all (98 percent) of transportation-sector emissions result from the consumption of petroleum products such as motor gasoline, diesel fuel, jet fuel, and residual fuel.

Recognizing this concern, FHWA is working with other modal administrations through the Department of Transportation Center for Climate Change and Environmental Forecasting to develop strategies to reduce transportation's contribution to GHGs – particularly CO_2 emissions – and to assess the risks to transportation systems and services from climate changes.

There are also several programs underway in Wyoming to address GHG emissions. Wyoming is a founding member of the Climate Registry, a nationwide voluntary effort to quantify GHG emissions from all sources and lay the foundation for potential future carbon emissions trading and mitigation efforts. Wyoming has also formed a working group to evaluate the potential for underground carbon sequestration[4].

Because climate change is a global issue and the emissions changes due to project alternatives are very small compared to global totals, FHWA did not calculate the GHG emissions associated with the alternatives. Because GHGs are directly related to energy use, the changes in GHG would be similar to the changes in energy consumption presented in Section 4.24 of this EIS. The relationship of current and projected Wyoming highway CO_2 emissions to current global emissions is shown in **Table 4-11**. Even though Wyoming is experiencing rapid VMT growth rates of nearly 2.9 percent per year, overall CO_2 emissions from the Wyoming highway system are expected to grow only slightly between 2005 and 2035, because of the fuel economy and renewable fuels programs in the 2007 Energy Bill. The table also illustrates the size of the project corridor relative to the total Wyoming travel activity.

Table 4-11
Greenhouse Gas Emissions (All Alternatives)

Global CO_2 Emissions 2005, MMT*	Wyoming Highway CO_2 Emissions 2005, MMT	Projected 2035 Wyoming Highway CO_2 Emissions, MMT	Wyoming Highway Emissions, Percent of Global Total (2005)	Study Corridor VMT, Percent of Statewide VMT** (2005)
28,051	6.2	6.3	0.022%	0.18%

*Energy Information Administration (EIA), International Energy Outlook 2008 (MMT = million metric tons)
Statewide 2005 VMT was 9,058,000,000 miles per year. Study Corridor 2005 VMT was 16,446,900 miles per year.

4.25.6 Mitigation

The following measures could reduce the project's portion of the cumulative impacts to the resources of concern:

- Coordination with Teton County and the USFS landscape architect to determine appropriate design treatments to minimize visual impacts as they relate to community character. Specific mitigation for visual impacts is contained in Section 4.22.4.
- The final design will incorporate BMPs to mitigate unavoidable adverse effects to water resources and water quality. These BMPs are discussed in detail in Section 4.12.3, Water Resources Mitigation and Section, 4.13.3, Water Quality Mitigation.
- Wildlife movement will be accommodated with wildlife crossings provided at Game Creek, Flat Creek, South Park Bridge over the Snake River in the north and

[4] Underground carbon sequestration is the artificial process of removing carbon from the atmosphere by capturing and storing it underground by various means.

Snake River Bridge, Horse Creek, and area south of Horse Creek for underpass. WYDOT will also include other measures to reduce the risk of wildlife-vehicle collisions in the Study Corridor, such as maintaining a 30-foot clear zone, and use of signage to warn drivers during high wildlife use periods (see Section 4.18.5 for more information).

4.25.7 Summary

In summary, the incremental impacts associated with the alternative highway improvements, when added to past, present and reasonably foreseeable future projects, would not result in significant cumulative impacts. Mitigation measures would be implemented to reduce the project's contribution to cumulative impacts to the resources of concern.

4.26 Permits Required

The following permits would or may be required for construction of a build alternative and would be obtained prior to construction:

- **Section 401 Water Quality Certificate**, issued by the Wyoming DEQ. This permit would be required for impacts to waterways. A Section 401 Water Quality Certificate is required in conjunction with an Individual 404 Permit (dredge and fill permit) for any transportation construction project or maintenance activity where work occurs below ordinary high-water line or adjacent to wetlands.
- **Section 402 Permit**, issued by the Wyoming DEQ, is required for dewatering of construction areas, if necessary. The following activities would require the acquisition of a 402 Permit:

- Construction dewatering operations associated with activities such as utility excavation, bridge pier installation, foundation or trench digging, or other subsurface activities.
- If discharge is expected to occur from a point source discharge from mechanical wastewater treatment plants, vehicle washing, or industrial discharges.

- **Section 404 Permit,** issued by the Army Corps of Engineers (USACE), is required whenever construction projects or maintenance activities requiring filling occur below the ordinary high-water line in any body of water considered a water of the United States (navigable waters of the United States and adjacent wetlands; all tributaries to navigable waters and adjacent wetlands; interstate waters and their tributaries and adjacent wetlands).
- **Wyoming Pollutant Discharge Elimination System (WYPDES) Permit**, issued by the Wyoming Department of Environmental Quality, Water Quality Division. A WPDES Permit would be obtained prior to construction in accordance with Section 402 of the Clean Water Act. This stormwater discharge permit is required to assure the quality of stormwater runoff for surface disturbances of one or more acres associated with the construction of the project. A general permit has been established for this purpose. The process for receipt of coverage under the general

permit depends upon the scale of the construction activities. Land disturbance of at least 1 acre, but less than 5 acres falls under the provisions of the Small Construction General Permit; land disturbance of 5 acres or more falls under the provisions of the Large Construction General Permit. A Notice of Intent (NOI) to request coverage under the general stormwater permit must be submitted to the Wyoming Department of Environmental Quality, Water Quality Division for the Large Construction General Permit. The level of coverage necessary for this project (Small or Large Construction General Permit) would be determined upon completion of the roadway design.

- **Stormwater Construction Permit**, authorized by the Wyoming DEQ. This is a State of Wyoming General Permit (Permit WYR10-0000) for stormwater discharges associated with large construction projects in accordance with Section 402 of the Clean Water Act.
- **Floodplain Development Permit**, issued by Teton County. All development permitted within the floodplain shall comply with the Teton County Floodplain Management Resolution. A floodplain development permit is required for almost any development-related change to the floodplain, including, but not limited to, construction of new structures, modifications or improvements to existing structures, excavation, filling, paving, drilling, driving of piles, mining, dredging, land clearing, grading, or permanent storage of materials and/or equipment.
- **Conditional Letter of Map Revision**, issued by FEMA. If any changes would be made to the floodplain (area or elevation), a request is made to FEMA to issue a Conditional Letter of Map Revision. Once the project is completed, a request is made to FEMA to issue a Letter of Map Revision.
- **WYDOT Access Approval**. This approval is issued by the WYDOT for new or modified access connections to the highway.
- **Migratory Bird Take Permit**, issued by the USFWS, is required if a migratory bird nest is affected.
- **Nest Take Permit**, issued by the USFWS if active nests are to be removed or if the nest is a raptor nest, active or not.
- **Fugitive Dust Permit** would be required if more than 25 acres of land is impacted and/or project duration is longer than six months.
- **Construction Access Permits.** Construction Access Permits are required for temporary access needs outside the construction project limits.
- **Construction Permits from Local Jurisdictions.** Construction Permits from local jurisdictions may be required for the construction of WYDOT facilities.
- **Easements.** Easements would be required for construction, slope, and utilities.
- Erosion Control/Grading Permits.
- U.S. Forest Service Access or Right-of-Way Permit.

- **Other Local Permits,** such as building, utility or survey permits, may be required to support project construction requirements.

Chapter 5.0: Section 4(f) *De Minimis* Impact Documentation

5.1 Introduction

Section 4(f) was created when the U.S. Department of Transportation (USDOT) was formed in 1966. It was initially codified at Title 49 United States Code (U.S.C.) Section 1653(f) (Section 4(f) of the USDOT Act of 1966).

In 1983, Section 1653(f) was reworded and recodified at Title 49 U.S.C. Section 303. These two statutes have no real practical distinction and are still commonly referred to as "Section 4(f)."

Congress amended Section 4(f) in 2005 when it enacted the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (Public Law 109-59, enacted August 10, 2005) (SAFETEA-LU). Section 6009 of SAFETEA-LU added a new subsection to Section 4(f), which authorizes the FHWA to approve a project that results in a *de minimis* impact to a Section 4(f) resource without the evaluation of avoidance alternatives typically required in a Section 4(f) Evaluation.

Section 6009 amended Title 23 U.S.C. Section 138 to state:

> "The Secretary shall not approve any program or project (other than any project for a park road or parkway under Section 204 of this title) which requires the use of any publicly owned land from a public park, recreation area, or wildlife and waterfowl refuge or national, state, or local significance as determined by the federal, state, or local officials having jurisdiction thereof, or any land from an historic site of national, state, or local significance as so determined by such officials unless (1) there is no feasible and prudent alternative to the use of such land, and (2) such program includes all possible planning to minimize harm to such park, recreational area, wildlife and waterfowl refuge, or historic site resulting from such use. The requirements of this section shall be considered to be satisfied and an alternatives analysis not required if the Secretary determines that a transportation program or project will have a de minimis impact on the historic site, parks, recreation areas, and wildlife or waterfowl refuges. In making any determination, the Secretary shall consider to be a part of a transportation program or project any avoidance, minimization, mitigation, or enhancement measures that are required to be implemented as a condition of approval of the transportation program or project."

5.2 Von Gontard Trail

The Von Gontard multiuse trail is located immediately adjacent to and along the west side of U.S. Highway 26/89/189/ 191, and was completed in 1999. It connects to the Paul Merritt Trail, which extends from Jackson south to its terminus at the south leg of South Park Loop Road. The Von Gontard Trail begins at the south end of the Paul Merritt Trail and extends approximately 2.0 miles south, to its terminus opposite Game Creek Road (see **Figure 5-1**). Both trails consist of a ten-foot asphalt surface path.

The Von Gontard Trail is groomed for cross-country skiing and snowshoeing in the winter months, and contains a parallel equestrian trail. These trails are located within WYDOT right-of-way and, where they extend onto private property, on easements owned by Teton County. The Von Gontard easements cover an approximately 4.2-acre area outside of the road right-of-way. The county's Parks and Recreation Department maintains the trails. It is important to note that trails that occupy a transportation facility right-of-way, and are not limited to specific locations within the right-of-way, are not afforded Section 4(f) protection. Therefore, portions of the Von Gontard Trail within the highway right-of-way do not qualify for Section 4(f) protection. However, recreational trails located on publicly-owned easements, and the easements themselves, are protected under Section 4(f). Therefore, portions of the trail outside of the right-of-way and owned by Teton County would fall under Section 4(f) protection.

Recommendations cited in *Pathways in Jackson Hole: A Conceptual Plan*, 1992; *Hoback Junction EIS Bicycle/Pedestrian Plan*, Draft, 2003; and *Recreation Project Plan, South Park River Access*, September 2004 are shown in **Figure 5-1**. They include a separated pathway from the south end of the Von Gontard Trail at Game Creek Road (approximately MP 146.75) to Hoback Junction. This would be a separated pathway within the existing highway easement. The *Pathways in Jackson Hole: A Conceptual Plan* also shows a proposed pathway within the former highway right-of-way for Henry's Road, between Horse Creek and Game Creek

5.2.1 Impacts

Construction of the five-lane sections associated with both build alternatives would require widening of the existing highway footprint. Construction would temporarily impact the existing Paul Merritt and Von Gontard trails where they are located within the existing WYDOT right-of-way. Both trails would be relocated and opened to recreational use before the existing trails are impacted so that recreational activities are not interrupted and use of the trails would be protected.

No impacts would occur to trails located outside existing WYDOT right-of-way and within County-owned easements. However, in the area across from Little Horsethief Lane (see **Figure 5-2**), the proposed footprint would encroach on the County-owned easement for the Von Gontard Trail. In this area, the existing pathway extends outside of the easement such that the existing pathway would not be impacted, only the easement would be impacted. As stated above, the easement is afforded Section 4(f) protection. The build alternatives would require conversion of approximately 0.05 acre of the trail easement to transportation use.

The build alternatives would impact the existing trail in one other location—approximately 0.5 mile south of the location described above, or about 1,000 feet north of WYDOT's south yard. In this area, temporary impacts would occur to the existing trail but not to the pathway easement. [This is another area where the trail extends outside of its intended easement; however, since the easement would not be impacted, Section 4(f) would not apply]. WYDOT would reconstruct and reroute the trail to eliminate the conflict. If practicable, WYDOT would reroute the trail onto the easement.

Figure 5-1
Existing and Proposed Trails

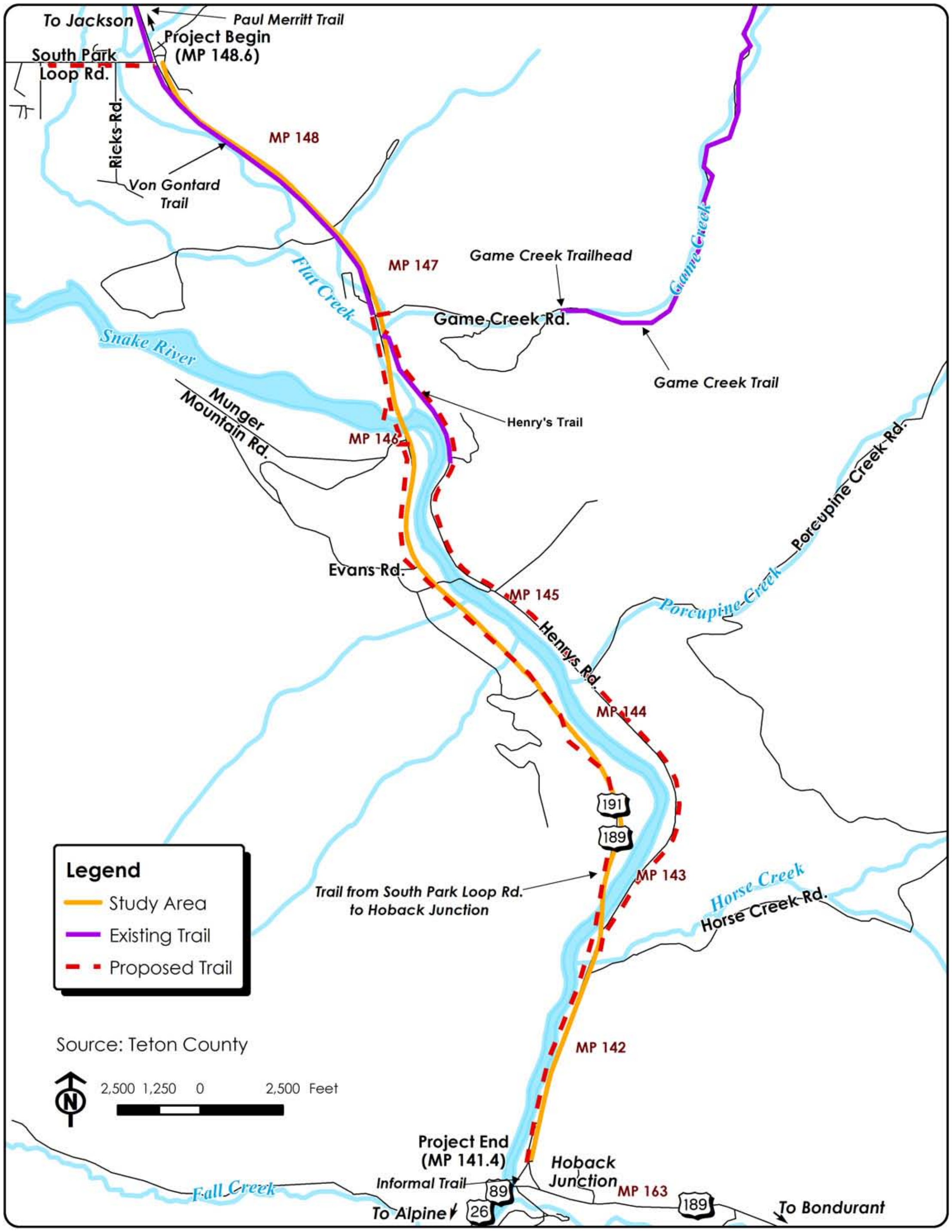
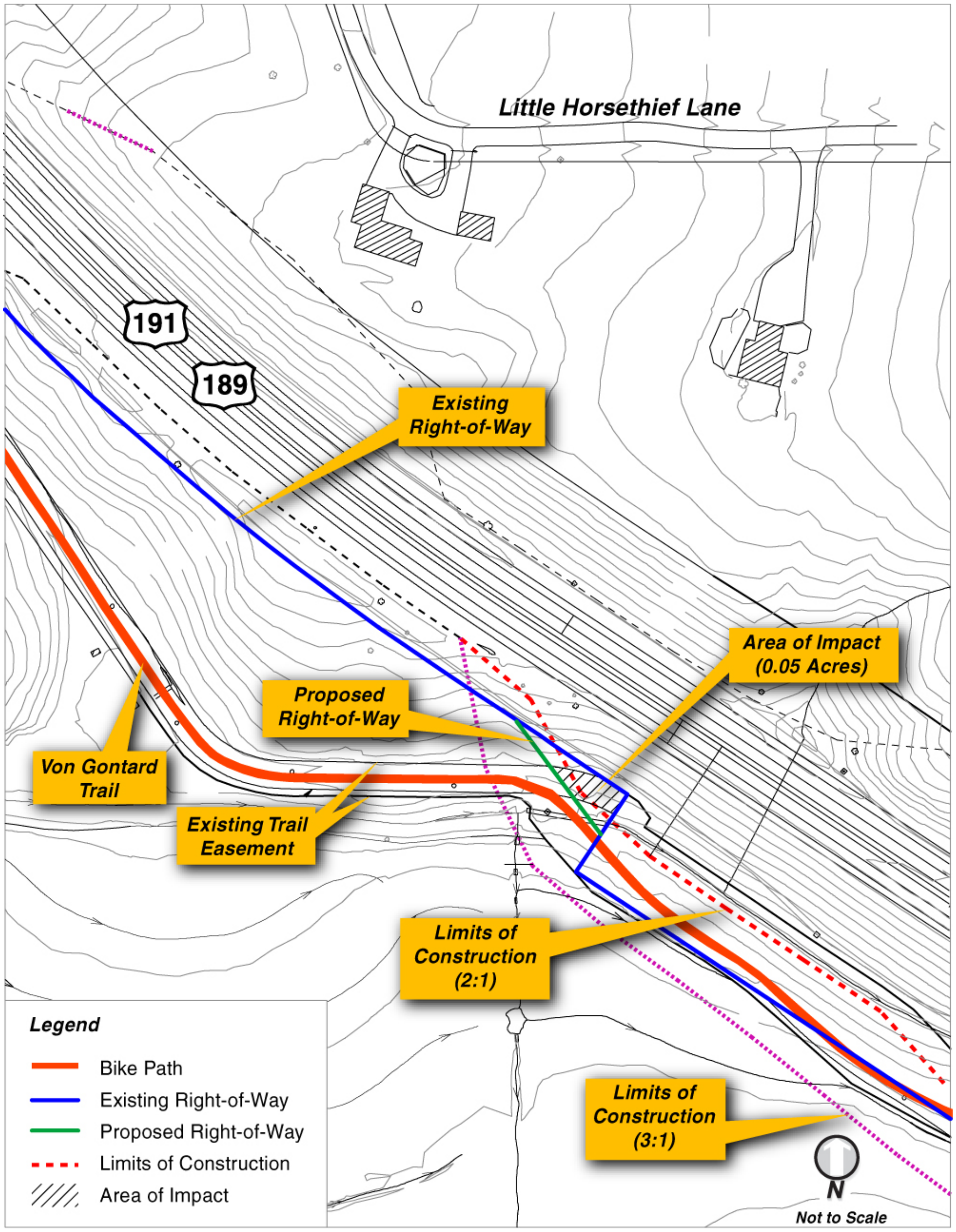


Figure 5-2
Proposed Highway Footprint



5.2.2 Measures to Minimize Harm

WYDOT conducted an analysis to attempt to avoid impacts to the trail easement near Little Horsethief Lane. The analysis indicated that avoiding the easement would require shifting the highway alignment roughly 33 feet to the east. Changes to accommodate this shift would affect approximately 3,750 feet of proposed highway. Backslope cuts and right-of-way impacts would increase on the east side of the highway. The residence immediately north/northwest of the impacted area and on the opposite side of the highway may be impacted by this alignment shift; preliminary construction limits run very close to the main dwelling (less than 25 feet away).

WYDOT then evaluated increasing the fill slope to avoid and minimize trail-easement impacts. The original design called for a 3:1 slope in this area, resulting in greater impacts to the existing trail and easement than those discussed above. However, to avoid the existing pathway and reduce easement impacts, WYDOT has proposed increasing the fill slope to a 2:1 slope and building guardrail to shield motorists. These measures allow for impacts to the Von Gontard Trail to be minimized.

5.2.3 Mitigation

To compensate for impacts to the easement, WYDOT proposes to purchase an easement where the existing bikepath extends outside of the easement for which it was intended and convey the easement to the County. This would enhance the trail facility by ensuring the county retains an easement for that portion of the trail where it currently does not.

5.2.4 Finding of *De Minimis*

As discussed in Section 5.1, Section 6009(a) (1) of SAFETEA-LU added a new subsection to Section 4(f) that authorizes the FHWA to approve a project that uses Section 4(f) lands that are part of a recreational resource, without preparation of an Avoidance Analysis, if it makes a finding that such uses would have *de minimis* impacts upon the Section 4(f) resource.

Based on the evaluation conducted for the Von Gontard Trail, FHWA determined that impacts to the trail easement would not adversely affect the activities, features, and attributes of the trail. The existing trail would not be affected long term. Construction would temporarily impact the existing Von Gontard Trail. It would be relocated and opened to recreational use before the existing trail is impacted so that recreational activities are not interrupted and use of the trail would be protected. The pavement surface of the proposed highway facility would be located at a higher elevation than the pathway, helping to reduce noise impacts from the facility.

Based on this finding, and taking into consideration the harm minimization and mitigation measures that have been proposed, and considering public input received during the DEIS comment period and public hearing, it is the conclusion of the FHWA that the Preferred Alternative would have *de minimis* impacts to the Von Gontard Trail and that an analysis of feasible and prudent avoidance alternatives under Section 4(f) is not required.

5.2.5 Coordination

On March 13, 2007 FHWA sent a letter to the Teton County/Jackson Parks and Recreation Department that requested concurrence on the *de minimis* finding for the Von Gontard Trail. A letter of concurrence was received from Jackson Hole Community Pathways on behalf of Teton County/Jackson Parks and Recreation on June 20, 2008 (see **Appendix A).**

Chapter 6.0: Comments and Coordination

6.1 Public and Agency Involvement Program

The Jackson South EIS process involved an extensive public and agency involvement program. The goal of the public involvement process for the EIS was to provide numerous opportunities for interested parties to participate in and contribute to the EIS process. The intent was to solicit information, ideas, and opinions from the public. This was accomplished by providing the public with opportunities for participation, contribution, and education within the EIS process.

Comments and input received as part of this outreach helped shape the alternatives and impact analysis used in this Jackson South EIS.

Please refer to the *Public Involvement Technical Report*, 2008 that documents the public notifications and public meetings discussed in this chapter.

6.2 Elements of Program

6.2.1 Notice of Intent

The Notice of Intent for the Hoback Junction EIS was published in the Federal Register on August 25, 2000. When the Federal Highway Administration (FHWA), and Wyoming Department of Transportation (WYDOT) decided to separate the study, another Notice of Intent for the Jackson South EIS was published in the Federal Register on September 17, 2007.

6.2.2 Mailing List Development

A mailing list of 490 individuals and groups was compiled. Persons were continually added to the mailing list as comments were received throughout the Hoback Junction and Jackson South EIS processes. The mailing list is used for the distribution of newsletters, dissemination of project information, and notification of open houses.

6.2.3 Public Open House Meetings

The purpose of the public open house meeting is to allow participants to have personal interaction with planners, engineers, FHWA, WYDOT, and other project team members. It allows all individuals interested in the project equal time to express their concerns and have questions answered. The open houses are designed to provide information to the general public and to obtain their input. Five public open house meetings were held for the Hoback Junction EIS:

- **September 27, 2000,** at the Teton County Library Jackson.
  - Public Scoping meeting.
  - Approximately 74 people attended.

  - This meeting was held to obtain input on project issues, provide a description of the NEPA process, describe transportation needs, and obtain public input. This meeting was held in an open house format with project staff available to answer questions and record comments. This meeting was held from 5:30 pm to 7:00 pm.
- **June 14, 2001**, at the Fire Hall at Hoback Junction.
  - Approximately 29 people attended.
  - The purpose of this meeting was to provide a description of the process, explain the latest developments regarding project Purpose and Need, and solicit public input and address concerns. Information was provided on crash locations, travel demands, traffic congestion, alternative transportation modes, existing deficiencies, and landslides. This meeting was held in an open house format from 5:00 pm to 7:00 pm, with a formal presentation made at 5:30 pm.
- **December 4, 2001**, at the Camp Creek Inn on U.S. Highway 189/191 in Teton County.
  - Approximately 37 people attended.
  - The purpose of this meeting was to provide a project update, present on-going data collection results, and solicit public input and address concerns. This meeting was held in an open house format from 5:30 pm to 7:00 pm, with a formal presentation made at 6:00 pm.
- **July 9, 2002**, at the WYDOT Office on U.S. Highway 26/89/189/191 in Teton County.
  - Approximately 50 people attended.
  - This meeting was held to present alternatives evaluated and those dismissed, present the next steps in the process, and solicit public input. This meeting was held in open house format from 5:00 pm to 7:00 pm.
- **November 3, 2004**, at the Jackson Hole High School Commons Area.
  - Approximately 46 people attended.
  - The purpose of this meeting was to present the evaluation of alternatives and receive public input on the highway section from Hoback Junction to South Park Road. This meeting was held in an open house format from 5:30 pm to 6:30 pm. A presentation was conducted by WYDOT from 6:30 pm to 7:00 pm followed by a question and answer period.

- **February 26, 2009**, at the Jackson Hole High School. This was the public hearing held for the Draft EIS. Please see Section 6.6 for more information.

6.2.4 Newsletters and Postcards

The project newsletter was developed and used as another form of providing project information to the public, as well as reaching an audience who might not have attended the public open houses. The following newsletters were sent to individuals on the project mailing list throughout the course of the project. Newsletters were also made available on the WYDOT Web site (http://dot.state.wy.us) under the link "Public Meeting Schedule."

- Newsletter dated September 2000. The purpose of this newsletter was to introduce the project, explain the public involvement process and EIS process, and announce the September 27, 2000, public scoping open house.
- Newsletter dated November 2000. The purpose of this newsletter was to summarize information and comments received at the September 27, 2000, public scoping meeting, explain the next steps for the project, and present the project Purpose and Need.
- Newsletter dated June 2001. This newsletter announced the June 14, 2001, public meeting and information to be presented, explain the project schedule, and provide a list of Interdisciplinary (ID) Team representatives (see Section 6.3.1).
- Postcard mailed November 2001. This postcard announced the December 4, 2001, public meeting.
- Newsletter dated June 2002. This newsletter announced the July 9, 2002, public meeting and information to be presented.
- Newsletter dated July 2002. The purpose of this newsletter was to present the steps in the EIS process and where the project was in that process, and provide results of the initial alternatives analysis, including alternatives dismissed and advanced and the preliminary evaluation matrix.
- Newsletter dated October 2004. This newsletter announced the November 3, 2004, open house.
- Newsletter dated August 2005. This newsletter presented the second level alternatives evaluation and screening results for the project.
- Newsletter mailed February 2009. This newsletter announced availability of the Draft EIS, beginning of the public comment period, and public hearing date and location. Please see Section 6.6 for more information.

6.2.5 Project Contacts

Project staff was available to answer questions from the public. They were responsive and available to the public via phone, fax, e-mail, and in person. The two main project personnel were:

Timothy Stark, PE
Environmental Services
Wyoming Department of Transportation
5300 Bishop Blvd
Cheyenne, WY 82009-3340
307-777-4379 (phone)
307-777-4193 (fax)
E-mail: timothy.stark@dot.state.wy.us

Jim Clarke, AICP
Jacobs Engineering Group, Inc.
707 17th Street, Suite 2300
Denver, CO 80202
303-820-5218 (phone)
303-820-2402 (fax)
E-mail: jim.clarke@jacobs.com

6.2.6 Public Information and Press Releases

Press releases were distributed for the public open houses held on September 27, 2000 and November 3, 2004.

6.2.7 Special Outreach to Environmental Justice Populations

Outreach to low-income and minority populations was based on U.S. Census Bureau data, field investigation, and coordination with local agencies. While it was expected that some of the residents and businesses in the study area would receive project information through traditional communications (newspapers, television, radio) and through project mailings, special outreach efforts were made to ensure an increased level of project awareness and participation in the project. Specialized outreach activities included the following:

- Newsletter announcing the July 9, 2002, public meeting was hand delivered to residents of the Evans Mobile Home Park, and the mobile homes north of the intersection of Henry's Road and the highway.
- Spanish language translation and interpretation was made available upon request for all project mailings and public meetings.
- Newsletters announcing the June 14, 2001, public meeting were sent to the following locations:
  - Teton County Library
  - Jackson Hole Chamber of Commerce
  - Jackson Hole Mountain Resort
  - START Public Bus Service
  - Department of Family Services
  - Good Samaritan Mission
  - Teton County Public Health Department
  - Our Lady of the Mountains Catholic Church
  - Brad Crouch (ID Team member), Point Store in Hoback Junction
  - Conservation Alliance
  - Carmena Oaks, Jackson Town Hall
  - The Learning Center

In addition, the following public meetings were held at locations along U.S. Highway 26/89/189/191 or Hoback Junction to provide a convenient meeting location for study area residents:

- June 14, 2001, Fire Hall at Hoback Junction
- December 4, 2001, Camp Creek Inn
- July 9, 2002, WYDOT offices south of Jackson at 1040 Evans

6.2.8 Letters and Comments

Written communication in the form of letters and comment sheets was received throughout the project. During the course of the project, and prior to the DEIS public comment period, many comments were received via letter, phone conversation, meeting, e-mail, or facsimile. Summaries of those comments and comments received at the public open houses are contained in the *Public Involvement Technical Report*, February 2008.

6.3 Public Input Obtained

General public comments received throughout the course of the project included:

- Preserve wildlife and scenic quality—brings visitors to area—economic impact.
- Consider wildlife crossings and animal/vehicle collisions.
- Minimize impacts to river.
- Noise concerns—traffic and truck air brakes.
- Don’t build a wide four- or five-lane highway.
- Improve safety—decrease traffic speed, separate pedestrians from traffic, reduce/avoid steep grades (icy in winter), widen highway.
- Want multiuse pathways (pedestrians, bicycles, ATVs, snowmobiles).
- Concern about lengthy construction period—expensive and inconvenient.
- Concern highway improvement will decrease property values.
- Concern about landscaping—aesthetics, who will pay for it, water conservation, visibility.
- Concern about impact to business and customer access.
- Preserve and improve recreation access.
- Concern about relocations.
- Concern about vegetation impacts and spread of noxious weeds. Preserve large trees near highway.

Comments received from non-profit organizations included the following: (A summary of comment letters received by non-profit organizations can be found in the *Public Involvement Technical Report*, February 2008.)

- Include non-motorized transportation options in the project – bicycle and pedestrian facilities.
- Include mass transit in project.
- Use current wildlife data.
- Minimize wildlife impacts.
- Provide effective wildlife crossings
- Does widening a road make it safer?
- A three-lane highway would have fewer impacts to aesthetics, wetlands, and riparian areas than a five-lane highway.

6.3.1 Interdisciplinary Team

An Interdisciplinary (ID) Team was established to provide input to FHWA and WYDOT regarding decision making throughout the NEPA processes (see also Section 2.2 of this EIS). The ID team included representatives of the U.S. Forest Service, Teton County, Lincoln County, Sublette County, Wyoming Game and Fish Department, the Jackson Hole Conservation Alliance, WYDOT, FHWA, local businesses, and Jacobs Carter Burgess[5]. This team met at key points throughout the project to provide feedback on technical and environmental issues and participate in the screening of alternatives. ID Team members possessed technical expertise in the areas of engineering, environment, business concerns, wildlife, transportation, and recreation. Together they provided a wealth of knowledge to assist in preparing this EIS.

The following ID Team meetings were held:

- **January 10, 2001**. The purpose of this meeting was to introduce members of the ID Team, identify the role and responsibility of the ID Team, review the needs for the project, review information from the September 2000 public scoping meeting, and reach consensus on project Purpose and Need.
- **June 14, 2001**. The purpose of this meeting was to present history and data on the roadway, including safety, wildlife, traffic characteristics, highway system, property ownership, existing deficiencies, landslide areas, alternative transportation modes, and recreation access.
- **December 4, 2001**. The purpose of this meeting was to discuss the alternative screening process and identify a range of alternatives to be considered.
- **July 9, 2002.** This meeting focused on the section of highway from South Park Road to just north of Hoback Junction. Discussion centered on alternatives evaluation, definition of community character, and details of bike and pedestrian facilities.

[5] Carter & Burgess, Inc. was acquired by Jacobs Engineering in November 2007, but is referenced as Carter & Burgess in certain areas of this document for project tasks that occurred prior to November 2007, and in materials contained in the appendix that were prepared prior to November 2007.

- **October 30, 2002**. The purpose of this meeting was to discuss the five alignment options.
- **July 9, 2003.** The regulatory role of the U.S. Army Corps of Engineers and the U.S. Fish and Wildlife Service was presented, and information on wildlife, wetlands, and cultural resources was discussed.
- **October 9, 2003**. The purpose of the meeting was to identify any missing data and to raise awareness of issues for future process.
- **November 4, 2004**. The purpose of the meeting was to present information on the additional screening of alternatives.
- **June 29, 2005**. The purpose of the meeting was to discuss alternatives dismissed and carried forward.
- **May 11, 2006.** The purpose of the meeting was to present alternatives recommended to be dismissed and carried forward for evaluation in the EIS.
- **August 5, 2009.** The purpose of the meeting was to discuss wildlife crossing types and locations evaluated by WYDOT, select the preferred pathway option, and present results of WYDOT's evaluation of the Teton County Alternative. The Combination Alternative was identified as the Preferred Alternative.

6.4 Agency Input Obtained

6.4.1 Coordination with State and Federal Agencies

Meetings were held with several state and federal agencies throughout the Hoback Junction EIS process, including the Environmental Protection Agency, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, Bureau of Land Management, U.S. Forest Service, and Wyoming Game and Fish Department. The purpose of these meetings was to conduct scoping, collect data, and obtain technical direction and input.

Cooperating Agencies

The following agencies were invited to participate as a cooperating agency on this project in accordance with FHWA regulations 23 CFR 771.111(d):

- Bureau of Land Management
- Teton County
- U.S. Army Corps of Engineers
- U.S. Environmental Protection Agency
- U.S. Fish and Wildlife Service
- U.S. Forest Service

The U.S. Army Corps of Engineers, U.S. Forest Service, and the U.S. Fish and Wildlife Service accepted the invitation to serve as a cooperating agency on this project (see **Appendix A**).

6.4.2 Coordination with Local Agencies

The project team met with Teton County Commissioners and the Teton County Planning Department throughout the course of the project to discuss evaluation criteria, alternatives, and land use and zoning within the study area. The Chairman of the County Commissioners served on the ID Team (see Section. 6.3.1). **Appendix A** contains copies of pertinent correspondence with local agencies.

6.4.3 Tribal Coordination

The project team coordinated with the Shoshone-Bannock Tribal Council and the Eastern Shoshone Business Council regarding areas of traditional spiritual and religious significance that may occur near the project area (see **Appendix A**). Both tribes did not indicate that any such areas were located in the study corridor. A representative of the Eastern Shoshone Tribe participated in a field visit to the Game Creek site. They did not note concerns of a traditional spiritual or cultural nature regarding the site, but stressed the importance of minimizing impacts.

6.5 Distribution and Review of the DEIS

The issuance of a DEIS is the formal opportunity for the public, agencies, and other interested persons or groups to comment on the project and assessment findings. These comments were considered in identifying the Preferred Alternative addressed in this FEIS. The Record of Decision (ROD) is the formal decision on selecting the Preferred Alternative.

A Notice of Availability (NOA) of the DEIS, including the February 26, 2009 date for the Public Hearing and the January 23-March 9, 2009 dates for the 45-day comment period, were published in the *Federal Register* and the *Jackson Hole Daily* and *Casper Star-Tribune* newspapers. The NOA was also mailed to individuals on the project mailing list (notices are contained the *Public Involvement Technical Report*).

The DEIS was distributed for official review to the federal, state, and local agencies listed in Chapter 8.0 of the DEIS, to members of the public at their request, and to the ID Team members. WYDOT made the DEIS available for download on their Web site (http://dot.state.wy.us). The DEIS also was available for public review during the public comment period at the locations listed in **Table 6-1**:

Table 6-1
DEIS Review Locations

• WYDOT District Office 3200 Elk Street Rock Springs, Wyoming	• Teton County Library 125 Virginian Lane Jackson, Wyoming
• Jackson City Hall 150 East Pearl Jackson, Wyoming	• Teton County Engineering Office 320 South King Street Jackson, Wyoming
• WYDOT Headquarters 5300 Bishop Boulevard Cheyenne, Wyoming	• WYDOT Jackson Office 1040 Evans Road Jackson, Wyoming
• Federal Highway Administration 2617 East Lincoln Way Cheyenne, Wyoming	• Hoback Market 10880 South US Highway 89 Jackson, Wyoming 83001

6.6 Public Comments and Hearing on the DEIS

A public hearing was held on February 26, 2009 at the Jackson Hole High School, 1910 West High School Road, Jackson, Wyoming from 5:00 pm to 7:00 pm. Notices announcing the public hearing were mailed to addresses on the project mailing list and advertised in the *Jackson Hole Daily* and *Casper Star-Tribune* newspapers.

The public hearing provided an opportunity for the general public to provide written and verbal comments on the DEIS. The DEIS comment period ran from January 23, 1009 to March 9, 2009.

Fifty-three members of the public and local agency representatives signed in at the public hearing. One hundred comment letters and emails and a petition with 156 signatures were received during the 45-day DEIS comment period. The following agencies and local organizations provided comments on the DEIS:

- Department of the Interior, Office of Environmental Policy and Compliance
- US Environmental Protection Agency
- US Department of Agriculture, Forest Service, Bridger-Teton National Forest
- Wyoming Game and Fish Department
- Teton County Board of Commissioners
- Jackson Hole Conservation Alliance
- Jackson Hole Wildlife Foundation

- Friends of Pathways
- Greater Yellowstone Coalition
- Save Historic Jackson Hole
- Snake River Fund

All comments received during the 45-day DEIS comment period, and responses to those comments, are presented in **Appendix D**. Common themes or concerns in the comments include:

Wildlife
- Wildlife is highly valued.
- Protect wildlife and make highway safer for wildlife.
- Concern that a wider highway will increase wildlife mortality.
- A wider highway would make it easier to avoid wildlife.
- It is easier to avoid wildlife on a narrower highway.
- Provide wildlife crossings/underpasses or overpasses/fencing.
- Against wildlife fencing.
- Concern about construction impacts on wildlife.

Safety
- Speed limits - reduce/enforce speed limits, improve signage.
- Concern about safe access/merging onto highway.
- Concern about number of wildlife-vehicle collisions.
- Provide safe access to South Park boat launch area.
- A wider highway is less safe.
- A wider highway is safer.
- Consider traveler safety first, then wildlife.
- There are other ways to make highway safer instead of widening.

Traffic/Transit
- Traffic projections in the DEIS are too high.
- Need to accommodate traffic.
- Want use of alternate transportation modes.
- Increase/improve transit schedule/use.
- Bus is not good option for everyone, especially in a rural setting.
- Build redundant roads to take pressure off highway.

Snake River
- Concern about impacts to the river (visual, noise, water quality).
- Protect Wild & Scenic River eligibility.

Pathway
- A pathway along the Study Corridor is desired.
- Locate path closer to the river for improved recreation/interpretive experience.
- Want pedestrian crossings at Game Creek and Horse Creek.

- Provide access to the South Park boat launch area.
- Pathway should not promote human access to crucial wildlife habitats.
- Provide wider pathway and shoulder for bicyclists.

Visual Conditions

- Concern about visual impact of a wider highway.
- Concern about impacts to scenic views/area's beauty.
- Visual impacts may lead to decline in tourism.

Noise

- Concern about increased noise.

Construction

- Concern about travel delays during construction.
- Concern that construction delays will impact outfitters/river users during peak summer season.
- Concern about lengthy construction schedule.

Community Character

- Concern that a five-lane highway would not be consistent with the rural/community character of the Study Corridor.

Highway Alternatives

- A five-lane highway is not warranted.
- Prefer the Combination Alternative.
- Should consider Teton County's alternative.
- Consider a new alternative with two travel lanes plus turn lanes.
- Wider road will result in increased maintenance costs in future.
- Consider interim solutions.
- A petition with 156 signatures voiced support for the Combination Alternative.

6.7 Final EIS and Record of Decision

FHWA and WYDOT considered all substantive comments received on the DEIS in identifying the Preferred Alternative. The Preferred Alternative identified for the Jackson South EIS is the Combination Alternative.

WYDOT will announce the availability of this FEIS for review through local newspapers, notice to the project mailing list, and WYDOT's Web site. This FEIS will be made available for public review at the locations listed in **Table 6-1** and on WYDOT's Web site. WYDOT will distribute the FEIS for review to the federal, state, and local agencies listed in Chapter 8.0 of this FEIS, to members of the public at their request, and to the ID Team. A 30-day period will be provided for review of this FEIS. A public information meeting will be scheduled during the 30-day comment period.

Following receipt of comments on this FEIS, FHWA will prepare a Record of Decision (ROD) for the EIS. In the ROD, FHWA will:

- Identify the selected alternative and the basis for its selection.
- Describe briefly each alternative considered.
- Summarize the basis for the *de minimis* finding.
- Describe the measures adopted to minimize environmental harm.
- Describe the monitoring program adopted for FEIS mitigation measures.
- Provide responses to substantive comments received on the Final EIS.

Chapter 7.0: List of Preparers

The consultant responsible for preparation of this EIS was Jacobs Carter Burgess in Denver, Colorado.

Subcontractors provided technical expertise on various portions of this EIS. These subcontractors include:

- West, Inc. (Cheyenne, Wyoming): assessed wetlands, vegetation and wildlife, threatened/endangered species, and rare species.
- Center for Collaborative Solutions (Bozeman, Montana): facilitated project meetings.

Table 7-1 lists the representatives of the agencies and firms responsible for preparation and review of this EIS, with their project responsibility, education, and experience.

Table 7-1
List of Preparers

Name, Title and Project Responsibility	Education, Registration	Experience
U.S. Department of Transportation, Federal Highway Administration		
Lee Potter, PE EIS Reviewer	BS, Civil Engineering MS, Civil Engineering Professional Engineer	20 years experience in development of transportation projects
Randy Strang, PE EIS Reviewer	BS, Mining Engineering Professional Engineer	7 years experience in NEPA
U.S. Army Corps of Engineers		
Chandler Peter Regulatory Project Manager	BS, Biology	22 years experience in wetland ecology/ regulation
U.S. Forest Service		
Darin Martens, LA, ASLA WYDOT Project Liaison and Landscape Architect, Project Coordination	BS, Landscape Architecture MA, Education / Collaboration / Facilitation Graduate Minor, Environment & Natural Resources Wyoming Licensed Landscape Architect, Professional American Society of Landscape Architects	18 years experience in landscape architecture
Wyoming Department of Transportation		
Timothy Stark, PE Environmental Services Engineer	BS, Civil Engineering Professional Engineer	11 years experience in NEPA and 14 years experience in transportation design
Jeff Weinstein Environmental Coordinator	BS, Range Management MS, Range Management	7 years experience in environmental analysis
Bill Bailey Hydraulic Engineer	MS, Engineering	31 years experience in hydraulic engineering, including hydrology, geomorphology
Ray Bromagen Transportation Tech I, Road Design	GED	24 years experience with WYDOT
Jeffrey Brown, PE Design Team Leader	BS, Civil Engineering Professional Engineer	20 years experience in road design and construction

Table 7-1
List of Preparers

Name, Title and Project Responsibility	Education, Registration	Experience
Matthew Carlson, PE State Highway Safety Engineer	BS, Civil Engineering	23 years experience in highway construction, materials and safety
John Eddins, PE District Engineer	BS, Civil Engineering Professional Engineer	25 years experience in construction and transportation
Mark Falk, PE, PG Project Geologist	BS, Geological Engineering Professional Engineer	21 years experience in geotechnical engineering
Julie Francis, PhD Archaeologist, Section 106 Compliance	BA, Anthropology MA, Anthropology PhD, Anthropology	31 years experience in archaeology
Gregg Fredrick, PE State Bridge Engineer	BS, Civil Engineering Professional Engineer	23 years experience in bridge design
Peter Hallsten, PE Construction survey data compilation and analysis	BS, Civil Engineering Professional Engineer	17 years experience in civil engineering
Chuck James Tech I, Road Design	2 years, University of Wyoming	36 years experience in highway design
Paul Jones, PE Principal Engineer, Traffic Flow and Geometrics	BS, Civil Engineering MS, Civil Engineering-Transportation Professional Engineer	20 years experience in traffic engineering
Anthony Laird, PE Project Development Engineer	BS, Civil Engineering	24 years experience in road design and construction
Jay Meyer Bicycle/Pedestrian Coordinator	BS, Business Administration MA, Economics Member, Association of Pedestrian and Bicycle Professionals	14 years experience in transportation planning
Leroy Wells, PE District Construction Engineer	BS, Civil Engineering Professional Engineer	29 years experience in highway engineering
Jacobs Carter Burgess		
Jim Clarke, AICP Project Manager	BA, History MURP, Urban and Regional Planning Certified Planner	21 years experience in environmental planning
Jeanette Lostracco, AICP Project Manager	BA, Geography MBA Certified Planner	31 years experience in environmental analysis
Diana Bell Visual	BS, Landscape Architecture	14 years experience in environmental planning
Craig Carter, PG Hazardous Waste	BS, Geology MS, Geology Professional Geologist	18 years experience in environmental investigations and remediation projects
Tracey MacDonald Environmental Justice	BA, International Business BS, Political Science Graduate Courses in Planning	14 years experience in the transportation and environmental planning fields
Misty Swan Cultural Resources, Bicycle/Pedestrian Facilities, FEIS document preparation	NEPA courses	22 years experience in NEPA document preparation
Andy Priest GIS Specialist	BA, Natural Resource Management	9 years experience in GIS and environmental planning
Shonna Sam, AICP Land Use and Zoning, Cumulative Effects	BA, Geography BA, Environmental Studies MA, Urban and Regional Planning	4 years experience in environmental planning

Table 7-1
List of Preparers

Name, Title and Project Responsibility	Education, Registration	Experience
	Certified Planner	
Jill Schlaefer Air Quality and Noise	BS, Geology MS, Geology	29 years experience in geologic and environmental planning
Jennifer Wolchansky Socioeconomic, Parks and Recreation, Wild and Scenic Rivers, Construction	BS, Environmental Science MA, Geography	5 years experience in NEPA
West, Inc.		
Dave Young Project Manager Wildlife Biologist/Threatened and Endangered Species Specialist	BA, Biology MS, Zoology	15 years experience in environmental analysis
Greg Johnson Senior Ecologist/Wetland Scientist Wetland Functional Assessment and Mitigation	BS, Wildlife Conservation and Management MS, Zoology and Physiology	20 years experience in field ecology
Elizabeth Lack Botanist/Wetland Scientist Wetland Delineations, Vegetation Surveys	BS, Forestry-Concentrated Biology MS, Botany	18 years experience in wildlife biology
Rhett Good Wildlife Biologist Wildlife, Vegetation, Wetland Delineations	BS, Biology MS, Zoology and Physiology	12 years experience in wildlife biology
Hall Sawyer Wildlife Biologist Wildlife, Big Game and Fisheries	BS, Wildlife Biology MS, Zoology	11 years experience in research biology
Center for Collaborative Solutions		
Carson Taylor Public Involvement Facilitation/Mediation	BA, Political Science	13 years experience in mediation and facilitation

Chapter 8.0: List of FEIS Recipients

Following is a list of agencies and/or individuals who received a copy of this document:

Local Agencies:

Lincoln County
Don Aullman
P. O. Box 296
483 N. Main
Thayne, WY 83127

Sublette County
Jim Roscoe
P. O. Box 1789
Wilson, WY 83014

Teton County
Andy Schwartz
Board of County Commissioners
P. O. Box 3594
200 S. Willow
Jackson, WY 83001

Teton County Engineering
Jeff Hermansky, P.E.
320 S. King Street
Jackson, WY 83001

Teton County Engineering
Gordon Gray
320 South King Street
PO Box 3594
Jackson, WY 83001

Teton County Planning and Development
Paula Stevens, Senior Planner
Teton County Administration Building
200 S. Willow Street, Top Floor
P.O. Box 1727
Jackson, WY 83001

Town of Jackson
Mayor Mark Barron
P.O. 1687
Jackson, WY 83001

Town of Jackson Fire Department/EMS
Willy Watsabaugh, Chief
Administrative Offices
P.O. Box 901
40 East Pearl Avenue
Jackson, WY 83001

State Agencies:

State Historic Preservation Office
Mary Hopkins, Interim SHPO
2301 Central Avenue
Cheyenne, WY 82002

State Historic Preservation Office
Richard Currit, Senior Archaeologist
2301 Central Avenue
Cheyenne, WY 82002

Wyoming Department of Environmental Quality
122 West 25th Street
Herschler Building
Cheyenne, WY 82002

Wyoming Game and Fish Department
Gary Fralick
Star Valley Ranch
167 Mahogany Drive
Thayne, WY 83127

Wyoming Game and Fish Department
Rob Gipson, Fish Biologist
Jackson Regional Office
P.O. Box 67
420 North Cache
Jackson, WY 83001

State Agencies:

Wyoming Natural Resources Conservation Service
P.O. Box 33124
100 East B Street, 3rd Floor
Casper, WY 82602-5011

Wyoming State Library
Lesley Boughton, State Librarian
516 South Greeley Highway
Cheyenne, WY 82002

Federal Agencies:

Bridger-Teton National Forest
Darin Martens
Richard Clark
P.O. Box 1880
340 N. Cache
Jackson, WY 83001

Bridger-Teton National Forest
Dale Dieter
Jackson Ranger District
P.O. Box 1689
25 Rosencrans Lane
Jackson, WY 83001

Bridger-Teton National Forest
Theresa Moran
P.O. Box 1880
340 North Cache
Jackson, WY 83001

U.S. Army Corps of Engineers
Omaha District
Matthew Bilodeau, Program Director
Paige Wolken, Project Manager
Wyoming Regulatory Office
2232 Dell Range Boulevard, Suite 210
Cheyenne, WY 82009-4942

U.S. Environmental Protection Agency
Region 8
Dana Allen, Environmental Engineer
1595 Wynkoop Street
Denver, CO 80202-1129

Federal Agencies:

U.S. Environmental Protection Agency
EIS Filing Section
Ariel Rios Building
1200 Pennsylvania Avenue, N.W.
Washington, DC 20460

U.S. Department of Housing and Urban Development
Deborah Griswold, Acting Field Office Director
Casper Field Office
150 East B Street, Room 1010
P.O. Box 11010
Casper, WY 82602-5001

U.S. Department of the Interior
Office of Environmental Policy and Compliance
Willie R. Taylor, Director
Main Interior Building
MS 2342
1849 C Street, NW
Washington, DC 20240

U.S. Department of the Interior
National Park Service
Intermountain Region
Gary Weiner, National Rivers Program Manager
12795 West Alameda Parkway
P.O. Box 25287
Denver, Colorado 80225-0287

U.S. Department of the Interior
U.S. Fish and Wildlife Service
Brian T. Kelly, Field Supervisor
5353 Yellowstone Road
Suite 308
Cheyenne, WY 82009

Interested Parties:

Eastern Shoshone Business Council
Mr. Ivan Posey, Chairman
15 North Fork Road
PO Box 538
Ft. Washakie, Wyoming 82514

Friends of Pathways
Tim Young, Executive Director
Box 2062
355 South Millward
Jackson, Wyoming 83001

Greater Yellowstone Coalition
Lloyd Dorsey
PO Box 4857
Jackson, WY 83001

Jackson Hole Wildlife Foundation
Leon Chartrand, PhD., Executive Director
PO Box 8042
265 East Simpson Avenue
Jackson, WY 83002

Shoshone Bannock Tribal Council
Carolyn Smith, Cultural Resource Coordinator
PO Box 306
Pima Drive
Ft. Hall, Idaho 83203

Snake River Fund
Lexey Wauters
P.O. Box 11932
180 South Cache
Jackson, WY 83002

Snake River Park KOA, Inc.
Stan Chatham
9705 South Highway 89
Jackson, WY 83001

Interested Parties:

Thomas Gilcrease Foundation
Barta Busby, President
c/o Robert S. Busby, DDS
5282 Medical Drive #430
San Antonio, TX 78229

Interdisciplinary Team Members:

Business Representative
Michael L. Shidner
11055 South Highway 89
Jackson, WY 83001

Brad Crouch (alternate)
10850 South Highway 89
Jackson, WY 83001

Jackson Hole Conservation Alliance
Cynthia Harger, Interim Exec. Director
Box 2728
685 S. Cache
Jackson, WY 83001

Jackson Hole Conservation Alliance
Public Lands Director
PO Box 2728
685 S. Cache
Jackson, WY 83001

Wyoming Department of Transportation
Bob Bonds
Environmental Coordinator
Wyoming Department of Transportation
5300 Bishop Blvd.
Cheyenne, WY 82009

Wyoming Department of Transportation
Jeff Brown
Project Development
5300 Bishop Blvd.
Cheyenne, WY 82009

Interdisciplinary Team Members:

Pete Hallsten
Resident Engineer
Wyoming Department of Transportation
1040 Evans Road
Box 14700
Jackson, WY 83002

Leroy Wells
Wyoming Department of Transportation
District 3 Conservation Engineer
PO Box 1260
Rock Springs, WY 82902

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