



United States Department of Agriculture

Forest Service

Rocky Mountain Region

Shoshone National Forest Travel Management Plan

Preliminary Environmental Assessment



Forest Service

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Shoshone National Forest Public Motor Vehicle Use Preliminary Environmental Assessment Cody, Wyoming

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Abstract: The Forest Service is preparing a preliminary environmental assessment (PEA) to designate roads, trails, and areas on the National Forest System (NFS) lands administered by the Shoshone National Forest, in accordance with the Travel Management Rule (TMR; 36 Code of Federal Regulations [C.F.R.] pts. 212, 251, and 261). The routes and areas determined to be appropriate for public motor vehicle use would then be included in future motor vehicle use maps for the Shoshone National Forest. This project includes analysis of wheeled motor vehicle use and over-snow motor vehicle use, consistent with applicable law and agency guidance.

The Forest Service has included three alternatives in the Preliminary EA, including the no action alternative. The Preliminary EA will analyze and disclose to the public the environmental, social, and economic impacts of the roads, trails, and areas proposed for motorized use under the alternatives. In addition to the effects analysis, the PEA describes the project's background, outlines the purpose of and need for the project, describes the components of the alternatives under analysis, and summarizes consultation and coordination that has been completed throughout the life of the project. The alternatives are based on the results of internal analysis and public input received during the scoping process between 2015 and 2018. The action alternatives seek to achieve the goals of the Forest Plan and provide a safe, efficient, and environmentally sound transportation system for the public.

The Preliminary EA is available for review online. The project webpage at which information on this project can be accessed (including past activities associated with the Preliminary EA) is: <https://www.fs.usda.gov/detail/shoshone/home/?cid=stelprd3846526>. That webpage has links to this NEPA document, appendices, PDF maps, and KML files for use with Google Earth and other similar platforms. If you would like to request a hard copy or CD of the Preliminary EA or have any questions, please contact Mark Foster, Environmental Coordinator, at the Shoshone National Forest Supervisor's Office, (307) 578-5137 or submit your request by email to SM.FS.shonfcomment@usda.gov ("Attention: Shoshone NF Travel Management Planning Project"). Media requests for more information should be directed to the Shoshone National Forest Public Affairs Officer, Kristie Salzmann, by phone at (307) 578-5190.

Comments: Written comments concerning this project delivered electronically or by mail will be accepted for 30 calendar days following the publication of a legal notice in the Cody Enterprise,

the newspaper of record. Publication of this notice is expected to occur on July 28, 2020. The publication date in the newspaper of record is the exclusive means for calculating the comment period for this analysis. Those wishing to comment should not rely upon dates or timeframes provided by any other source. Only those who submit timely and specific written comments regarding this project will be eligible to file an objection. It is the responsibility of persons providing comments to submit them by the close of the comment period. Individuals and organizations wishing to be eligible to object to a draft decision on these actions must meet the requirements of 36 C.F.R. § 218.5.

Written comments (please specify "Attention: Shoshone NF Travel Management Planning Project") may be submitted via any of the following methods:

- Email:

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Thank you for your interest in the management of National Forest System Lands.

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Acronym & Abbreviations	Full Phrase
ATV	all-terrain vehicle
BLM	Bureau of Land Management
BMP	best management practice
C.F.R.	Code of Federal Regulations
CAA	Clean Air Act
CDNST	Continental Divide National Scenic Trail
CWA	Clean Water Act
DN	decision notice
EA	environmental assessment
EIS	environmental impact statement
EO	executive order
ESA	Endangered Species Act
FLPMA	Federal Land Policy and Management Act
Forest Service	United States Department of Agriculture, Forest Service
FPMA	Forest Plan Management Area
FRA	Forest Reserve Act
FSH	Forest Service Handbook
FSM	Forest Service Manual
GIS	geographic information system
H	high benefit travel analysis process benefit
H/H	high benefit/high risk
H/L	high benefit/low risk
HUC	hydrologic unit code
INFRA	Forest Service infrastructure database
K	K factor inherent susceptibility of soil to erosion
L/H	low benefit/high risk
L/L	low benefit/low risk
LEO	uniformed law enforcement officer
LMP	Shoshone National Forest Land Management Plan 2015 Revision
M	medium benefit travel analysis process benefit
MIS	management indicator species
ML	maintenance level
mph	miles per hour
MRS	Minimum Road System
MVUM	motor vehicle use map
NAAQS	National Ambient Air Quality Standards

Acronym & Abbreviations**Full Phrase**

NEPA	National Environmental Policy Act
NFMA	National Forest Management Act
NFRTA	National Forest Road and Trail Act
NFS	National Forest System
NFSR	National Forest System road
NFST	National Forest System trail
NHPA	National Historic Preservation Act
NOI	Notice of Intent
NVUM	National Visitor Use Monitoring Program
OHV	off-highway vehicle
ORV	off-road vehicle
OSV	over-snow vehicles
RD	Ranger District
RFSS	Region Forester's Sensitive Species
ROS	recreation opportunity spectrum
ROW	right-of-way
RPA	Forest and Rangeland Renewable Resources Planning Act
SH	State Highway
Shoshone NF	Shoshone National Forest
SNF	Shoshone National Forest
SUP	Special Use Permit
TAP	travel analysis process
TAR	travel analysis report
The Forest	Shoshone National Forest
The Shoshone	Shoshone National Forest
TMR	Travel Management Rule
U.S.C.	United States Code
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UTV	utility terrain vehicle
WCF	watershed condition framework
WUI	wildland-urban interface
Wyoming Stat. Ann.	Wyoming Statutes Annotated

1 Chapter 1

1.1 Introduction

The Forest Service is proposing to designate roads, trails, and areas for public motorized use. These designations will result in changes to wheeled motorized vehicle and over-snow motorized vehicle (OSV) use on public routes (roads and trails) and areas within the Shoshone National Forest (the Shoshone, the Shoshone NF, or the Forest). Additional changes are proposed for closed (i.e., stored) roads and administrative roads on the Forest. Designations of routes and areas for wheeled motorized and over-snow vehicle use by the public and identification of the minimum road system comprise the two components of this project and are generally referred to as travel management throughout the document. Changes to wheeled motorized vehicle use under consideration include converting roads to motorized trails, expanding the route system to allow public motorized access, applying seasonal restrictions to motorized routes during critical periods, decommissioning unneeded routes, and incorporating needed administrative routes into the Forest Service road system, among other proposals.

The Shoshone National Forest Travel Management Plan Preliminary Environmental Assessment (Preliminary EA) was completed to analyze the physical, biological, social, and economic effects of the proposed changes to the designated system of roads, trails, and areas. The Forest Service has prepared this Preliminary Environmental Assessment in compliance with the National Environmental Policy Act (NEPA) and other relevant federal and state laws and regulations. The Forest Service intends to provide access to the Shoshone National Forest while protecting physical, biological, and cultural resources. This Preliminary EA discloses the direct, indirect, and cumulative effects that would result from the proposed action and alternatives with the purpose of informing any final travel management decisions.

This document is not a decision document. It is a document disclosing the environmental effects of implementing the proposed alternatives. This analysis is intended to assist the Responsible Official in making an informed decision on how best to implement the agency's Travel Management Rule. (36 C.F.R. pt. 212) That decision will be documented in a Decision Notice signed by the Forest Supervisor of the Shoshone National Forest.

With the release of this Preliminary EA, the Forest Service will provide a comment period during which members of the public may provide comments on the alternatives considered and the analysis. (36 C.F.R. §§ 212.52, 212.81(d); 36 C.F.R. pt. 218, subpt. B) After the close of the comment period and an opportunity to review this public input, the Forest Service will release a Final EA. The Final EA will address issues raised with respect to the analysis of this Preliminary EA and will be made available for public review for a period of 30 days prior to issuing any Finding of No Significant Impact. (36 CFR pt. 212, subpts. A, B, and C)

1.2 Document Structure

The Forest Service has prepared this Preliminary EA in compliance with NEPA and other relevant federal and state laws and regulations. This Preliminary EA discloses the direct, indirect, and cumulative environmental effects of the proposed action and alternatives. The document is organized into four parts:

- Chapter 1 – Purpose and Need: The chapter includes information on the Travel Management Planning Project project area, the history of the project, the purpose of and need for the project, and the Forest Service’s proposal for achieving that purpose and need. This section also details how the Forest Service has informed the public of the proposal and how the public has responded.
- Chapter 2 – Alternatives: This chapter provides a more detailed description of the alternatives considered under this project, as well as alternative methods for achieving the stated purpose. These alternatives were developed based on an interdisciplinary planning effort and issues raised by the public and other agencies during project scoping efforts. This discussion also includes possible mitigation measures.
- Chapter 3 – Affected Environment and Environmental Effects: This chapter describes the environmental effects of implementing the proposed action and other alternatives. This analysis is organized by resource area. Within each section, background information relevant to the resource is described first, followed by the effects of Alternative 1: No Action Alternative, which provides a baseline for evaluation and comparison of the other alternatives that follow.
- Chapter 4 – Consultation, Coordination, Literature Cited, and Glossary: This chapter provides a list of preparers, persons and agencies consulted during the development of the environmental assessment. This chapter also includes a catalogue of the literature cited relevant to each forest resource, and a glossary of terms used in the Preliminary EA.

The Forest Service has also prepared appendices to support the analysis and provide information to the public. These appendices are:

- Appendix A – Maps of proposed alternatives for wheeled vehicle and OSV use.
- Appendix B – A catalogue of proposals included in the alternatives and those proposals not carried forward for consideration. This appendix also compares Travel Analysis Process recommendations from the 2017 Travel Analysis Report with the National Forest System roads proposed under the alternatives.
- Appendix C – A review of minimization criteria screening applied to trails for wheeled vehicle use and trails and areas for OSV use. This appendix indicates the screening questions used to identify potential interactions of trails and areas with resources and the project design features available to mitigate these interactions.
- Appendix D – Supplemental materials particular to forest resources referenced in effects analysis sections.

1.2.1 Background

The Shoshone National Forest rests in the middle of the Rocky Mountains in northwest Wyoming, between the Great Plains and the continental divide. The Forest’s approximately 2.44 million acres span elevations from 4,600 feet to 13,804 feet across five counties: Fremont, Hot Springs, and Park counties, with smaller portions in Sublette and Teton counties. Five designated wilderness areas comprise roughly 1.37 million acres of the Forest, approximately 55% of the total area. The

backcountry recreation opportunities these and other similar areas provide include backpacking, hunting, fishing, horseback riding and packing, mountain climbing, and rock climbing.

The Forest also offers numerous opportunities for public motorized recreation. Popular driving corridors allow for sightseeing or for visitors to travel through the Shoshone on their way to other destinations. Within these corridors, visitors find opportunities for driving for pleasure, viewing scenery and wildlife, camping, picnicking, and hiking. And between the backcountry and travel corridors are transition areas where common opportunities include motorized access, off-highway vehicle riding, snowmobiling, mountain biking, hiking, dispersed recreation, hunting, fishing, horseback riding and packing, and other opportunities.

Currently, the Forest has approximately 1,130 miles of National Forest System (NFS) roads and 36 miles of NFS trails for wheeled vehicle use. Additionally, there are over 522,000 acres available for OSV use, including more than 200 miles of groomed and 85 miles of ungroomed over-snow trails. Many factors have influenced how this system developed over the years, including land ownership patterns, use of forest resources, legislation, recreation demands, and changes in public attitudes. The Forest Service intends to continue to provide different opportunities for recreation across the Forest consistent with these factors.

1.2.2 Travel Management Rules

The Forest Service launched the Shoshone National Forest's Travel Management Planning Project in 2015, after publishing the revision of the Forest Plan, the Shoshone National Forest Land Management Plan 2015 Revision (referred to in text as the Forest Plan; cited as Shoshone LMP). This Travel Management Planning Project complies with the 2005 Travel Management Rule and the 2015 Use by Over-Snow Vehicles Rule. (70 Fed. Reg. 68264 (Nov. 9, 2005); 80 Fed. Reg. 4500 (Jan. 28, 2015)) The Forest Service published those rules to "clarify policy related to motor vehicle use, including the use of off-highway vehicles . . . consistent with provisions of Executive Order 11644 and Executive Order 11989." (70 Fed. Reg. 68264, 68264; *see also* 80 Fed. Reg. 4500, 4500–01). These rules—and the corresponding suite of regulations—establish a framework for designating motor vehicle use on all National Forest System lands. This framework provides that motor vehicle use be designated by class of vehicle and time of year. (36 C.F.R. §§ 212.51(a), 212.81(a)) It also provides opportunities to incorporate sustainable motorized recreation, protection of the environment, increased public safety, and reasonable access into management of the National Forest System. The designation of routes and areas for motor vehicle use is required to comply with this national framework as well as direction specified in the Forest Plan.

The Travel Management Planning Project is proposing changes to both wheeled and over-snow motorized vehicle use. In this document, the term "wheeled" refers to wheeled motorized use that occurs on National Forest System roads and trails regardless of the season. The term vehicle, as used in this document, refers to a motorized vehicle, consistent with 36 C.F.R. § 212.1. This document will use "non-motorized" to indicate when impacts from or interactions with non-motorized vehicles are incorporated into the analysis. A "wheeled vehicle," therefore, refers to a wheeled motorized vehicle operating on a road or trail.

A National Forest System road (NFSR) is defined as "[a] motor vehicle route over 50 inches wide, unless identified and managed as a trail." (36 C.F.R. § 212.1) A National Forest System trail is defined as "[a] route 50 inches or less in width or a route over 50 inches wide that is identified

and managed as a trail.” (*Id.*) Different requirements based on State law apply to operators and vehicles depending on whether wheeled vehicle travel occurs over an NFSR versus an NFST. (FSM 7731.2 ¶ 1; 36 C.F.R. § 261.15) Generally speaking, NFSTs “present different challenges and require different skills from driving on roads,” with trails “characterized by narrower treads and clearing limits, slower speeds, narrower turning radii, and a more intimate experience with the surrounding landscape than roads designed for motor vehicles.” (FSH 2353.28j ¶ 1) Direction for wheeled motorized use comes from the 2005 Travel Management Rule, Forest Service regulations (36 C.F.R. pt. 212, subpt. B), and Forest Service guidance (Forest Service Manual 7700, Forest Service Handbook 7709.55). Available public motorized access routes for wheeled use will be designated at the conclusion of this project with the decisions incorporated into updated motor vehicle use maps (MVUMs). (36 C.F.R. § 212.56)

The term “over-snow vehicle” (OSV) is defined as “[a] motor vehicle that is designed for use over snow and that runs on a track or tracks and/or a ski or skis, while in use over snow.” (36 C.F.R. § 212.1) This definition includes over-snow motorized vehicles such as snowmobiles, snow bikes, tracked All-Terrain Vehicles (ATVs) or Utility Terrain Vehicles (UTVs), and other vehicles equipped with tracks and intended for over-snow use. Direction for OSV use comes from the 2015 Use by Over-Snow Vehicles Rule. (36 C.F.R. pt. 212, subpt. C)

Additionally, non-motorized recreation opportunities and uses will be considered in this analysis in terms of the effects that designating roads and trails for wheeled vehicle use and designating routes and areas for over-snow vehicle use have on non-motorized recreation opportunities.

After routes and areas are designated, motor vehicle use not in accordance with these designations is prohibited, including motor vehicle use off designated roads and trails and outside designated areas. (36 C.F.R. §§ 261.13, 14) Certain motor vehicle uses are exempt from these regulations. These uses include the following:

- limited administrative use by the Forest Service (36 C.F.R. §§ 261.13(d), 261.14(a));
- use of any fire, military, emergency, or law enforcement vehicle for emergency purposes (36 C.F.R. §§ 261.13(e), 261.14(b));
- authorized use of any combat or combat support vehicle for national defense purposes (36 C.F.R. §§ 261.13(f), 261.14(c));
- law enforcement response to violations of law, including pursuit (36 C.F.R. §§ 261.13(g), 261.14(d));
- vehicle use that is specifically authorized under a written authorization issued under Federal law or regulations (36 C.F.R. §§ 261.13(h), 261.14(e)); and
- use of a road or trail that is authorized by a legally documented right-of-way held by a state, county, or other local public road authority (36 C.F.R. §§ 261.13(i), 261.14(f)).¹

Designated routes and areas on the Forest will govern all public motor vehicle use, including both wheeled and over-snow use. As indicated above, once a Decision Notice is signed for the Travel Management Planning Project, the Forest Service will provide MVUMs that indicate public routes

¹ Additionally, the Motor Vehicle Use regulations (36 C.F.R. § 261.13) exempt aircraft, watercraft, and over-snow vehicles from the requirements applicable to motor vehicles (defined under 36 C.F.R. § 261.2).

for wheeled vehicle use (with applicable restrictions²) and OSVUMs that indicate public routes and areas for OSV use (similarly, with applicable restrictions) on the Shoshone National Forest. Any restriction of motor vehicle use off the designated system will go into effect once the Forest Service designates the system of roads, trails, and areas open to motor vehicle use on the Shoshone National Forest and has published these maps.

Until that time, current MVUMs will indicate roads and trails available for wheeled vehicle use. Because no OVSUM currently designates routes and areas for over-snow motor vehicle use, this use would occur consistent with current management: specific area closures and restrictions applied as appropriate, but no routes or areas designated for use.

1.3 Existing and Desired Condition

This section describes the existing and the desired condition for the wheeled vehicle use system and the over-snow vehicle use system. Data in this section reflecting wheeled and over-snow vehicle use, as well as data in Chapter 3, reflects data current as of March 2020. These data capture the current motorized vehicle system (i.e., wheeled and over-snow vehicle) and the proposed systems under the action alternatives. This section focuses on the existing conditions of the current motorized vehicle system, while recognizing management goals for this system.

1.3.1 Wheeled NFS Route System

1.3.1.1 Existing Condition

The MVUM incorporates the existing designated road and trail system. Over the years, the Forest Service has developed an extensive system of roads, trails, and areas for public motorized/mechanical recreation, which includes highway legal vehicles, off-highway vehicles (OHVs) such as all-terrain vehicles (ATVs) and utility terrain vehicles (UTVs), motorcycles, and over-snow vehicles including snowmobiles. The MVUMs for the Shoshone National Forest indicate the following categories of roads and trails, with corresponding definitions:

Roads Open to Highway Legal Vehicles Only: Roads open only to motor vehicles licensed or certified under State law for general operation on all public roads.

Roads Open to All Vehicles: Roads open to all motor vehicles, including smaller off highway vehicles that may not be licensed for highway use (not to oversize or overweight vehicles under State traffic law).

Trails Open to All Vehicles: Trails open to all motor vehicles, including both highway legal and nonhighway legal vehicles.

Trails Open to Vehicles 50" or Less in Width: Trails open only to motor vehicles less than 50 inches in width at the widest point on the vehicle

Trails Open to Motorcycles Only: Trails open only to motorcycles. Sidecars are not permitted.³

² Applicable restrictions may include vehicle size restrictions and/or seasonal restrictions.

³ Additional designations on current Shoshone National Forest MVUMs include: Special Vehicle Designations, Seasonal Designations, and Dispersed Camping.

The Forest Service Manual (FSM) directs Forest Service units to use these seven categories to identify classes of motor vehicles when conducting travel management and designating use via MVUMs. (FSM 7711.3 ¶ 6) These classes, and specifically the vehicle classes relevant to road use, present potential confusion when applied in Wyoming.

Wyoming law allows that off-road recreation vehicles may be operated on main-traveled roadways, including a public road right-of-way, street, road or highway. (Wyoming Stat. Ann. § 31-5-1601) This flexibility under Wyoming law potentially conflates the Forest Service vehicle road class definitions. Additional confusion may arise from the potentially overlapping definitions of “off-road recreation vehicle” under Wyoming law (Wyoming Stat. Ann. § 31-1-101), of “off-road vehicle” under Executive Order 11644 (37 Fed. Reg. 2877 (Feb, 8, 1972)), and of off-highway vehicle under Forest Service regulations and guidance (36 C.F.R. § 212.1; FSM 7705).

In this Travel Management Planning Project, the Forest Service has opted to use Maintenance Level to explain the alternatives considered in lieu of the vehicle class definitions currently set forth in the FSM and the MVUMs. These maintenance levels indicate road condition and corresponding appropriate vehicle use on the Shoshone National Forest. This metric more accurately depicts NFSRs of the Shoshone and indicates to the public changes to use proposed under the alternatives currently considered.

The Forest Service uses five maintenance levels (ML) to classify roads by level of service, ranging from ML 1 (roads that have been placed in storage and are currently closed to all vehicular use) to ML 5 (roads that provide a high degree of user comfort and convenience). Roads ML 3 through 5 generally reflect roads that a typical sedan could drive down, while ML 2 roads are more suited for high clearance vehicles. The Maintenance Level, Forest Service Description, Use Direction, and Corresponding Management on the Shoshone National Forest are set forth below (Table 1).

Table 1: Maintenance Level Description and Application on the Shoshone National Forest

Maintenance Level	Forest Service ML Description, FSH 7709.59 ¶ 62.32	Forest Service ML Management Direction, FSH 7709.59 ¶ 62.32	Shoshone NF Management Vehicle Usage Corresponding to ML
ML 1	These are roads that have been placed in storage between intermittent uses. The period of storage must exceed 1 year. Basic custodial maintenance is performed to prevent damage to adjacent resources and to perpetuate the road for future resource management needs. Emphasis is normally given to maintaining drainage facilities and runoff patterns. Planned road deterioration may occur at this level. Appropriate traffic management strategies are “prohibit” and “eliminate” all traffic. These roads are not shown on motor vehicle use maps.	Roads receiving level 1 maintenance may be of any type, class, or construction standard, and may be managed at any other maintenance level during the time they are open for traffic. However, while being maintained at level 1, they are closed to vehicular traffic but may be available and suitable for nonmotorized uses.	None – Roads considered stored and vehicle use prohibited
ML 2	Assigned to roads open for use by high clearance vehicles. Passenger car traffic, user comfort, and user convenience are not considerations. Warning signs and traffic control devices are not provided	Discourage or prohibit passenger cars, or accept or discourage high clearance vehicles.	High-Clearance Vehicles at Low Speed

	with the exception that some signing, such as W-18-1 "No Traffic Signs," may be posted at intersections. Motorists should have no expectations of being alerted to potential hazards while driving these roads. Traffic is normally minor, usually consisting of one or a combination of administrative, permitted, dispersed recreation, or other specialized uses.		
ML 3	Assigned to roads open and maintained for travel by a prudent driver in a standard passenger car. User comfort and convenience are not considered priorities. The Manual on Uniform Traffic Control Devices (MUTCD) is applicable. Warning signs and traffic control devices are provided to alert motorists of situations that may violate expectations.	Encourage or accept use by passenger cars, though discourage or prohibit strategies applied for certain classes of vehicles or users.	Standard Passenger Cars at Low Speed
ML 4	Assigned to roads that provide a moderate degree of user comfort and convenience at moderate travel speeds. Most roads are double lane and aggregate surfaced. However, some roads may be single lane. Some roads may be paved and/or dust abated. Manual on Uniform Traffic Control Devices is applicable.	Encourage use, though prohibit strategies applied for certain classes of vehicles or users.	Standard Passenger Cars at Moderate Speed with Moderate Degree of User Comfort
ML 5	Assigned to roads that provide a high degree of user comfort and convenience. These roads are normally double lane, paved facilities. Some may be aggregate surfaced and dust abated. Manual on Uniform Traffic Control Devices is applicable.	Encourage use.	Standard Passenger Cars at Moderate Speed with High Degree of User Comfort

As of March 2020, the Forest manages 1,130 miles of roads. Of this total, 878.41 miles are open to all public use, 70.51 miles are managed for administrative use (including permitted use), and 181.22 miles are classified as ML 1 (i.e., placed in storage and closed to all vehicular use). Maintenance level 2 and 3 NFSRs open to the public and available for wheeled vehicle use total approximately 871.68 miles (administrative ML 2 and 3 roads total 69.79 miles). The Shoshone has 6.74 miles managed as ML 4 or 5 roads (administrative ML 4 roads total 0.72 miles, and no administrative ML 5 roads are on the Forest). The majority of NFSRs were originally established to support logging or range operations.

Table 2 below describes the existing road system on the Shoshone. It should be noted that while roads not under Forest Service jurisdiction will be important for describing the social and environmental impacts of the district road system, they will not be considered for management actions in this analysis.

Table 2: Existing Road System Mileage by Maintenance Level

Maintenance Level	Open to All Mileage	% of Total	Open to Administrative Use Only	% of Total	Total
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ML 2	693.96	91%	67.12	9%	761.07
ML 3	182.1	99%	0.96	1%	183.06
ML 4	4.17	63%	2.40	37%	6.57
ML 5	2.47	100%	0.00	0%	2.47
Total	882.7	93%	70.48	7%	953.17
*An additional 181.15 ML 1 roads are in storage and currently closed to all motorized use.					

The Forest Service maintains a current system of National Forest System Trails (NFSTs) of 33.98 miles open to wheeled vehicles 50 inches wide or less (NFST, ≤50" wide) and 2.04 miles open for single-track use (NFST, Open⁴), for a total of 36.02 miles. The official system of roads and trails allows for a variety of recreational opportunities on the Forest and access to unique settings. Dispersed camping is also allowed off identified routes, with camps permitted within 300 feet of the centerline of motorized routes (consult the MVUM to determine routes where dispersed camping is allowed). The Shoshone National Forest separately prohibits cross-country wheeled vehicle travel, which includes a ban on off-road travel for game retrieval. (36 C.F.R. § 261.56) Wheeled vehicle use is also prohibited on any snowmobile trail (unless otherwise permitted). (Shoshone NF Order Number 10-005) This prohibition of wheeled vehicle use on snowmobile trails eliminates potential conflict between user groups.⁵

The miles of system roads have declined by about 10 percent since 1989. New construction, which averaged about four miles per year in the first decade following the 1986 Forest Plan, dropped to less than one mile per year in subsequent decades. New construction of roads, generally, results from the need for access to manage vegetation. Decommissioning, averaging about six miles per year between 1990 and 2010, occurred on both system roads and non-system routes. Activities in recent years have led an average rate of eight miles per year decommissioned.

The demand for motorized recreation results in the continued presence, and sometimes creation, of unauthorized routes on the ground. These unauthorized, or "user-created," routes have proliferated over the recent decades. These routes appear as often to access popular areas for dispersed recreation (camping, hunting, horseback riding, etc.). These routes are not kept in the Forest Service roads inventory and do not receive maintenance to ensure environmental impacts are minimized. The number of unauthorized routes continues to grow as more and more visitors use the area and drive vehicles off road.

1.3.1.2 Desired Condition

The 2005 rule directs the Forest Service to provide for a system of NFSRs, NFSTs, and areas on NFS lands that are designated for motor vehicle use and by class and time of year (if appropriate)

⁴ These NFSTs are designated as open to all vehicles and open to single-track use. For purposes of the analysis included herein, these NFSTs are identified as NFST, Open.

⁵ Wheeled motorized access via NFSRs and NFSTs may coincide in areas where over-snow vehicle use occurs—distinct from OSV trails. Wheeled vehicles travel NFSRs and NFSTs often with trailers carrying OSVs to access areas with sufficient snow depth for OSV use. Travel on these roads shifts with season and weather conditions. The Forest Service recognizes the opportunities for varied recreation that open NFSRs and NFSTs offer for the motorized community and is committed to retaining these opportunities consistent with resource protection.

(36 C.F.R. § 212.50). As part of this project, the Forest Service is considering identifying a minimum Forest road system necessary to provide safe and efficient travel for the administration, utilization, and protection of NFS lands considering long-term funding expectations while ensuring that the identified system minimizes adverse environmental impacts. (36 C.F.R. § 212.5(b)) This minimum road system would reflect analysis and recommendations developed through the previously conducted Travel Analysis Process and related reports. This analysis includes consideration of all system roads, including those currently open to public vehicle use and closed to public motor vehicle use, such as Maintenance Level 1 roads, administrative roads, or roads utilized under special-use permits.

Complementing the intent to establish the minimum road system for the Forest is the goal of designating a motorized route system open to the public that accommodates motorized access needs consistent with the Forest Plan and the 2005 Travel Management Rule. The Plan contains the following guidance relevant to the road system:

Relevant Goals for Roads and Trails

- National Forest System roads and trails needed for long-term objectives and to meet desired conditions are constructed and maintained in a manner that provides for user safety and minimizes impacts to natural resources. (RDTR-GOAL-01)
- Roads and trails not needed for long-term objectives are decommissioned, stabilized, and restored to a more natural state. (RDTR-GOAL-02)
- All System roads and trails open to wheeled motorized vehicles are shown on a motor vehicle use map that is available at no charge to the public. (RDTR-GOAL-03)
- A variety of wheeled motorized trail loops are provided for riders of different abilities. (RDTR-GOAL-04)
- The road and motorized trail systems are established using the travel management planning project. (RDTR-GOAL-08)
- Resource impacts from use of unauthorized motorized routes are eliminated, along with the unauthorized route. (RDTR-GOAL-09)

Relevant Objectives for Roads and Trails

- Maintenance occurs on at least 60 percent of maintenance levels 3, 4, and 5 miles and at least 5 percent of maintenance level 2 miles of System roads annually. (RDTR-OBJ-01)
- Maintenance occurs on at least 15 percent of System trail miles annually. (RDTR-OBJ-02)
- At least three new, wheeled motorized trail loop opportunities are available. (RDTR-OBJ-05)

Relevant Standards for Roads and Trails

- Maintain system roads at the minimum maintenance level that meets the management objectives for the area. (RDTR-STAND-01)

These goals, objectives, and standards reflect the intent of this Travel Management Planning Project to identify a financially sustainable road and trail system that provides safe and efficient travel for the administration, utilization, and protection of NFS lands with minimal adverse environmental impacts. Road management objectives and trail management objectives that document the intended purpose, standards, operation and maintenance criteria will be developed as a result of the final decision.

1.3.2 Over-Snow Vehicle Use System

1.3.2.1 Existing Condition

The Forest currently does not publish OSVUMs. The Forest recognizes approximately 289 miles of snowmobile trails (groomed/ungroomed), and approximately 522,970 acres available for OSV use. Over-snow motorized use occurs on the Forest consistent with the Forest Plan and subject to specific area and route closures (see Shoshone National Forest Special Orders for current closures, <https://www.fs.usda.gov/detailfull/shoshone/alerts-notice/?cid=stelprdb5175892&width=full>).

The Forest Plan indicates where this is use can occur (Shoshone LMP Table 22) and that:

- OSV use is permitted on roads and trails open to wheeled vehicles consistent with law and regulations;
- over-snow motorized vehicle use is permitted on designated groomed snowmobile trails;
- snowmobile use is permitted on designated ungroomed snowmobile trails; and
- snowmobile use is permitted within identified winter range exemption areas.

(Shoshone LMP 120) The Forest Plan also states that tracked ATVs/UTVs can operate on routes designated on the MVUMs or on groomed snowmobile trails (when snow is present). (Shoshone LMP 103) The Forest Plan identifies, therefore, three classes of vehicles: OSVs, snowmobiles, and tracked ATVs/UTVs. OSVs is a general term that covers both snowmobiles and tracked ATVs/UTVs under the Forest Plan.

The Forest Service is providing revised definitions and categories of OSVs that update the terms used in the Forest Plan for purposes of this Travel Management Planning Project. OSVs will continue to correspond to the regulatory definition: “[a] motor vehicle designed for use over snow and that runs on a track or tracks and/or a ski or skis, while in use over snow.” (36 C.F.R. § 212.1) This project includes two sub classes of OSVs. These classes are:

- Class 1: over-snow vehicles that exert a ground pressure of 1.5 pounds per square inch (psi) or less. Class 1 vehicles correspond to “snowmobile” as that term is used in the Forest Plan.
- Class 2: over-snow vehicles that exert a ground pressure of 1.5 pounds per square inch (psi) or greater. Class 2 vehicles correspond to “tracked ATVs” as that term is used in the Forest Plan.

The Forest Service determined that these classes provide more detailed and science-based explanations for the types of OSVs that recreate on the Forest while allowing for an accurate assessment of impacts. As indicated above Class 1 OSVs typically exert a ground pressure of 1.5

pounds per square inch (psi) or less. This class includes snowmobiles, tracked motorcycles, tracked all-terrain vehicles (ATVs), tracked utility terrain vehicles (UTVs), and snowcats. Class 2 OSVs typically exert a ground pressure of more than 1.5 psi. This class includes tracked four-wheel drive (4WD) sport utility vehicles (SUVs) and tracked 4WD trucks. The Forest does not have any documented conflicts between different classes of OSV use. Consistent with the Forest Plan, Class 1 OSVs would be allowed on all designated OSV trails and areas; Class 2 OSVs would only be allowed on designated groomed OSV trails (or where a NFSR or NFST was open year-round to wheeled vehicles). Areas and routes on National Forest System lands for OSV use will be identified on separate OSVUMs. (36 C.F.R. § 212.81) This Travel Management Planning Project will use the term OSV unless effects are traceable and relevant to one class of vehicles (in that instance, the OSV class will be identified and effects analyzed).

1.3.2.2 Desired Condition

Two primary factors necessitate establishing routes and areas for OSV use. First, this process would incorporate area closures identified in the Forest Plan (Shoshone LMP, SPLC-GUIDE-4). Areas of OSV use would be closed to protect habitat for big game species, including crucial winter range and parturition areas. The Forest would also identify exceptions to closures where over-snow use may occur, consistent with the Forest Plan. Second, the 2015 Use by Over-Snow Vehicles Rule directs the Forest Service to designate routes and areas of OSV use where snowfall is adequate. (36 C.F.R. § 212.81) Designating these routes and areas and publishing the OSVUM would bring the Forest into compliance with these guiding regulations and ensure use occurs in appropriately identified locations. The desired condition for the Forest is to designate a system of routes and areas suitable for OSV use consistent with the Forest Plan and the 2015 Use by Over-Snow Vehicles Rule.

1.4 Context and Need for the Travel Management Planning Project

This section explains the purpose and need for the Shoshone National Forest to implement the Travel Management Planning Project. The section further explains the scope, location, and decision framework used to arrive at a management decision with respect to motorized use on the Forest.

1.4.1 Project Purpose & Need

This Travel Management Planning Project is needed to bring the motorized recreation system into compliance with regulations for both wheeled vehicles use and for OSV use. This process is a framework to identify, develop, and implement a motorized use system consistent with Agency direction and with the Forest Plan.

The project is needed to address the following reasons with respect to wheeled vehicle use:

- **To achieve multi-use goals for a discrete population of recreationalists.** The Travel Management Planning Project intends to address the increasing demand for motorized routes for a growing recreational group on the Forest, including providing opportunities for motorized loop routes.

- **To ensure a fiscally sustainable motorized route system.** Budgets over the past decade have caused the Forest Service to evaluate how it can safely, efficiently, and sustainably manage a road and trail system on the Shoshone National Forest that meets the diverse needs of the public. Ensuring a safe and efficient travel system remains a central focus of this planning project, and any outcome will incorporate these considerations.
- **To reduce adverse impacts to resources.** Existing use of some system routes can raise resource issues. These resource issues can involve hydrologic resources, wildlife resources, and potential user conflict. This process intends to address these issues to arrive at a motorized route system that provides access and opportunity for use while minimizing adverse environmental impacts, consistent with 36 C.F.R. part 212.
- **To meet direction from the 2015 Revision to the Land Management Plan.** The Record of Decision from the 2015 Revision to the Land Management Plan directed the Forest Service to conduct a Travel Management analysis for the Shoshone National Forest. This process will fulfill this direction.

The process will also allow the Forest Service to publish OSVUMs that designate routes and areas for OSV use, and thereby provide clear direction to the public.

The intended purpose of this Planning Project is to

- identify a minimum road system needed for safe and efficient travel and for administration, utilization, and protection of NFS lands (36 C.F.R. § 212.5);
- provide a system of designated public roads and trails for wheeled vehicle use consistent with the Forest Plan, Executive Orders 11644 and 11989, and subpart B of the travel management regulations (36 C.F.R. § 212.51); and
- provide a system of designated public trails and areas for OSV use consistent with the Forest Plan, Executive Orders 11644 and 11989, and subpart C of the travel management regulations (36 C.F.R. § 212.81).

1.4.2 Project Scope

The Forest Supervisor (Responsible Official) of the Shoshone National Forest is charged with establishing the scope of the environmental analysis, including the scope of the actions and alternatives to be analyzed. (40 C.F.R. § 1508.25) The following sideboards set by the Forest Supervisor were used to evaluate proposals received and guide the analysis of the alternatives:

- **Consistency with Forest Plan:** Management direction for this project comes from the Shoshone National Forest Land Management Plan 2015 Revision, which sets the Forest-wide direction (goals, desired conditions, objectives, standards, and guidelines) for managing the resources of the Forest (Forest Plan). The Forest Plan embodies the provisions of the National Forest Management Act (NFMA), its implementing regulations, and other guiding documents. When appropriate, this Preliminary EA tiers to the 2015 Forest Plan Final Environmental Impact Statement and Record of Decision in compliance with 40 C.F.R. § 1502.20.

- **Forest Setting Objectives:** The Forest Service will seek to retain the character of the Shoshone National Forest as a backcountry forest, while maximizing access and recreation opportunities through a safe and efficient road and motorized trail system.

1.4.3 Proposed Project Location

The proposed project location is inclusive of the entire Shoshone National Forest where motorized use is permissible according to Management Area (MA) prescriptions in the Forest Plan (Shoshone LMP, pgs. 111-189). The project area excludes the following:⁶

- MA 1.1 Wilderness
- MA 1.1A Glacier Addition to the Fitzpatrick Wilderness
- MA 1.3 Back country recreation year-round non-motorized
- MA 1.6B Dunoir Special Management Unit
- MA 2.3 Proposed research natural areas
- MA 3.5D Back country recreation and forest restoration (year-round non-motorized).

The area upon which motorized use is allowed totals 522,970 acres, equating to roughly 21 percent of the total area of the Forest—with an approximate 75 percent of the Forest area characterized as backcountry. Motorized use is not, logically, the primary recreation characteristic of the Shoshone National Forest. Nonetheless, it is an important component of recreation on the Forest in the places where it is permitted.

The Forest Plan sets forth detailed descriptions of the type of motorized use authorized in each management area, consistent with the management goals, objectives, and standards for that area. These management areas (MA) include backcountry settings (MA 3.3A, MA 3.3B, MA 3.3C, MA 3.5A, MA 3.5B, MA 3.5C) unique natural landscapes (MA 1.5A, MA 1.6A, MA 2.2A, MA 3.1A, MA 3.1B, MA 3.1C), areas with cultural or historic significance (MA 3.6A, MA 3.6B, MA 4.5A) and various other recreation and administrative places (MA 4.2, MA 4.3, MA 5.2, MA 5.4, MA 8.1, MA 8.2, MA 8.6). For a full description and the management implications of these designations, please refer to the Shoshone Forest Plan.

⁶ The Forest Plan does authorize temporary roads in “back country recreation year-round non-motorized” and “back country recreation and forest restoration-year-round non-motorized” areas. The construction and use of temporary roads are outside the scope of this Planning Project, and will be addressed on a project-by-project basis.

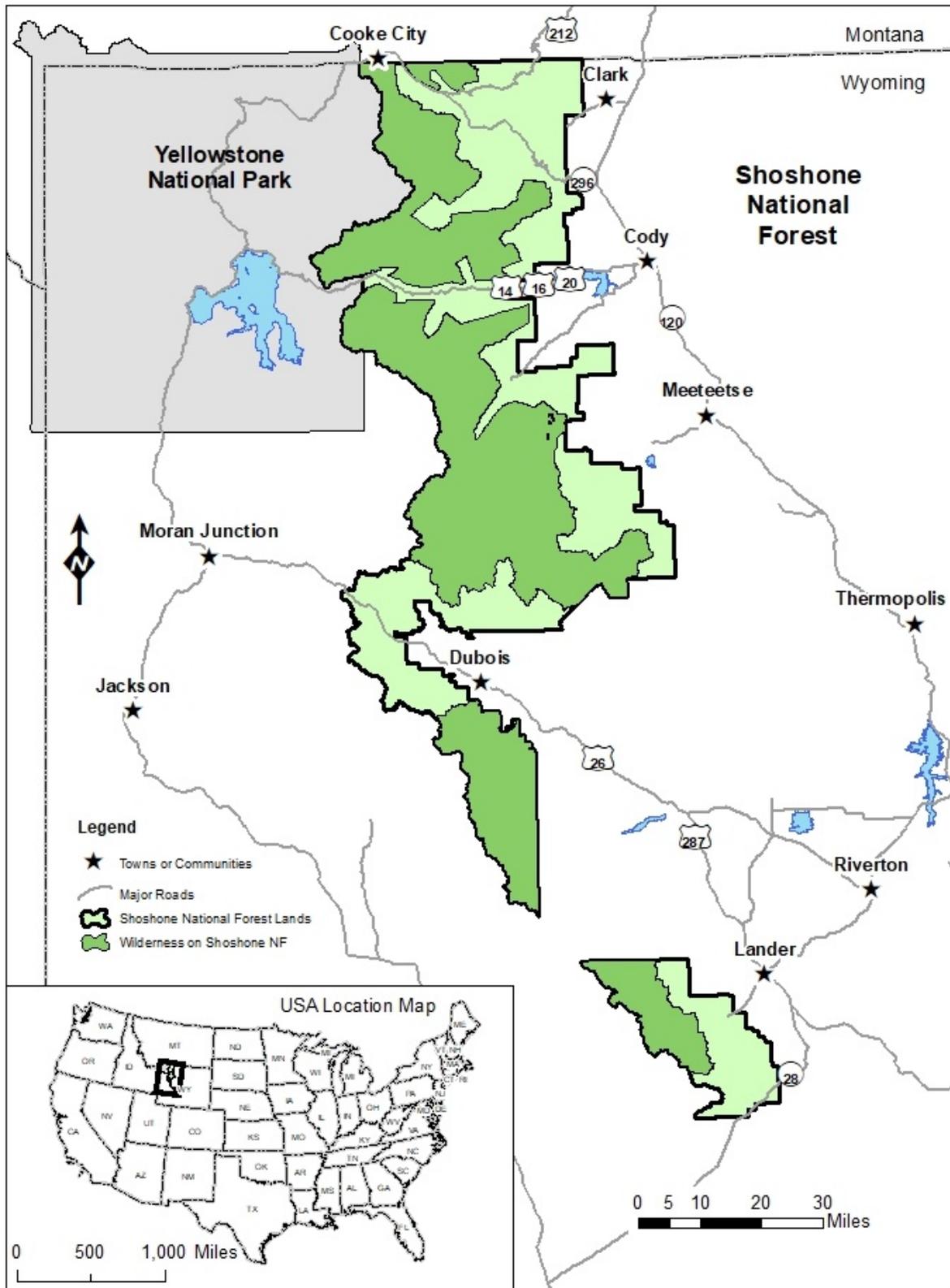


Figure 1: Vicinity map (Caption Figure style)

1.4.4 Decision Framework

Given the purpose and need, the responsible official reviews the proposed action, the other alternatives, and the environmental consequences in order to make the following decisions:

- Whether the proposal is consistent with the Forest Plan.
- Whether further analysis is needed through the preparation of an Environmental Impact Statement (EIS).
- Whether the alternatives or a combination of alternatives ensures that the Forest follows the requirements for multiple uses, outlined in the Multiple Use Sustained Yield Act of 1960.
- Whether the alternatives or a combination of alternatives best represents the trails designated as open to public wheeled motor vehicle use, taking into consideration the minimization criteria for motor vehicle use on trails and areas outlined in 36 C.F.R. § 212.55.
- Whether the alternatives or a combination of alternatives best represents the trails and areas designated as open to OSV use, taking into consideration the minimization criteria for motor vehicle use on trails and areas outlined in 36 C.F.R. § 212.81.
- Whether specific design criteria, project design features, or mitigation measures are necessary for wheeled routes or for OSV routes and areas.
- Whether and how any monitoring measures will be implemented under a selected alternative.

1.5 Public Involvement

The Forest Service conducted several years of outreach on this issue, engaging with the public, State agencies and partners, and incorporating substantive input. The process began following the issuance of the 2015 Revision to the Land Management Plan for the Forest, which included several goals for motorized travel. Forest Service personnel developed on-the-ground proposals from these broad goals with public input. Soon after, in 2016, the Forest Service released a proposed action and sought comments through public scoping. The Forest Service also issued a Notice of Intent to prepare an Environmental Impact Statement for this Travel Management Planning Project on May 27, 2016 (81 Fed. Reg. 33655, 33655 (May 27, 2016)). The Forest received hundreds of comments, held public meetings and conference calls, and organized field visits to gather external input. This public input provided the Forest Service with vital information that it used to revise the proposed action. That revised proposed action went out to the public in 2017 during a second scoping round.

The Forest Service refined its proposals based on the results of this outreach. These collaborative efforts highlight an informative, data-driven, and publicly engaged decision-making process that the Forest Service has continued through this process. This process also provided an opportunity to identify issues of concern to the public and effects potentially overlooked in the analysis of the alternatives. These issues are discussed in greater detail below.

The Shoshone National Forest Travel Management Plan is a project or activity implementing a land management plan, not authorized under the Healthy Forests Restoration Act, that is subject to pre-decisional administrative review under 36 C.F.R. part 218, subparts A and B.

1.6 Issues

Issues serve to highlight effects or unintended consequences that may occur from the proposed action and alternatives. Incorporating these issues into the analysis of impacts strengthens the understanding of the effects associated with any given alternative and the trade-offs between them, informing both the decision-maker and the public (FSH 1909.15, 12.4). An issue is not an activity in itself; instead, it is the projected effects of the activity that create the issue.

Issues were identified through the scoping process and through internal review by resource specialists. The Forest Service identified the following issues in scoping that drove the development of alternatives and analysis.

1.6.1 Necessity of an Environmental Impact Statement versus an Environmental Assessment

As stated above, the Forest Service issued a notice of intent to prepare an Environmental Impact Statement assessing the effects to forest resources of the Travel Management Planning Project and alternatives contained therein. The two scoping periods of 2016 and 2017 provided extensive public input, with comments received from a broad spectrum of stakeholders. The Forest Service reviewed these comments and conducted further internal scoping to identify issues of concern. Analysis considered these issues of concern, assessing the potential effects to discrete forest resources. The Forest Service has used these issues to focus analysis of the effects of motorized use on roads, trails, and areas throughout the Shoshone National Forest, considering both landscape level macro effects and project specific micro effects. The resulting analysis, set forth in Chapter 3 of this Preliminary EA, will inform the Forest Supervisor of the level of effect associated with the alternatives considered to discrete forest resources. The Forest Supervisor will determine whether the level of effect rises to a significance threshold that warrants an Environmental Impact Statement or whether a finding of no significant impact is appropriate (FONSI).

The Forest Service will consider all comments and public input as it continues to assess the impacts and effects associated with the Travel Management Planning Project. Any decision as to conducting an Environmental Impact Statement or issuing a FONSI will occur after an opportunity for public review and comment and after any necessary additional analysis.

1.6.2 Motorized Vehicle Recreation

Motorized vehicle recreation, including wheeled and OSV use, are components of the recreational experiences the Shoshone National Forest offers to the public. The Forest Service recognizes the quality of motorized experiences sought on the Forest, including offering a diverse range of opportunities for different skill levels, opportunities that suit certain population segments (e.g., older or disabled individuals), and accommodation for current and future growth in motor sports. The Forest Plan revision in 2015 acknowledged many of these factors in developing goals, objectives, and standards for motorized recreation. The Travel Management Planning Project has attempted to address this issue. The action alternatives, Alternatives 2 and 3, consider

opportunities for diverse OHV use across the Forest consistent with resource protection goals. These alternatives include proposals to convert many of the roads on the Shoshone National Forest to trails suitable for wheeled vehicles (e.g., ATVs, UTVs, etc.). This management scheme would allow current use by licensed operators in motor vehicles suitable for operation on state highways, roads, and other rights of way to continue. In addition, unlicensed operators, particularly youth operators, would be able to operate ATVs, UTVs, and other similar vehicles enrolled in the State of Wyoming's State Trails Program on these routes. Managing these routes collaboratively with the State of Wyoming through this program would provide additional funding mechanisms that can assist the Forest Service in maintaining these routes and, thereby, improve user experience while minimizing resource impacts.

1.6.3 Enforcement and Unauthorized Use

Enforcement of unauthorized motor vehicle use, including off-road and off-trail use, occurs on the Shoshone National Forest. Resource degradation from unauthorized use could result in inappropriate or unauthorized use of system and non-system roads or trails with the potential for damage to forest resources, increased user conflicts, and decreased safety for nonmotorized users. The Shoshone National Forest consistently monitors its routes open to public motor vehicles for appropriate use. The issue of prohibiting inappropriate motor vehicle use is a necessary outcome of the Travel Management Planning Project, as subsequently issued MVUMs and OSVUMs that correspond to the selected alternative will indicate to the public appropriate vehicle class and seasonal limits on roads, trails, and areas. Future monitoring, partnerships, and education efforts offer effective and integral means of addressing unauthorized use.

1.6.4 Effects to Forest Resources

Effects to forest resources include effects to individual wildlife species (e.g., grizzly bear, Canada lynx, and wolverine); degradation of water quality, watershed condition, and air quality; spread of invasive plants and invasive aquatic species; and damage to cultural resources. These effects are analyzed for each alternative in Chapter 3. Different indicators were developed to assess the impacts of wheeled vehicle and OSV use for resources. Independent minimization criteria screening questions and project design features were similarly developed with respect to wheeled vehicle use over trails and OSV use on trails and in areas.

One issue related to Effects to Forest Resources are seasonal restrictions. Alternative 1 would continue current seasonal restrictions of Forest Service roads and trails. The action alternatives, Alternative 2 and Alternative 3, would propose additional seasonal restrictions to Forest Service routes. The majority of these additional restrictions are targeted to areas identified by the State of Wyoming's Game and Fish Department as integral to big game habitat and can include crucial winter range habitat, parturition habitat, and other similarly vital habitat. The Forest Service recognized the importance of this habitat and addressed issues surrounding it in the revision of the Land Management Plan in 2015. That Plan sets goals, standards, and objectives for managing these areas. Seasonal restrictions incorporated under the action alternatives primarily address these goals, standards, and objectives, and the State of Wyoming provided vital data to identify appropriate routes and recommend applicable dates. Restricting wheeled vehicle use on these routes during the proposed periods is expected to have benefits to big game, and effects associated with these proposals are addressed below.

Resource concerns involving sediment run-off, water resource impacts, and aquatic species effects prompted the limited restriction of a small number of additional routes. These proposed closures are expected to minimize route degradation, decrease funding maintenance needs, and improve overall user experience along these routes when open. Further analysis is set forth below.

1.6.5 Trail and Area Analysis: Minimization Criteria

Comments received during the two previous scoping periods addressed the application of minimization criteria requirements to trails and areas designated as open to motorized use for wheeled and over-snow vehicles. The Forest Service has incorporated the minimization criteria requirements consistent with 36 C.F.R. § 212.55(b) into the analysis of alternatives. These criteria, which include screening trails and areas open to motorized use and considering project design features, were applied to identify impacts and refine the alternatives. These criteria include a consistent method across the alternatives that utilizes the best available data and management practices. The screening process and development of project design features are described more fully in Chapter 2.

1.6.6 High Lakes Wilderness Study Area

Over-snow vehicle use in the High Lakes Wilderness Study Area predates the establishment of the area in 1984 via the Wyoming Wilderness Act. Questions persist as to the suitable type and frequency of OSV use in the areas. The Forest Service has considered these questions and provided an analysis of use based on best available data. Chapter 3 provides greater detail on this Area, the OSV use that occurs within its boundaries, and the potential effects of management under the alternatives.

1.6.7 Adequate Snow Depth

Regulations that guide designating OSV use on National Forest System lands (including roads, trails, and areas), require that the responsible official incorporate snow depth as a consideration. The regulations state, “[o]ver-snow vehicle use on . . . National Forest System lands shall be designated by the Responsible Official . . . of the National Forest System where snowfall is adequate for that use to occur.” (36 C.F.R. § 212.81(a)) Responsible officials could apply this inquiry to areas “where snowfall may occur, but is not consistently adequate for OSV use[.]” (80 Fed. Reg. 4500, 4507 (Fed. 27, 2015)) This inquiry is suited, then, to areas of infrequent or potentially variable snowfall that would not be adequate for over-snow vehicle use. (*See id.* (reasoning that the determination incorporate “local conditions, including, as appropriate, variability in the weather”))

The Forest Service has conducted a preliminary screening exercise to determine areas not suited for over-snow vehicle use based on adequate snow depth. This analysis required two steps. First, the Forest considered generally adequate snow depth for OSV use, bearing in mind potential impacts to resources. Second, the Forest evaluated historic snow depth trends based on SNOTEL data. The Forest used data in or near to areas where OSV use occurs or may occur in the future. This information provided the best available data from which to assess snow depth for areas of use and evaluate management options.

Beginning with the first step of this analysis, at least one study has documented potential impacts from OSV use in thin snow-cover settings. Fassnacht et al. (2018) examined the effects of differing levels of use on snowpack properties at two different locations in Colorado. Fassnacht et al. found that snow density changes were more pronounced for thinner snow accumulations (the operational standard of 30 centimeters or 11.8 inches) and when OSV use started in deeper snow-packs (120 centimeters or 47 inches) there was less difference in density, hardness, and ram resistance compared to no snowmobile use. These results suggest that from a management standpoint, it may be desirable to limit OSV use in shallower snow conditions to avoid increases in density, hardness, and ram resistance that could possibly impact land resources below the snowpack. Based on this study, the Forest employed a metric of 12" inches of snow depth to assess adequacy of current locations.

On the second step of the analysis, the Forest selected SNOTEL observation sites based on Ranger District and proximity to over-snow vehicle use areas. NRCS data for snow depth from these sites was averaged by month for all years of available data. Data was available for all observation sites from at least 2004 onward (providing at least 16 years of data from which to develop monthly averages of snow depth in inches).

Applying a metric of 12" (Fassnacht et al., 2018), the data illustrate that adequate snow-depth is generally available Forest-wide throughout the traditional over-snow vehicle use season. (See Table 3) The Forest is taking steps to formally recognize this season under Alternative 2, with the Ranger Districts establishing open/close dates for use. The North Zone, which includes the Clarks Fork, Greybull, and Wapiti Ranger Districts, will allow OSV use November 1 to May 31. The Washakie Ranger District will allow snowmobiling from December 1 to May 31. And the Wind River Ranger District will allow snowmobiling from November 1 to May 31. These date ranges generally reflect the period during which these areas—district wide—support adequate snow depths for over-snow vehicle use. The Forest recognizes nonetheless that variability of weather during the shoulder seasons (i.e., November and May) can present conditions that do not support OSV use (especially at lower elevations). To address any concerns regarding potential resource damage during such periods, Line Officers will retain authority to adjust open and close dates district-wide and on an area-specific-basis. The Forest believes this approach will provide opportunities for over-snow vehicle use recreation while protecting forest resources.

Alternative 3 does not currently identify open and closure dates for use of over-snow motorized vehicles. The Forest Service has not included dates under this Alternative based on public input regarding responsible use and reflecting the history of minimal resource issues that arise from such use. While seasonal dates may offer the public precise guidance on appropriate use (as under Alternative 2), the Forest also recognizes the current responsible manner in which this use occurs on the Forest Service.

Table 3: SNOTEL Data by Site & Ranger District, with Averages by Month of Daily Mean Snow Depth (inches)

SNOTEL #: Common Name	Ranger District	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
SNOTEL 326: Beartooth Lake	Clarks Fork	50.88	62.88	71.18	76.53	65.71	31.69	1.47	0.00	0.35	5.47	20.94	36.41
SNOTEL 875: Wolverine	Clarks Fork	24.26	32.11	33.11	22.16	4.63	0.00	0.00	0.00	0.00	0.53	4.32	14.79
SNOTEL 472: Evening Star	Clarks Fork	58.94	73.00	80.94	82.82	62.88	23.13	0.65	0.00	0.41	5.71	22.12	41.41
SNOTEL 560: Kirwin	Greybull	27.38	33.95	39.86	41.00	24.24	2.20	0.00	0.00	0.38	4.90	12.24	20.95
SNOTEL 819: Timber Creek	Greybull	11.06	14.06	14.12	12.59	4.24	0.00	0.00	0.00	0.06	1.47	3.65	8.41
SNOTEL 616: Marquette	Wapiti	14.24	17.94	21.47	24.29	14.53	1.88	0.00	0.00	0.12	2.53	6.29	11.88
SNOTEL 350: Blackwater	Wapiti	51.57	62.79	73.21	81.00	69.43	29.93	1.29	0.00	0.47	8.64	24.07	40.50
SNOTEL 923: Deer Park	Washakie	31.36	39.78	46.13	48.17	32.87	7.00	0.00	0.00	0.27	3.27	11.86	22.23
SNOTEL 525: Hobbs Park	Washakie	31.06	38.38	46.56	52.31	40.06	11.07	0.00	0.00	0.31	5.13	12.69	22.81
SNOTEL 775: South Pass	Washakie	35.06	43.18	49.00	48.35	28.18	3.69	0.00	0.00	0.12	2.76	10.76	23.65
SNOTEL 826: Townsend Creek	Washakie	20.76	27.06	31.76	31.53	14.41	0.75	0.00	0.00	0.12	2.29	6.76	14.41
SNOTEL 379: Burroughs Creek	Wind River	32.25	39.88	43.50	42.50	23.06	3.07	0.00	0.00	0.12	2.13	9.94	22.38
SNOTEL 405: Cold Springs	Wind River	19.27	25.45	27.82	21.86	9.00	0.62	0.00	0.00	0.18	2.36	6.77	13.73
SNOTEL 585: Little Warm	Wind River	26.76	34.12	38.76	36.35	16.59	1.06	0.00	0.00	0.18	3.29	10.41	19.82
SNOTEL 822: Togwotee Pass	Wind River	52.29	64.29	72.29	74.33	60.62	22.35	1.30	0.00	0.33	6.14	20.48	37.95

2 Chapter 2 – Description of the Alternatives

2.1 Introduction

This chapter describes and compares the alternatives considered for the Shoshone National Forest Travel Management project. It includes a description and map of each alternative considered. This section also presents the alternatives in comparative form, sharply defining the differences between each alternative and providing a clear basis for choice among options by the decision maker and the public.

2.2 Process Used to Develop Alternatives

As indicated above, the Forest Service has conducted extensive outreach over several years in the course of developing the proposals analyzed herein. Since September 2015, the Forest Service has held 16 public meetings, four cooperator meetings/conference calls, and 11 field trips to gather external input on the need for changes to the Motor Vehicle Use Map and winter motorized use.

In May 2016, the Forest Service released a proposed action for public comment, receiving a total of 332 individual comments. After reviewing this project, the Rocky Mountain Regional Office recommended to the Forest that, for the sake of efficiency and effectiveness, the Forest incorporate assessment of a minimum road system under Subpart A into the project. The Forest then held a series of public meetings and field trips in the spring/summer of 2017 to explain and present a preliminary minimum road system (MRS). The public was given the opportunity to provide comments on the MRS as well as submit any additional proposals for consideration. This informal comment opportunity yielded four new proposals from internal and external scoping efforts.

As a result of these prior scoping and planning efforts for this project, 136 ranger district-specific and two Forest-wide proposals were submitted for changes to the wheeled vehicle travel system. For the winter travel system, there were 16 district-specific and nine Forest-wide proposals submitted by interested agencies, members of the public, and staff of the Shoshone National Forest. To develop the Proposed Action, the SNF interdisciplinary team identified proposals through a screening process that considered rules and regulations, guidance from the Forest Supervisor, and input from public meetings and field trips. This process incorporated the criteria for designating roads, trails, and areas for wheeled vehicle use under both subpart B (wheeled) and subpart C (over-snow) of 36 C.F.R. part 212. (36 C.F.R. §§ 212.55(a), 212.81(d)) Table 4, below, sets forth the screening criteria the Forest Service incorporated into the proposal development and review.

Table 4: Screening Criteria Applied during Proposal Development

Baseline Considerations	
<i>Legality</i>	Whether law, regulation, or policy prohibited the proposal. This criterion also considered whether valid easements/access rights authorized public use.

<i>Forest Plan Consistency</i>	Whether the proposal was consistent with the management direction under the Shoshone Land Management Plan 2015 Revision.
Forest Management & Recreation Considerations	
<i>Budgetary Feasibility</i>	Whether current budget allocations for road and motorized trail maintenance can finance the proposal.
<i>Potential for Non-Compliance</i>	Whether the proposal presents enforcement issues and invites non-compliance.
<i>Loops & Linkages</i>	Whether the proposal provides increased access, including loops and linkages, while avoiding new ground disturbance through construction.
<i>Dispersed Site Access</i>	Whether the proposal provides access to well-used dispersed camping sites.
<i>Re-Opening Roads</i>	Whether the proposal involves opening a closed road consistent with resource concerns.
<i>User Conflicts</i>	Whether the proposal increases potential for conflict between different user groups.
<i>IRAs</i>	Whether a proposed motorized trail in an inventoried roadless area retains area characteristics while providing access.
Resource Considerations	
<i>Threatened & Endangered Species</i>	Whether the proposal affects Primary Conservation Area for Grizzly Bears or other secure habitat related to species listed and proposed for listing as threatened and endangered under the federal Endangered Species Act.
<i>Wildlife, Including Big Game Species</i>	Whether the proposal overlaps with big game secure habitat, parturition areas, crucial winter range, or migration routes with potential impacts to species.
<i>Watershed & Aquatic Species</i>	Whether the proposal implicates watershed and aquatic species resource concerns due to run-off, erosion, and sedimentation caused by proximity of motorized routes to waterbodies, stream crossings occurrence and frequency, and road density.
<i>Soils</i>	Whether the proposal occurs on steep slopes prone to erosion or landslides.
<i>Invasive Species</i>	Whether the proposal would promote the establishment and spread of invasive and noxious plant species.
<i>Cultural Resources</i>	Whether the proposal may lead to disturbance or damage of cultural resources on the Forest.

These criteria with additional input received through the public scoping periods provided the Forest Service with ample data from which to determine the feasibility of proposals. Additional data and recommendations arose through the Travel Analysis Process for the road system (with the output of the process being the Travel Analysis Report) and the application of minimization criteria to the trail and area system (discussed below, *see* 2.2.1 (Minimum Road System and 2.2.2 (Minimization Criteria)).

2.2.1 Minimum Road System

Forests are required to “identify the minimum road system needed for safe and efficient travel and for administration, utilization, and protection of National Forest System lands.” 36 C.F.R. § 212.5(b)(1). The process that leads to determining the minimum road system (MRS) involves identifying roads likely needed and those likely not needed for administration, utilization and protection of National Forest System lands while meeting applicable statutory and regulatory requirements and reflecting long-term funding expectations. Forests utilize a science-based approach, consistent with 36 C.F.R. § 212.5(b)(1), from which to evaluate current roads and make recommendations that may then be examined in the NEPA process. This Travel Analysis Process culminates in a Travel Analysis Report that explains methodology for evaluating roads, application of methodology to the existing road system, and results of the analysis (i.e., recommendation of likely needed and likely unneeded roads). (See FSH 7709.55 ch. 20 (describing the framework utilized through the Travel Analysis Process to develop the Travel Analysis Report))

The TAP describes current conditions, risks, benefits, opportunities (needs for change), and provides recommendations for action. The intent is that future NEPA analyses with adequate public input carry forward, reject, or modify the recommendations in the TAR, and provide the basis for making specific transportation system related decisions on the Forest. This process and the related recommendations informed the proposals identified as viable and the alternatives considered in this Preliminary EA.

The Forest Service utilized the Travel Analysis Process to identify and categorize roads, publishing the results of that analysis in the 2017 Travel Analysis Report. The report memorialized the route-by-route analysis of all National Forest System roads on the Forest, providing recommendations for the minimum road system needed for public access and Forest management. These recommendations reflect an applied analysis that incorporates multiple resource and user inputs specific to each road on the Forest, representing both current and future management objectives. Specific inputs considered in the analysis and described in the 2017 TAR are: physical, biological, social, and economic risks and benefits of every system road. Specific benefits of roads included: recreation access, timber access, fuels treatment access, range access, and special uses. Metrics for assessing risks from road use were developed from impacts to water resources, aquatic organism passage, wildlife, botany, heritage resources, and public health & safety / financial burden. The 2017 Travel Analysis Report describes these benefits and risks in greater detail and explains how numerical values were assigned for each category. (Further information on the TAP and TAR are described in section 3.2)

2.2.2 Minimization Criteria

Trails were subject to a screening process similar, albeit different, to the TAP/TAR process. This screening process necessitates the application of “minimization criteria” to trails and areas open to motorized use for wheeled and over-snow vehicles. The term “minimization criteria,” as used throughout this document, refers to the subset of the specific criteria that the responsible official is to consider “with the objective of minimizing” the four categories of impacts set forth in 36 CFR §212.55(b)(1)-(4) when designating trails and areas for motorized use. These categories of impacts include:

- Damage to soil, watershed, vegetation, and other forest resources;

- Harassment of wildlife and significant disruption of wildlife habitats;
- Conflicts between motor vehicle use and existing or proposed recreational uses of NFS lands or neighboring federal lands; and
- Conflicts among different classes of motor vehicle uses of NFS lands or neighboring federal lands.

(36 C.F.R. §§ 212.55(b), 212.81(d))⁷

On the Shoshone, wheeled vehicle use only implicates the minimization criteria review for motorized trails, because the Forest prohibits cross-country motorized travel. As stated previously, the prohibition on cross-country wheeled vehicle travel includes a ban on off-road travel for game retrieval, though limited dispersed camping can occur along designated routes. (36 C.F.R. § 261.56) The Forest authorizes OSV use in areas (*i.e.*, cross-country travel) and on trails, and both are subject to the minimization criteria. Table 5 correlates the regulatory minimization criteria to resource areas of the Forest and the section of this EA that provides more detailed analysis of the relevant criterion.

Table 5: Minimization Criteria, Applicable Resource Area, and Section of the EA Addressing Minimization Criteria

Minimization Criteria (36 C.F.R. § 212.55(b))	Applicable Resource Area	Section of the EA Addressing Minimization Criteria and Considering Effects Analysis
Damage to soil, watershed, vegetation, and other forest resources	1. Hydrologic Resources 2. Soil Resources, Botany Species (Wildlife) 3. Cultural Resources	3.8 (Soils), 3.9 (Watersheds), 3.12 (Cultural Resource), 3.18 (Wildlife: Sensitive Plant Species)
Harassment of wildlife and significant disruption of wildlife habitats	4. Threatened and Endangered species (Wildlife) 5. Species of Local Concern (Wildlife)	3.14 (Wildlife: Threatened and Endangered Species), 3.15 (Wildlife: Management Indicator Species and Region 2 Sensitive Species), 3.16 (Wildlife: Species of Local Concern), 3.17 (Wildlife: Aquatic Species)
Conflicts between motor vehicle use and existing or proposed recreational uses of NFS lands or neighboring federal lands	6. Recreation (Trails) 7. Engineering (Roads)	3.2 (Transportation: the Shoshone NF Road System), 3.3 (Recreation: the Shoshone Motorized Trail Network and Recreation Opportunities)
Conflicts among different classes of motor vehicle uses of NFS lands or neighboring federal lands	7. Recreation (Trails) 8. Engineering (Roads)	3.2 (Transportation: the Shoshone NF Road System), 3.3 (Recreation: the Shoshone Motorized Trail Network and Recreation Opportunities)
Compatibility of motor vehicle use with existing conditions in populated areas, taking into account sound, emissions, and other factors	Not Applicable (<i>see</i> Socioeconomic Effects Analysis)	3.4 (Socio-Economics)

⁷ The minimization criterion applicable to populated areas, 36 C.F.R. § 212.55(b)(5), does not apply to the Forest due to the low population densities of adjacent Forest communities. *See* the socioeconomic effects analysis, which describes the population and demographic data for these communities.

Each action alternative incorporated the minimization criteria above when designating trails and areas for motorized use. Resource specialists developed screening criteria to determine where trails or areas intersected with a resource that implicated a minimization criterion. Points of intersection informed resource specialists' development of appropriately tailored mitigation actions that would minimize potential impacts from motorized use along the trail or in the area. Design criteria and mitigation activities that achieve sufficient minimization of impacts are set forth in Appendix C. Appendix C further contains the results of trails proposed under Alternative 2 and Alternative 3 screened through these questions.⁸

It is important to note that applying the minimization criteria should not be interpreted as strictly requiring the prevention of all impacts. Instead, in applying the minimization criteria, the Forest Service maintains the flexibility to manage for a reasonable reduction of impacts while still addressing the need to provide trails and areas for public motorized use experiences.

2.3 Alternatives

Each alternative incorporates a range of route types and suitable uses, as well as specific actions taken with respect to routes. These route types and uses—some of which have been discussed and referenced above—are listed and defined below. Actions taken with respect to wheeled routes are also defined.

Route Types & Uses

NFSR, ML 1 – National Forest System roads in storage and closed to all wheeled vehicle use.

NFSR, administrative – National Forest System roads open to administrative and permitted use.

NFSR, open to all wheeled vehicles – National Forest System roads open to all wheeled public use.

NFSR, open to wheeled vehicles 64 inches wide or less – National Forest System roads open to all wheeled vehicles with a maximum width of 64 inches.

NFST, open to wheeled vehicles 50 inches wide or less – National Forest System trails open to all wheeled vehicles with a maximum width of 50 inches.

NFST, open to wheeled vehicles 64 inches wide or less – National Forest System trails open to all wheeled vehicles with a maximum width of 64 inches.

NFST, open to all wheeled vehicles – National Forest System trails open to all wheeled public use (includes single track NFSTs).

⁸ Many NFSTs proposed under Alternative 2 and Alternative 3 will have been reviewed through the TAP/TAR process as well as screened according to the minimization criteria requirements. Many NFSRs are proposed to be converted to NFSTs under these action alternatives. The Forest Service reviewed those existing NFSRs through the risk/benefit assessment of the TAP/TAR, arriving at recommendations for each NFSR. For NFSRs converted to NFSTs under either of the action alternatives, the minimization criteria were applied through this Travel Management Planning Project.

Route Actions

Keep as is – NFS routes identified as maintained in the alternative consistent with current management

Conversions – NFS routes converted by the type (e.g., NFSR to NFST) or the use (e.g., NFSR, open to all wheeled vehicle, to NFSR, administrative)

Additions – NFS routes added to the wheeled vehicle system (e.g., Add new NFSR, open to all wheeled vehicles)

Subtractions – NFS routes currently open to public wheeled vehicle use that are decommissioned

Apply Seasonal Restriction – NFS routes subject to seasonal restriction of wheeled vehicle use

Just under 200 unique proposals were considered for wheeled vehicle use, with 32 considered for OSV use. Appendix B sets forth the proposals carried forward for analysis under Alternatives 2 and 3 for wheeled vehicle use and for OSV use. Alternative 1, the no action alternative, would continue current management and therefore does not have any proposals that would alter this management. This Alternative is not included in the Appendix. The tables in Appendix B include a location note for the change, a description of the change (corresponding to the categories identified above), and a rationale.

Also included in Appendix B are tables that identify proposals considered during the scoping of the Travel Management Planning Project but eliminated from further study. The rationale for eliminating these proposals is included for both wheeled and OSV use proposals.

Many of the proposals carried forward for analysis are common to Alternatives 2 and 3. Proposals also may have very slight changes between the alternatives. For instance, Alternative 2 proposes to convert many NFSRs to NFSTs open to wheeled vehicles, while Alternative 3 proposes to convert the same roads to NFSTs open to wheeled vehicles 64-inches wide or less. Access for motorized users was a central consideration when considering converting NFSRs to NFSTs. Each alternative analyzed below incorporated these changes onto the analysis of the system of roads, trails, and areas open for motorized use. Analysis considered impacts associated with construction (e.g., where additions are made), with maintenance, and with use.

Forest Plan direction, public input, and science-based travel analyses applied to these proposals informed this Travel Management Planning Project. These various processes have led to the current proposals under consideration, and the Alternatives described below.

2.3.1 Summary Comparison of Alternatives Analyzed in Detail

Maps for each alternative considered in detail in this Preliminary EA can be found in Appendix A. Table 6 below compares the alternatives considered in detail in this Preliminary EA. The totals shown represent only those roads and trails currently open to, or proposed as open to, public wheeled vehicle use. This does not include routes not open to the public, such as those for administrative use, ML 1 roads, and special-use permit roads. Additionally, roads that are proposed for conversion to trails in an alternative are tallied under trails.

Table 6: Summary of the NFS Routes Open to Public Motor Vehicle Use, by Alternative

Designated Routes	Alternative 1	Alternative 2	Alternative 3
Roads (Miles)	882.70	731.99	718.35
Percent Change	N/A	-16.67%	-18.22%
Trails (Miles)	36.02	198.00	194.51
Percent Change	N/A	449.74%	440.05%
Total Routes (Miles)	914.43	929.99	912.86
Percent Change	N/A	1.70%	-0.17%

Additional information that reflects the designated NFS routes, including the conversion, addition, subtraction, or other management action are identified in detail below.

Each alternative proposes an MRS for the NFS roads. As described above, the MRS includes the need to balance long-term funding, minimization of adverse effects associated with those roads, and the ability to meet the resource or management objectives in the Forest Plan. The MRS includes roads that are open to public motor vehicle use (roads open to all vehicles and or open to highway vehicles only) and those roads closed to public motor vehicle use (ML1 and administrative use only). Table 7 provides a summary of the MRS for each alternative based on the maintenance level for NFSRs.

Table 7: MRS Road Maintenance Level Mileage by Alternative

Maintenance Level	Alternative 1	Alternative 2	Alternative 3
ML 1	181.15	248.96	185.16
ML 2	761.07	630.19	603.74
ML 3	183.06	183.06	183.06
ML 4	6.57	6.57	6.57
ML 5	2.47	2.47	2.47
Total NFSR Mileage	1134.32	1071.26	981.00

Additional discussion of the MRS and costs associated with the systems proposed under each alternative can be found in Chapter 3, Transportation: the Shoshone NF Road System.

The OSV system is an independent component of motorized use on the Shoshone Forest. Table 8 below displays the cumulative OSV system proposed under the alternatives, with Table 9 comparing the action alternatives with the current management regime.

Table 8: Comparison of Alternatives with Cumulative Forest-Wide Mileage for Over-Snow Motorized Use

Cumulative Miles ¹ by Route	Alternative 1	Alternative 2	Alternative 3
Total OSV Trail System (Open to Class 1 OSVs)	288.88	299.00	288.88
Groomed	201.19	201.19	201.19
Class 2 OSV Trails (Groomed) ³	N/A ⁴	171.39	112.27

Ungroomed	87.69	97.81	87.69
Areas Open to Motorized Travel (acres ²)	522,970.00	521,616.00	512,442.00

¹ Miles rounded to the nearest 100th (0.00)

² Acres rounded to the nearest 100th (0.00)

³ Since current trails are not designated under an OSVUM, tracked ATV use is not subject to any restriction aside from targeted special orders.

⁴ Ungroomed tracked ATV use and corresponding Class 2 OSV management is discussed above.

Table 9: Comparison of Alternatives with Change from Current Condition (Alternative 1) for OSV Use

Cumulative Miles ¹ by Route	Alternative 1	Alternative 2	Alternative 3
Total OSV Trail System (Open to Class 1 OSVs)	0.00	10.12	0.00
Groomed	0.00	0.00	0.00
Class 2 Trails (Groomed) ³	0.00	171.39	112.27
Ungroomed	0.00	10.12	0.00
Areas Open to Motorized Travel (acres ²)	0.00	-1,354.00	-10,528.00

¹ Miles rounded to the nearest 100th (0.00)

² Acres rounded to the nearest 100th (0.00)

³ Since current trails are not designated under an OSVUM, tracked ATV use is not subject to any restriction aside from targeted special orders.

⁴ Ungroomed tracked ATV use and corresponding Class 2 OSV management is discussed above.

2.3.1.1 Summary

Table 6 through Table 9 illustrate the nature of changes to the minimum road system, the designated system for wheeled vehicle use, and the designated system for over-snow vehicle use on the Forest. At the landscape level, the total changes in mileage (and for OSV use, acreage) are relatively minor. For example, the designated (open) system of motorized routes, which encompasses roads and motorized trails open to the public, increases by 1.70% under Alternative 2 (when compared with the current system) and decreases by 0.17% under Alternative 3. Similarly minor are the changes to the OSV systems proposed under Alternatives 2 and 3 when viewed at the landscape scale. These Alternatives do incorporate a suite of specific proposals, and the analysis of effects associated with these proposals assists the Forest in identifying potential impacts to resources not otherwise apparent from this landscape perspective.

2.4 Alternatives Analyzed in Detail

Three alternatives were developed in detail for the current Travel Management Planning Project. Each "action alternative" (i.e., Alternatives 2 and 3) was designed to be a viable alternative. The Alternatives presented below represent a range of reasonable alternatives, given the purpose and need and key issues for the proposed action. Public input has largely driven the development of these proposals, beginning with comments received during the Forest Plan revision. Comments received from the initial scoping effort in May of 2016 led the Forest Service to modify its preliminary proposed action. Additional comments received through the 2017 scoping of the modified proposed action provided the Forest Service with supplemental information that led to the currently proposed action Alternatives.

The interdisciplinary team has analyzed these three alternatives in this Preliminary EA. They are: Alternative 1 (No Action); Alternative 2; and Alternative 3. Alternative 1 represents the existing situation on the SNF for both wheeled and OSV use. Alternatives 2 and 3 reflect many of the proposals considered in the Proposed Action in 2016, with modifications under each alternative. These alternatives are described in greater detail below. All information included in the text, tables, and maps is based on the best available information; corrections and adjustments will occur during project implementation. All numbers, including road and trail miles, are approximations. The motorized system identified in each of the action alternatives is aimed at meeting the requirements of the Travel Management Rules while providing access to a range of recreational opportunities required by a variety of user groups and protecting sensitive natural and cultural resources. Summary landscape-scale data for roads, trails, and areas designated for motorized use are described below.

2.4.1 Landscape-Scale Data under the Alternatives

2.4.1.1 Alternative 1

The No Action alternative represents the existing condition and the baseline against which the “action” alternatives are measured. The Forest Service is not required to but may consider a no-action alternative when analyzing impacts through an environmental assessment. (36 C.F.R. § 220.7(b)(2)(ii); *see also* FSH 1909.15 § 41.22 (“A stand-alone no-action alternative is not required.”)) For this analysis the existing condition is defined differently for wheeled vehicle use (36 C.F.R. pt. 212, subpt. B) and for over-snow use (36 C.F.R. pt. 212, subpt. C). Each motorized use is described in turn.

2.4.1.1.1 Wheeled Vehicle Use

The No Action alternative for wheeled vehicle use reflects the current designated system of NFSRs and NFSTs designated on the Shoshone National Forest MVUMs for the North Zone (Clarks Fork Ranger District, Greybull Ranger District, and Wapiti Ranger District) and South Zone (Washakie Ranger District and Wind River Ranger District). Subsequent changes to the motorized routes available for wheeled use would be addressed on a project-by-project basis. Table 10 summarizes the route statistics for Alternative 1.

Table 10: Summary of Alternative 1 Wheeled Routes

<i>Identified & Designated Routes</i>	<i>Mileage</i>
NFSR, ML 1	181.15
NFSR, administrative	70.48
NFSR, open to all wheeled vehicles	882.70
NFST, ≤50" wide (open to OHVs such as ATVs and motorcycles)	36.02
Total Wheeled Route System	1170.35

The road system for the Forest totals 1,134 miles under this Alternative. Of these road miles, 882.70 are open to the public. (Table 11) These roads fall within all Maintenance Level categories—these categories are described in greater detail in the Transportation Effects Analysis. The vast majority of Forest roads open to the public fall within ML 2.

Table 11: Alternative 1 Existing NFSR System – Open to Public Motorized Use, Administrative Use Roads, & Stored Roads

Maintenance Level	Open to All Public Motorized Use	% of Total	Open to Administrative Use	% of Total	Stored Roads	% of Total	Total Road System
ML 1	0.00	0%	0.00	0%	181.15	100%	181.15
ML 2	693.96	91%	67.12	9%	0.00	0%	761.07
ML 3	182.10	99%	0.96	1%	0.00	0%	183.06
ML 4	4.17	63%	2.40	37%	0.00	0%	6.57
ML 5	2.47	100%	0.00	0%	0.00	0%	2.47
Total System Mileage	882.70	78%	70.48	6%	181.15	16%	1134.33

By district, the road system resembles the following:

Table 12: Alternative 1 Existing NFSR System by Ranger District

Operational Maintenance Level	Clarks Fork	Greybull	Wapiti	Washakie	Wind River	Total Miles
FSR ML 1	53.93	39.42	6.54	9.63	71.62	181.15
FSR ML 2	169.56	91.35	89.25	183.06	227.86	761.07
FSR ML 3	15.11	22.44	19.21	47.30	78.99	183.06
FSR ML 4	2.15	0.00	3.40	1.02	0.00	6.57
FSR ML 5	0.47	0.00	1.81	0.20	0.00	2.47
Total Miles	241.22	153.22	120.21	241.20	378.47	1134.32
Miles of Seasonal Restrictions (% of Total*)	102.11 (42%)	39.51 (26%)	42.98 (36%)	72.16 (30%)	43.98 (12%)	300.75 (27%)

*Rounded to nearest whole percentage

Seasonal restrictions apply to roughly a quarter of all roads on the Forest, with the Clarks Fork Ranger District having the highest total number and highest percentage of roads under seasonal restriction. (Table 12)

The Forest also supports a current motorized trail system with 11.90 miles on the Washakie Ranger District and 22.08 miles on the Wind River Ranger District open to vehicles 50-inches-or-less-wide. Washakie Ranger District also authorizes single track motorized use on 2.04 miles (identified above as an NFST open wheeled vehicles 50 inches wide or less). Motorized trail opportunities total 36.02 miles Forest-wide—with no seasonal restrictions currently applied to these trails.

2.4.1.1.2 Over-Snow Motorized Use

No changes would occur under alternative 1 to the existing system of OSV use on trails and areas within the Shoshone National Forest except as prohibited by Forest Order. In addition, only those seasonal restrictions as specified in the Shoshone Forest Plan and contained in existing Forest Orders would continue. These restrictions and orders have resulted in an area of approximately

522,495 acres available for OSV use (roughly 24% of the Forest’s land base). Motorized over-snow vehicle travel would have no established start or end dates, with motorized use limited only by snow cover. Motorized use by Class 2 OSVs could continue on routes identified on the MVUM and on groomed OSV trails, consistent with the Forest Plan. (Forest Plan, 103) Mileage and acreage open to OSV use under Alternative 1 is set forth in Table 13.

Table 13: Alternative 1 OSV Use Opportunities Open to the Public

Winter Motorized Travel	Clarks Fork RD	Greybull RD	Wapiti RD	Washakie RD	Wind River RD	Total Miles
Trails (Miles)						
OSV Trails - Groomed	25.65	0.00	1.99	59.22	114.32	201.19
OSV Trails - Ungroomed	31.20	0.00	0.00	2.56	53.94	87.69
Total FS Snowmobile Trail System	56.85	0.00	1.99	61.79	168.26	288.88
Area (Acres)						
Total Area Open to OSV Travel	170,788	28,462	9,137	112,764	201,819	522,970

The Travel Management Regulations, Subpart C, would not be implemented, and no OSV use map would be produced.

2.4.1.2 Alternative 2

Alternative 2 corresponds to the Proposed Action released for public comment in November 2017 in the Shoshone National Forest Travel Management Scoping Document. This alternative, as explained in the Scoping Document, incorporated direction from the Regional Office to identify a minimum road system for the Forest consistent with 36 C.F.R. part 212, subpart A. The Forest Service also assessed comments received and incorporated issues raised by the public during the 2016 scoping into the alternatives. The changes to the road system and motorized trail network are summarized below. This summary reflects the generalized data consistent with individual on-the-ground proposals.

2.4.1.2.1 Year-Round Motorized Use

The summary of the road system and changes proposed under Alternative 2 are set forth in Table 14.

Table 14: Summary of Alternative 2 Wheeled Routes

<i>Identified & Designated RouteS</i>	<i>Mileage</i>
NFSR, ML 1	181.15
NFSR, administrative	70.48
NFSR, open to all wheeled vehicles	732.43
NFST, ≤50" wide (open to OHVs such as ATVs and motorcycles)	2.04
Total Wheeled Routes	986.10
<i>Converted NFS Route Classification</i>	
Convert NFSR to NFSR, ≤64" wide	2.47

Convert NFSR to administrative use only road	8.81
Convert NFSR to NFST, ≤64" wide	3.45
Convert NFSR to NFST, open to all wheeled vehicles	139.65
Convert NFST, ≤50" wide to NFST, ≤64" wide	18.14
Total Routes Converted	172.52
<i>Added NFS Routes</i>	
Add new NFSR, ML 1	67.81
Add new NFSR, access to dispersed camping (ML 2)	1.25
Add new NFSR, open to all vehicles (ML 2)	9.32
Add new NFST, ≤50" wide	5.18
Add new NFST, ≤64" wide	18.57
Total Routes Added	102.13
<i>Subtracted NFS ROUTES</i>	
Decommission NFSR	10.37
Decommission NFST, ≤50" wide	5.15
Total Routes Subtracted	15.52
<i>Seasonal Restrictions</i>	
NFSR Seasonal Restrictions	364.76
NFST Seasonal Restrictions	157.64

Table 15 sets forth the minimum road system proposed under Alternative 2, Forest-wide, focusing on the mileage by road Maintenance Level.

Table 15: Alternative 2 Proposed Road System

Maintenance Level	Open to All Public Motorized Use	% of Total	Open to Administrative Use	% of Total	Stored Roads	% of Total	Total Road System
ML 1	0.00	0%	0.00	0%	248.96	100%	248.96
ML 2	554.26	89%	67.12	11%	0.00	0%	621.38
ML 3	182.10	99%	0.96	1%	0.00	0%	183.06
ML 4	4.17	63%	2.40	37%	0.00	0%	6.57
ML 5	2.47	100%	0.00	0%	0.00	0%	2.47
Total System Mileage	729.67	69%	77.13	7%	248.96	24%	1055.76

By district, the minimum road system proposed under Alternative 2 would resemble the following:

Table 16: Alternative 2 Minimum Road System by Ranger District

Operational Maintenance Level	Clarks Fork	Greybull	Wapiti	Washakie	Wind River	Total Miles
FSR ML 1	57.94	39.42	6.54	11.52	133.53	248.96

FSR ML 2	165.74	95.30	89.71	68.95	210.50	630.19
FSR ML 3	15.11	22.44	19.21	47.30	78.99	183.06
FSR ML 4	2.15	0.00	3.40	1.02	0.00	6.57
FSR ML 5	0.47	0.00	1.81	0.20	0.00	2.47
Total Miles	241.41	157.16	120.67	128.99	423.03	1,071.26
Miles of Seasonal Road Restrictions (% of Total*)	109.30 (60%)	50.41 (43%)	44.65 (39%)	103.29 (88%)	57.12 (20%)	364.76 (44%)

*Excludes ML 1 roads when calculating total miles for purposes of denominator.

This alternative proposes additional seasonal restrictions, with the largest increase occurring in the Washakie Ranger District. (Table 16) These seasonal restrictions were proposed to address issues associated with protecting road surfaces and Forest resources during the wet spring months.

The designated motorized trail system would undergo substantial changes under Alternative 2. These changes are summarized below in Table 17.

Table 17: Alternative 2 Designated NFST by Class of Vehicle and by Ranger District

Designated NFST	Clarks Fork RD	Greybull RD	Wapiti RD	Washakie RD	Wind River RD	Total Miles
NFST, ≤50" wide	0.00	0.00	0.00	14.09	3.82	17.91
NFST, ≤64" wide	6.67	0.00	0.00	1.90	31.60	40.16
NFST, open to all wheeled vehicles	3.98	0	0	117.16	18.78	139.92
Total Designated NFST	10.65	0.00	0.00	133.15	54.19	198.00
Miles of Seasonal Trail Restrictions (% of Total)	8.38 (79%)	0.00 (N/A)	0.00 (N/A)	133.15 (100%)	16.52 (30%)	158.05 (80%)

Changes indicated above involve the expansion of the NFST network and the application of seasonal restrictions to this network. This network increases in miles by 167.13 when compared with Alternative 1 (the current NFST network). The network also provides expanded use opportunities, with the addition of NFSTs open to all wheeled vehicles and NFSTs open to wheeled vehicles 64 inches wide and less. The increase of motorized trail miles owes, predominantly, to the conversion of NFSRs to NFSTs: the alternative would convert 139.92 miles from NFSRs to NFSTs open to all vehicles and 3.45 miles to NFSTs open to wheeled vehicles 64 inches wide and less. Seasonal restrictions applied to motorized trails would address potential impacts to forest resources, and the effects analysis in Chapter 3 below examines these potential impacts with respect to individual resources.

Wyoming State traffic law governs use of motorized vehicles within the Shoshone National Forest, including on NFSTs. These NFSTs would allow current use to continue, provided vehicles complied with width restrictions for specific routes. Put alternatively, wheeled vehicle use can occur on NFSTs. This conversion also would provide expanded access to youth operators, ATV/UTV users,

and, meet Forest Plan direction (including incorporating motorized trail loops and linkages into the trail network). Additional discussion of recreational impacts is set forth in section 3.3 (Recreation: the Shoshone Motorized Trail Network and Recreation Opportunities).

2.4.1.2.2 OSV Use

Alternative 2 proposes to designate trails and areas for OSV use. This alternative includes the following actions for OSV use:

- Designating 288.88 miles of groomed and ungroomed trails for Class 1 OSV use (201.19 miles groomed, 87.69 ungroomed)
- Adding 10.12 miles of ungroomed trails to the Class 1 OSV trail system
- Closing approximately 1,350 acres to OSV use to allow cross-country skiing and minimize conflicts between users

Mileages and acreages open to OSV use under Alternative 2 are set forth in Table 18.

Table 18: Alternative 2 Designated Over-Snow Motorized Use Opportunities Open to the Public

Winter Motorized Travel	Clarks Fork RD	Greybull RD	Wapiti RD	Washakie RD	Wind River RD	Total
Trails (Miles)						
Snowmobile Trails - Groomed	25.65	0	1.99	59.22	114.32	201.19
Snowmobile Trails - Ungroomed	31.20	0	0	2.56	53.94	97.81
Total FS Snowmobile Trail System	56.85	0.00	1.99	61.79	168.26	299.00
Area (Acres)						
Total Designated Area Open to OSV Travel	170,788	28,462	9,137	112,764	201,819	521,616

Alternative 2 would also designate 258.03 miles of trails for Class 2 OSVs on the OSVUM. Of these trails, 38.79 miles outside of a designated MVUM road or motorized trail and off of a designated OSV trail. These routes currently contradict Forest Plan direction, which requires that these Class 2 vehicles operate on groomed trails or over MVUM roads and trails and may necessitate a Forest Plan amendment if they are carried forward.

Table 19: Alternative 2 Designated Tracked ATV Use on Ungroomed Snowmobile Trails

Tracked ATV Operation on Ungroomed Trails	Clarks Fork RD	Greybull RD	Wapiti RD	Washakie RD	Wind River RD	Total
Use Outside an MVUM Road or Motorized Trail	22.80	0.00	0.00	0.00	4.23	27.03

This Alternative would implement the Travel Management Regulations, Subpart C, and the Forest would publish OSVUMs at the conclusion of the project.

2.4.1.3 Alternative 3

Alternative 3 reflects modifications and minor changes to Alternative 2. These modifications and minor changes were the result of comments received and issues raised by the public during the November 2017 scoping. The changes to the road system and motorized trail network are summarized below. This summary reflects the generalized data consistent with individual on-the-ground proposals.

2.4.1.3.1 Year-Round Motorized Use

The summary of changes proposed under Alternative 3 is set forth in

Table 20: Summary of Alternative 3 Wheeled Routes

<i>Identified & Designated RouteS</i>	<i>Mileage</i>
Roads, ML 1	185.16
Roads, administrative	70.48
Roads, open to all wheeled vehicles	709.74
Trails, ≤50" wide (open to OHVs such as ATVs and motorcycles)	22.08
Total Wheeled Routes	987.45
<i>Converted NFS Route Classification</i>	
Convert NFSR to NFSR, ≤64" wide	0.00
Convert NFSR to administrative use only road	10.07
Convert NFSR to NFST, ≤64" wide	117.16
Convert NFSR to NFST, open to all wheeled vehicles	36.10
Convert NFST, ≤50" wide to NFST, ≤64" wide	0.00
Total Routes Converted	163.33
<i>Added NFS Routes</i>	
Add new NFSR, ML 1	4.01
Add new NFSR, administrative use only road	0.00
Add new NFSR, access to dispersed camping (ML 2)	0.71
Add new NFSR, open to all vehicles (ML 2)	4.38
Add new NFST, ≤50" wide	2.04
Add new NFST, ≤64" wide	2.66
Total Routes Added	13.80
<i>Subtracted NFS ROUTES</i>	
Decommission NFSR	5.79
Decommission NFST, ≤50" wide	0.00
Total Routes Subtracted	5.79
<i>Seasonal Restrictions</i>	
NFSR Seasonal Restrictions	353.37

NFST Seasonal Restrictions	160.36
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Table 21 sets forth the minimum road system proposed under Alternative 3, Forest-wide, focusing on the mileage by road Maintenance Level.

Table 21: Alternative 3 Proposed Road System

Maintenance Level	Open to All Public Motorized Use	% of Total	Open to Administrative Use	% of Total	Stored Roads	% of Total	Total Road System
ML 1	0.00	0%	0.00	0%	185.16	100%	185.16
ML 2	521.00	87%	77.65	13%	0.00	0%	598.65
ML 3	182.10	99%	0.96	1%	0.00	0%	183.06
ML 4	4.17	63%	2.40	37%	0.00	0%	6.57
ML 5	2.47	100%	0.00	0%	0.00	0%	2.47
System Total	709.74	73%	81.01	8%	185.16	19%	975.91

By district, the road system proposed under Alternative 3 would resemble the following:

Table 22: Alternative 3 Minimum Road System by Ranger District

Operational Maintenance Level	Clarks Fork	Greybull	Wapiti	Washakie	Wind River	Total Miles
FSR ML 1	57.94	39.42	6.54	9.63	71.62	185.16
FSR ML 2	154.68	95.30	94.58	53.79	205.39	603.74
FSR ML 3	15.11	22.44	19.21	47.30	78.99	183.06
FSR ML 4	2.15	0.00	3.40	1.02	0.00	6.57
FSR ML 5	0.47	0.00	1.81	0.20	0.00	2.47
Total Miles	230.35	157.16	125.54	111.93	356.01	981.00
Miles of Seasonal Road Restrictions (% of Total*)	102.26 (59%)	51.71 (44%)	41.34 (35%)	103.84 (100%)	64.54 (23%)	363.70 (46%)

* Excludes ML 1 roads when calculating total miles for purposes of denominator.

Similar to Alternative 2, Alternative 3 would implement additional seasonal restrictions with the largest increase occurring in the Washakie Ranger District. (Table 22) These seasonal restrictions were proposed to address issues associated with protecting road surfaces and Forest resources during the wet spring months.

Changes to the designated motorized trail system under Alternative 3 are set forth in Table 23 below.

Table 23: Alternative 3 Designated NFST by Class of Vehicle and Ranger District

	Clarks Fork RD	Greybull RD	Wapiti RD	Washakie RD	Wind River RD	Total Miles
NFST, ≤50" wide	0.00	0.00	0.00	13.94	24.11	38.05
NFST, ≤64" wide	0.69	0.00	1.96	117.64	0.00	120.30

NFST, open to all wheeled vehicles	16.52	0.00	0.00	0.00	19.63	36.16
Total Designated NFST	17.21	0.00	1.96	131.58	43.75	194.51
Miles of Seasonal Trail Closure (% of Total)	7.09 (41%)	0.00 (0%)	1.96 (100%)	131.10 (100%)	20.20 (46%)	160.36 (82%)

The overall footprint of the trail network under Alternative 3 resembles that of Alternative 2. Miles under the Alternative 3 network increase by 158.49 when compared with Alternative 1 (the current motorized trail network). The network also provides expanded use opportunities, with the addition of NFSTs open to all wheeled vehicles all and NFSTs open to wheeled vehicles 64 inches wide and less. A primary difference between Alternative 3 and Alternative 2 is that the majority of converted roads-to-trails fall under the NFSTs open to wheeled vehicles 64 inches wide and less category, versus under the NFSTs open to all wheeled vehicles category under Alternative 2 (compare Table 23 with Table 17). Seasonal restrictions applied to motorized trails would address potential impacts to forest resources, and the effects analysis below examines these potential impacts with respect to individual resources.

This proposed system would provide similar access opportunities as identified under Alternative 2. Additional discussion of recreational impacts is set forth in 3.3 (Recreation: the Shoshone Motorized Trail Network and Recreation Opportunities).

2.4.1.3.2 OSV Use

Alternative 3 proposes to designate trails and areas for OSV use similar to Alternative 2, though Alternative 3 does not propose to add any additional trails. This alternative includes the following actions for OSV use:

- Designating 288.88 miles of groomed and ungroomed trails for Class 1 OSV use (201.19 miles groomed, 87.69 ungroomed)
- Adding 10.12 miles of ungroomed trails to the Class 1 OSV trail system
- Designating, consistent with Forest Plan direction, trails suitable for Class 2 OSV
- Closing approximately 1,350 acres to OSV use to allow cross-country skiing and minimize conflicts between users
- Closing approximately 9,175 acres to OSV use in the High Lakes Wilderness Study area

Mileages and acreages open to OSV use under Alternative 3 are set forth in Table 24.

Table 24: Alternative 3 Designated OSV Use Opportunities Open to the Public

Winter Motorized Travel	Clarks Fork RD	Greybull RD	Wapiti RD	Washakie RD	Wind River RD	Total
Trails (Miles)						
Snowmobile Trails - Groomed	25.65	0	1.99	59.22	114.32	201.19
Snowmobile Trails - Ungroomed	31.20	0	0	2.56	53.94	87.69

Total FS Snowmobile Trail System	56.85	0.00	1.99	61.79	168.26	288.88
Area (Acres)						
Total Area Open to OSV Travel	161,613	28,462	9,137	112,764	200,465	512,442

Alternative 3 also would designate trails for Class 2 OSVs on the OSVUM, totaling 146.03 miles under this alternative. Of these trails, 20.84 miles occur outside of a designated MVUM road or motorized trail. These routes currently contradict Forest Plan direction with respect to Class 2 vehicles. This use may necessitate a Forest Plan amendment if carried forward.

Table 25: Alternative 3 Designated Tracked ATV Use on Ungroomed Snowmobile Trails

Tracked ATV Operation	Clarks Fork RD	Greybull RD	Wapiti RD	Washakie RD	Wind River RD	Total
Use Outside an MVUM Road or Motorized Trail	20.84	0.00	0.00	0.00	0.00	20.84

This Alternative would implement the Travel Management Regulations, Subpart C, and the Forest would publish OSVUMs at the conclusion of the project.

3 Chapter 3 – Environmental Impacts

3.1 Introduction

This chapter summarizes the physical, biological, social, and economic environments of the project area and the effects of implementing each alternative on that environment. It also presents the scientific and analytical basis for the comparison of alternatives presented in the alternatives chapter. This chapter presents the description of the affected environment, direct/indirect effects, and cumulative impacts. The Council on Environmental Quality (CEQ) Regulations recognizes three types of effects:

Direct effects are caused by an action and occur at the same time and place.

Indirect effects are caused by an action but occur later in time or farther removed in distance.

Cumulative impacts result from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes the actions.

(40 C.F.R. §§ 1508.7, .8) As past actions are already included in the affected environment, the cumulative impacts analysis builds upon this existing condition assessment by considering the incremental addition of direct and indirect effects of the proposed action as well as ongoing and reasonably foreseeable actions. A more detailed discussion of cumulative impacts is included below.

This chapter presents the scientific and analytical basis for comparison of the alternatives presented. It is organized by individual resource topic. Each resource topic section utilized unique methodology with different data sources to assess potential effects to resources under the alternatives. These methodologies, data sources, and analysis are described for each resource.

The Environmental Consequences section for each resource topic discusses direct, indirect, and cumulative impacts of implementing the alternatives and applicable design criteria. This section incorporates issue indicators, resource specific assumptions, and any incomplete or unavailable data at the time of the analysis.

3.1.1 Assumptions

The Forest Service made the following general assumptions for this analysis that apply to all resource analyses:

- Generally applicable standards and laws that apply throughout the analysis below include: the Travel Management regulations (36 C.F.R. pt. 212, subpts. A, B, and C); Executive Order 11644 (February 8, 1972); Executive Order 12898 (February 11, 1994); the Multiple Use - Sustained Yield Act of 1960; the National Environmental Policy Act of 1969; the National Forest Management Act of 1976; and the Forest Service Manual and the Forest Service Handbook.
- The current maintenance conditions of roads (NFSRs) and trails (NFSTs) open to public wheeled vehicle use would generally stay the same over time.
- New routes proposed under the alternatives (i.e., new NFSRs or new NFSTs) would be designated and added to the MVUM or OSVUM after any necessary regulatory actions and construction are

completed. Necessary regulatory actions include acquiring permits and authorizations from responsible local, state, and federal agencies, performing on-site surveys, and applying site-specific mitigation actions to minimize potential impacts.

- New NFS routes added to the system are also contingent on available funding. The Forest anticipates developing partnerships to support funding these projects.
- NFSTs open to all wheeled vehicles and NFSRs open to all wheeled vehicles have similar effects based on the vehicle characteristics and use (e.g., vehicle size, speed traveled on routes, frequency of travel, etc.).
- Any NFS routes not included in the decision are not precluded from being added, modified, or removed from the Shoshone's transportation system in future travel management decisions.
- Increased use from both motorized and nonmotorized recreational users may occur if populations increase.
- Public vehicle use would be limited to those routes and areas proposed under the alternatives for inclusion in the MVUMs and OSVUM by class and vehicle and time of year.
- Reducing routes available to public motor vehicle use may concentrate motor vehicle use.
- Decisions made in the Shoshone Forest Plan (2015) are incorporated into this analysis.
- Decommissioning routes could allow them to return to conditions similar to the surrounding areas over time. Blocking the entrance to a route is the minimum requirement for decommissioning. Refer to 36 C.F.R. § 212.5(b)(2) for potential route decommissioning activities.
- Motorized use of routes not designated for such use is not included in this analysis.
- This analysis evaluates the impacts of designating NFSRs, special use permit (SUP) roads, closed roads, motorized NSFTs, and areas.
- Future monitoring of wheeled and OSV use will occur coincidental to other ongoing monitoring and review activities on the Forest. When and where feasible, the Forest Service will assess vehicle use impacts with respect to forest resources and determine whether responsive action is necessary to limit impacts (examples of responsive action include seasonal restrictions, route closure, vehicle size limitations, and other similar measures).
- Public users will provide an additional monitoring mechanism, and the Forest Service will coordinate with both motorized and nonmotorized user groups to obtain site-specific vehicle use data.
- Current management of cross-country wheeled travel will not change under the action alternatives. Cross-country wheeled travel and game retrieval will remain prohibited on the Shoshone National Forest; dispersed camping will be permitted along designated NFS routes identified on the MVUM.
- Unless otherwise indicated, mileage and acreage figures are approximate and based on the nearest 100th, e.g., X.XX miles or 10th, e.g., X.X acres.

3.1.2 Data Sources

The Shoshone utilized as a primary data source the Forest Service's INFRA database, which tracks spatial (GIS) data and other attributes for NFS routes. INFRA includes information on existing conditions, seasonal restrictions, primary maintenance, maintenance levels, and other relevant NFS route attributes, and allows for tracking and recording changes to the NFS routes.

The agency insures the professional integrity, including scientific integrity, of the discussions and analyses and incorporates GIS and other data from various sources including those maintained by Forest Service resource specialists and other agencies, such as the Wyoming Game and Fish Department, Wyoming Department of Health, Wyoming Department of Administration and Information, the Environmental Protection Agency (EPA); US Census Bureau; US Geological Survey (USGS); and US Fish and Wildlife Service (USFWS).

3.1.3 Cumulative Impacts

Past, present, and reasonably foreseeable activities are actions known to have occurred, are presently occurring, or are likely to occur within the analysis areas for the Shoshone National Forest Travel Management Planning Project. These actions may contribute cumulative impacts when combined with the proposed activities. The Forest Service Handbook uses the Council on Environment Quality's definition of cumulative impact:

the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

(FSH 1909.15.05 (citing 40 C.F.R. 1508.7)) Cumulative impacts analysis incorporates, therefore, three categories of actions into the analysis of alternatives: past, present, and reasonably foreseeable future actions.

The analysis of cumulative impacts builds from consideration of the direct and indirect impacts on the environment that are expected or likely to result from the proposed action and alternatives. The environmental analysis required under NEPA is forward-looking in that it focuses on the potential impacts of the proposed action and alternatives. However, past and present activities have contributed or could be contributing to the existing condition of resources, as described in the Environmental Consequences sections of the resource analyses. Additionally, reasonably foreseeable activities may produce environmental effects to resources relevant to the proposal. Therefore, past, present, and reasonably foreseeable activities have been considered in the cumulative impacts analysis for each resource relative to potential future effects of the proposed activities. Because the proposal's direct and indirect effects vary in time and space, each likely effect should have a defined and specific cumulative impacts analysis area and timeframe.

The activities listed below are addressed in the Environmental Consequences discussions for each resource, identifying which effects may contribute cumulatively to the effects of the proposed activities, and what those effects might be. They are analyzed and discussed individually to the extent they may provide unique or especially pertinent ongoing and future cumulative impacts relevant to the pending

decision or are somehow particularly useful in illuminating or predicting the direct and indirect effects of the proposed activities, whether or not the monitored effects are actually cumulative to the proposed activities.

3.1.3.1 Past Actions

Only those residual impacts from past actions that are of the same type, occur within the same geographic area, at the same time, and have a cause-and-effect relationship with the direct and indirect impacts of the proposed action and the alternatives are considered relevant and useful for the cumulative impacts analysis. This analysis relies, to a large extent, on an examination of the current environmental conditions in order to highlight the impacts of past actions. These current conditions, reflective of past actions, facilitate analysis of the cumulative impacts of the proposed action and alternatives and past actions. This method allows for efficient analysis, since existing conditions reflect the aggregate impact of all prior human actions and natural events that have affected the environment and might contribute to cumulative impacts. Additionally, some of these activities may continue to produce environmental effects that overlap in time and space with issues or resources relevant to the proposed action and alternatives.

Table 26 lists known past activities on National Forest System and adjacent lands as identified by resource specialists, documentation, other agencies, etc. There are marked differences between past and current land management practices and policies. The evolution that has occurred in land management practices is the result of science, our ongoing monitoring results, and changing public values. During the scoping process and subsequent analysis of this project, the Forest Service determined that the past activities, decisions, information, and environmental documents listed in Table 26 are applicable to all or portions of the National Forest System lands included in the analysis area, and considered them during the cumulative impacts analyses discussed in this chapter.

3.1.3.2 Ongoing and Reasonably Foreseeable Future Actions

Cumulative impacts can only occur when the likely impacts resulting from the proposed action or alternatives overlap spatially and temporally with the likely impacts of ongoing and reasonably foreseeable future actions (FSH 1909.15, § 15.2). These actions encompass “[t]hose Federal or non-Federal activities not yet undertaken, for which there are existing decisions, funding, or identified proposals.” (36 C.F.R. § 220.3). And an “identified proposal” refers to a concrete goal for which the Forest Service is preparing a decision or implementing a decision and where the effects of the decision can be meaningfully evaluated (40 C.F.R. § 1508.23). Relevant present or reasonably foreseeable future actions are those having impacts that accumulate with the impacts of the alternative being analyzed.

3.1.3.3 Region of Influence

The region of influence for each resource evaluated by the cumulative impacts analysis is the project area, unless otherwise noted.

3.1.3.4 Time Frame

The time frame of the cumulative impact analysis incorporates the sum of the impacts of anticipated future actions consistent with implementing an alternative, in combination with other past, present, and future actions. This is because impacts may accumulate or develop over time. The future actions described in this analysis are those that are “reasonably foreseeable”; that is, they are ongoing (and will continue into the future), are funded for future implementation, or are included in firm near-term plans. The

temporal boundary for the cumulative impacts analysis is from 2010 through 2030, the farthest date out to reasonably identify future actions.

3.1.3.5 Process for Assessing Cumulative Impacts

The cumulative impact analysis for each resource or resource use builds on the analyses of the direct and indirect impacts of anticipated future actions to be taken, consistent with the project alternatives. In addition, the cumulative impact analysis considers other past, present, and reasonably foreseeable future actions and their impacts on natural resources, ecosystems, and human uses in the project area.

Table 26: Past, Current, and Reasonably Foreseeable Future Actions Considered in the Cumulative Impacts Analysis

Project Name	Project Description	Implementation Timeframe	District
Forest-Wide Management			
Forest Plan Revision	Revise the Forest Plan to provide current guidance on resource management activities on the Forest.	2015	Forest
Invasive Plant Management	Control of noxious and other invasive plants through the integration of manual, mechanical, biological, and ground and aerial herbicide control methods	2021	Forest
Mountain Bike Management	Designation of non-motorized trails for mountain bike use	2021	Forest
Roads & Trails Management			
Beartooth Hwy Reconstruction	Project to maintain and reconstruct Federal Highway 212, led by the Wyoming Department of Transportation	2018-2020	Clarks Fork
Seven D Bank Stabilization	This is a proposed long-term solution for bank stabilization on Sunlight Creek where it intersects with FSR 101.2A (7D Rd). 200 linear feet of bank will be stabilized using large woody debris and historic gravel will be replaced.	2018	Clarks Fork
Loop Road Maintenance	Loop Road Maintenance project improves sight distance by constructing pull-outs, add additional curve-widening, and perform road-side brushing.	2018	Washakie
Fossil Hill to Frye Lake Trail	Construction of non-motorized trail from Fossil Hill to Sheep Bridge Trail #701	2018	Washakie
Togwotee Pass to Brooks Lake Non-motorized Trail Construction	Construction of a non-motorized trail from Hwy 26/287 at Togwotee Pass to connect with NFS Trail #823. This trail is intended to be part of the Continental Divide National Scenic Trail once a separate project moving the trail is completed.	2019	Wind River
Cody County Snowmobile Association Shelter Permit Renewal	Proposal to issue a new permit to operate and maintain a shelter within the Island Lake Campground.	2019	Clarks Fork

Project Name	Project Description	Implementation Timeframe	District
Lander Nordic Ski Association Inner Pipeline Groomed Trail Extension	Proposal to authorize the Lander Nordic Ski Association to extent the Inner Pipeline Trail at the Beaver Creek Cross-Country Ski Trails.	2020	Washakie
Upper Brewers Trail Over-snow Grooming for Non-motorized Over-snow Travel	Proposal for over-snow grooming of the 5.5 mile long Upper Brewers Trail and a 1-mile portion of Forest Road 302.1E on the Washakie District for non-motorize over-snow use limited to skis, fat tire bikes and snowshoe travel.	2019	Washakie
Vegetation Management			
Budworm Response Project	The proposal is to treat approximately 2,000 acres using a combination of vegetation management prescriptions including sanitation salvage, shelterwood/seed tree harvest prescription.	2020 – 2024	Clarks Fork
Sunlight Vegetation Management Project	Vegetation management activities to improve forest condition, reduce the build-up of hazardous fuels, enhance defensible space, and improve wildlife habitat.	2020	Clarks Fork
Russell Peak Sanitation and Fuels Reduction	Proposal to utilize timber harvest and non-commercial treatments to respond to insect infestation, reduce fuel continuity near private structures and move vegetation towards Forest Plan desired conditions.	2020	Clarks Fork
High Lakes Resiliency Project	Proposal to implement vegetation management activities along Federal Highway 212.	2022	Clarks Fork
Greater Greybull Project	Vegetation management activities to improve forest condition, reduce build-up of hazardous fuels, enhance defensible space around historic Kirwin mining area, and improve wildlife habitat.	2020 – 2023	Greybull
Pine Creek HFRA	Pine Creek Project addresses insect and disease infestation on the southernmost portion of the Washakie Ranger District through a combination of treatments including mechanical harvest, aspen enhancement, and use of prescribed fire.	2020	Washakie
Loop Road Fuel Break	Project reduces fuel loads along Forest Service Road 300 through mechanical treatment and prescribed fire operations.	2020 – 2021	Washakie
Long Creek Project	Vegetation management project to treat approximately 7,479 acres using the following methods: Sanitation salvage; Aspen enhancement; Pre-commercial thinning; and Prescribed burning.	2020	Wind River

Project Name	Project Description	Implementation Timeframe	District
Lower Wind Vegetation and Fuels Reduction	Vegetation management activities to improve forest conditions and reduce hazardous fuels.	2021	Wind River
Lava Mountain Project	Vegetation management to treat approximately 5,367 acres using the following methods: Sanitation Salvage; Group Selection; Pre-commercial thinning; and Prescribed burning of piles	2020 – 2023	Wind River
Range Management			
Livestock Grazing Permit Renewal (2008)	Renewal of permits to graze for Face of the Mountain, Ghost Creek, Bench Guard Station, Rock Creek allotments.	2008	Greybull, Wapiti
Livestock Grazing Permit Issuance (2009)	Permit issuance for Greybull livestock grazing allotment.	2009	Greybull
Livestock Grazing Permit Issuance (2010)	Permit issuance for Basin, Lake Creek, Greybull, Piney, Squaw Creek, Atlantic City, Bull Creek, Carter Creek, Valley/Boulder, Salt Creek, Fish Lake, and Doby Cliff allotments.	2010	Clarks Fork, Greybull, Wapiti
Livestock Grazing Permit Issuance (2010)	Permit issuance for Little Rock, Sugarloaf, Washakie Needles, Bayer Mountain, and Middle Fork grazing allotments.	2010	Clarks Fork, Greybull, Washakie
Livestock Grazing Management (2013)	Grazing permits for the Big Creek, North Fork Winter Range, Rand Creek and Robbers Roost and seven Recreation Horse Allotments.	2013	Wapiti
Special Use Permitting (Outfitting, Guiding, and other Recreational Uses)			
Worthen Reservoir Special Use Permit Reissuance	Proposal to reissue a special use permit to the City of Lander, Wyoming to operate and maintain a reservoir, dam, and other structures necessary for monitoring flows into and out of the reservoir.	2020	Washakie

3.2 Transportation: the Shoshone NF Road System

3.2.1 Introduction

The analysis of transportation effects examines the existing road system, proposed changes under the different Alternatives, and corresponding maintenance and funding needs. This analysis assesses primarily the minimum road system consistent with 36 C.F.R. part 212, subpart A, but also addresses the designated NFS road system pursuant to 36 C.F.R. part 212, subpart B. Recreational impacts associated with NFS roads and NFS trails is considered in the following Recreation section (*see* 3.3).

The travel management regulation at 36 C.F.R. § 212.5 requires the Forest Service to identify a minimum road system needed for safe and efficient travel for administration, utilization and protection of NFS lands; and to identify roads under Forest Service jurisdiction that are no longer needed to meet resource management objectives for decommissioning or converted to other uses, such as trails (*see* 2.2.1). In

determining the minimum road system, the responsible official must incorporate a science-based travel analysis which informs future travel management decisions affecting use, operation and maintenance based on the physical, biological, social and economic benefits and risks of roads. Guiding the analysis is the TAP/TAR process conducted in 2015 and 2017. That process is described in greater detail below.

3.2.1.1 Travel Analysis Process/Travel Analysis Report

Travel Analysis is intended to inform subsequent National Environmental Policy Act (NEPA) processes, allowing individual projects to be more site-specific and focused, while still addressing cumulative impacts. The Travel Analysis Process (TAP) neither produces decisions nor allocates National Forest System lands for specific purposes. It merely provides the analytical framework from which to make recommendations that may then be examined in the NEPA process. It describes current conditions, risks, benefits, opportunities (needs for change), and recommends priorities for action.

The Forest began the process of identifying the minimum road system by reviewing roads for benefits and risks as part of the Travel Analysis Process (TAP). The Forest completed an initial TAP, and resulting Travel Analysis Report (TAR), in 2015. In 2017 the Forest revised the TAP/TAR and made it available to the public for review including an informal comment period which ended August 31, 2017.

The recommendations from the 2015 TAR are shown below:

- Roads listed in the H/H (High Benefit and High Risk) category should be considered for future capital improvements. These roads are needed as part of the minimum road system, and also represent resource and/or financial concerns. Action should be taken in order to reduce the risk impacts along these roads. These roads should receive the highest priority for maintenance and mitigation.
- Roads in the H/M (High Benefit and Medium Risk) category should be considered as a priority for maintenance and mitigation, but of a lesser priority when compared to the roads in category H/H. These roads are needed as part of the minimum road system due to their high benefit.
- Roads in the H/L (High Benefit and Low Risk) category are ideal roads because they provide high benefits to forest management and pose low risks. These roads are needed as part of the minimum road system.
- Roads in the M/H* (Medium Benefit and High Risk) category should be considered for priority mitigation of resource impacts, downgrading to a lower operational maintenance level (ML 2 to 1), or decommissioned.
- Roads in the M/M (Medium Benefit and Medium Risk) category should receive mitigation and maintenance, though secondary in priority to roads with higher benefits or higher risks. These roads create some resource impacts but also provide benefits. These roads are needed as part of the minimum road system.
- Roads in the M/L (Medium Benefit and Low Risk) category are needed as part of the minimum road system due to their importance and relatively low resource risk.
- Roads in the L/H* (Low Benefit and High Risk) category should be analyzed in depth and potentially downgraded to a lower operational maintenance level (ML 2 to 1), or decommissioned.

If decommissioning occurs, the risk impacts need to be addressed so they are eliminated or greatly reduced as a result of the decommissioning process.

- Roads in the L/M* (Low Benefit and Medium Risk) category should be considered as a low priority for maintenance. Similar to roads in the L/H these roads should be further analyzed for downgrading maintenance level, or decommissioning.
- Roads in the L/L* (Low Benefit and Low Risk) category should be analyzed in depth and potentially downgraded to a lower operational maintenance level (ML 2 to 1), or decommissioned.

Categories with an asterisk (*) next to them were shown as “Likely Not Needed for Future Use” on the Appendix B maps of the 2015 report. The categories with no asterisk were shown as “Likely Needed for Future Use” in the same report.

In 2017, the Forest Service re-engaged the TAP to refine its analysis with respect to ranking of roads. As described in the 2017 TAR, the 2017 TAP/TAR

was completed during a three-day workshop in which the team reviewed GIS data, INFRA data, aerial and topographic data, historic planning and project documents and filled out the TAP Matrix spreadsheet. The team collectively ranked each route based on the TAP criteria, which allowed for an iterative, collaborative, and rapid analysis process. Additionally, the roads identified as needing an in-depth analysis in the 2015 TAR were further evaluated and designated as needed or not needed for future use. The main focus of this TAP is to evaluate all existing NFSRs on the Shoshone National Forest for benefits and risks to other resources. During this evaluation existing roads that are currently not on the system were identified as potentially needed for land management activities.

During the three-day workshops it was determined that identifying roads as needed or not needed based on the benefit and risk did not represent access needs for forest management. For example, if a road had a low benefit but was an important access route for timber management, the road was identified as Likely Needed for Future Use. Therefore, individual road determinations were made during the workshops and the final designations were shown on the 2017 Travel Analysis Report Appendix A Benefit/Risk Matrix and Appendix B Maps.

The recommendations from the 2017 TAR are shown below with relevant descriptions:

- Roads listed in the H/H (High Benefit and High Risk) category should be considered for future capital improvements. These roads have resource and/or financial concerns. Action should be taken in order to reduce the risk impacts along these roads. These roads should receive the highest priority for maintenance and mitigation.
- Roads in the H/M (High Benefit and Medium Risk) should be considered as a priority for maintenance and mitigation, but of a lesser in priority when compared to the roads in category H/H.
- Roads in the H/L (High Benefit and Low Risk) category are ideal roads because they provide high benefits to Forest management and pose low risks.

- Roads in the M/H (Medium Benefit and High Risk) category should be considered for priority mitigation of resource impacts, but of a lesser in priority when compared to the roads in category H/M.
- Roads in the M/M (Medium Benefit and Medium Risk) category should receive mitigation and maintenance, though secondary in priority to roads with higher benefits or higher risks. These roads create some resource impacts but also provide benefits.
- Roads in the M/L (Medium Benefit and Low Risk) are important and present a relatively low resource risk.
- Roads in the L/H (Low Benefit and High Risk) category should receive mitigation and maintenance, though lower in priority to roads with higher benefits or higher risks.
- Roads in the L/M (Low Benefit and Medium Risk) category should be considered as a low priority for maintenance.
- Roads in the L/L (Low Benefit and Low Risk) category are relatively low resource risk.”

Not Likely Needed roads were selected by the TAP interdisciplinary team as roads that are not needed by resource specialists for the long-term management of the Forest. Additionally, existing non-system roads were identified as having a potential need for land management activities. Those roads were designated as Likely Needed.

The original scoping effort for Travel Management, the TAP and the resulting TAR, combined with input from the public and scoping comments, were used to develop the initial proposal for the minimum road system. Also noteworthy is that during the TAP a wildlife biologist was not part of the interdisciplinary team; however, during this current travel management effort a wildlife biologist will be analyzing all alternatives.

3.2.1.2 Current Analysis and Proposals

A National Forest System Road (NFSR) is defined as “A forest road other than a road which has been authorized by a legally documented right-of-way held by a State, county, or other public road authority.” (36 C.F.R. § 212.1) The Forest Service’s authority to develop and maintain a road system is set forth at 16 U.S.C. § 532. This direction regarding the administrative, protection, and utilization of National Forests recognizes the need for a transportation system to facilitate legitimate uses and management activities. Although the National Forest Road System is considered a “public” road system, it does not provide for the general commerce, convenience, and transportation needs of the public at large in the same manner as a public highway system. The Forest Service encourages public use of the National forests; therefore, the road system needs to accommodate public access and use, provided that these activities are consistent with existing laws, regulations, and management objectives.

Motor Vehicle Use is designated and shown on the Motor Vehicle Use Map (MVUM). This designation, per 36 C.F.R. § 212.51, describes the classes of wheeled motor vehicles and time of year that public wheeled vehicle use is allowed on the NFSR. Vehicle classes can include licensed vehicles (typically cars, sport utility vehicles, or licensed motorcycles) or unlicensed vehicles (typically ATVs, UTVs, and some motorcycles). The resulting minimum road system will include all of the Shoshone National Forest System roads shown on a Motor Vehicle Use Map (i.e., those roads designated as open to public wheeled vehicle use), as well as

those roads not shown on the Motor Vehicle Use Map (i.e., administrative or permitted use roads and those that have been placed in storage).

This analysis will focus on comparing the effects of implementing the proposed alternatives. The issues pertaining to transportation that have been identified for a detailed analysis include: management, maintenance, and funding of the existing and proposed road network, and potential conflicts of motorized mixed-use.

3.2.2 Methodology

This analysis is based on information contained in the Forest Transportation Atlas, which consists of Geographic Information System (GIS) data (current as of February 26, 2020), the Forest Natural Resource Manager (NRM) databases (current as of March 9, 2020) and the Transportation Analysis Report (April 27, 2017). Available funding amounts are based on the average of recent fiscal years: 2018 (FY18), 2019 (FY19), and 2020 (FY20). All numbers have been rounded to the nearest whole number.

3.2.2.1 Resource Indicators and Measures

The issues pertaining to transportation that have been identified for detailed analysis are: management, maintenance, and funding of the existing and proposed road network, and potential conflicts of motorized mixed-use.

Table 27: Resource condition indicators and measures for assessing effects

Issue	Indicator or Measure	Source
Management, maintenance, and funding of the existing and proposed road network	Miles	2015 Forest Plan (see Land and Resource Management discussion beginning on page 13.)
Motorized mixed use	Miles	EM-7700-30

3.2.3 Environmental Consequences

The primary issues involving the road system implicate both the minimum road system established under 36 C.F.R. part 212, subpart Am and the designated road system open to the public pursuant to 36 C.F.R. part 212, subpart B. The analysis of environmental consequences considers these aspects of the road system, particularly the ability of the Forest Service to manage, maintain, and fund the system. These key considerations are described and analyzed below.

3.2.3.1 Road Management, Maintenance and Funding

Road management involves managing NFS roads to: prevent damage to roadways, abate unsafe traffic conditions, control the use of vehicles that exceed the design capacity of a road, require cost recovery from commercial haulers to reduce maintenance costs, and meet any other road management objectives (RMOs), such as protecting wildlife habitat or achieving recreation opportunity spectrum (ROS) objectives. Road maintenance pertains to maintaining NFS roads to accommodate their intended use safely and in accordance with maintenance criteria documented in their RMOs. Funding is monies used to support road maintenance and construction activities.

Each year the Forest Service is responsible for maintenance of NFS roads. Roads are periodically assessed for condition, resource damage and maintenance needs. Roads require various levels of maintenance and

investment to stay functional. Road maintenance items are divided into those elements that are performed on an annual basis, on intermittent bases, and referred to as deferred maintenance. Annual maintenance, typically on ML 3 to 5 roads, includes items such as surface grading, ditch cleaning, culvert cleaning, dust abatement and if warranted, gravel replacement. Items such as roadside brushing on open roads, sign and gate replacement, checking stored roads for storm damage are performed on an intermittent basis. ML 1 road maintenance includes improving damaged road closures and repairing failed drainage structures. Deferred maintenance consists of maintenance that could not be accomplished in a timely manner and therefore becomes deferred. These items are usually more costly and require out-year planning and budgeting. Examples include culvert or bridge replacements, heavy maintenance items such as roadside clearing, culvert installation and minor road realignment related to safety improvements.

Table 28 describes the desired funding to maintain roads consistently and according to maintenance level specification. Road maintenance levels (ML) are described above in section 1.3.1.1. These costs do not represent a full maintenance cycle for every mile of road, instead they reflect the typical annual cost for maintenance of this group of roads at the recommended frequency. These cost estimates are a result of amortizing the costs for the maintenance cycle. For example, a maintenance level 2 road is maintained once every five years at a total cost of \$800 a mile, an amount that amortizes to \$160 per year. The cost estimates are based on annual maintenance needs such as blading, cleaning culverts and maintaining drainage structures and do not include deferred maintenance costs.

Table 28: Desired Annual Maintenance Interval and Annual Costs by Maintenance Level (based on average costs in NRM).

Maintenance Level	Cost/Mile	Desired Maintenance Interval	Annual Maintenance Cost/Mile
1	\$150	10 Years	\$15
2	\$800	5 Years	\$160
3, 4 & 5	\$1,500	1 Year	\$1,500

Road maintenance is funded primarily by Forest Service annual appropriations and periodically through project proposals by the Regional Office, Federal Highway Administration, and Wyoming Game and Fish Department. Maintenance priorities are identified in annual maintenance plans. Priorities incorporate safety, traffic volume, resource damage and road condition concerns. Road maintenance is not static: rather, it depends upon a number of factors, including:

- Allocated funding for road maintenance;
- Miles of road maintained through commercial activities, such as timber sale contracts, and by cooperators or other parties;
- Funding allocated for reconstruction and improvement projects to support emergency repairs, mitigate safety concerns, and meet other management activities;
- Funding needed for large projects, such as bridge replacement;
- Resource protection needs.

The Shoshone National Forest appropriated budget for road maintenance varies annually. The average funds available for maintenance from FY18 to FY20 was \$395,472. The amount allocated for road maintenance fluctuates on a yearly basis. Items such as annual appropriation totals, when the funds are received, employee salary, vacant positions, and additional mid-year appropriations all impact road

maintenance activities. The general trend in the Forest Service is for funds to be held at the Washington and Regional Office levels to support large scale projects. The result is that less appropriations are sent to the field units. It is projected that approximately \$275,000 will be available for road maintenance in FY21.

The Shoshone has been successful in applying for and receiving funds from the Federal Highway Administration for road repairs on maintenance level 3 - 5 roads. These funds supplement shortfalls in budgeting to maintain these higher ML roads. Not every road requires annual physical maintenance to stay functional. The Shoshone physically maintains approximately 21 percent of the open road system on an annual basis. Roads in maintenance levels 3 - 5 receive a higher level of attention because they are the primary access routes through the Forest and receive higher volumes of traffic. Maintenance on these roads generally includes surface blading once a year.

Approximately 158 miles of maintenance level 3 - 5 (ML 3 - 5) roads and 42 miles of ML 2 roads are maintained annually on a priority basis. The Shoshone Forest Plan Objectives for road maintenance sets an objective of annually maintaining 60% of ML 3 - 5 roads and 5% of ML 2 roads. Historically, these objectives have been met on an annual basis. Table 3 illustrates the miles of road and associated cost for the existing road system. The projected road maintenance funding (\$275,000) is down from previous years but is still sufficient to meet Forest Plan objectives (\$178,580). Funds above those needed to meet Forest Plan objectives are used to: repair washouts from the spring runoff, repair soft spots in the roadway, reopen roads closed by landslides and clean or replace culverts. The costs of these annual repairs (as distinguished from annual maintenance) regularly exceed available funding and lead to a repair backlog for NFSRs.

Table 29: Alternative 1 –Annual Maintenance Costs to meet Forest Plan Objectives.

Forest Plan Objectives	Miles of Road	Annual Maintenance (\$/mile)	Estimated Annual Cost
Forest Plan Objectives for ML 2 (5%) maintenance	38	\$160	\$6,080
Forest Plan Objectives for ML 3, 4, 5 (60%) maintenance	115	\$1,500	\$172,500
Total	153	\$1,660	\$178,580

Overall, the trend for the majority of the Shoshone’s roads is toward declining condition due to the reduction in overall funding and increases in traffic volume and use. As a result, deferred maintenance funding needs have increased to an estimated \$25 million. The Forest is not able to address certain items on an annual or proper cyclical basis, such as those listed below:

- Brushing needed every 10 years which is important for safety on ML 3 - 5 roads.
- Maintaining and replacing signs, signposts and cattleguards on System roads.
- Gate replacement and repairs on roads seasonally closed and/or ML 1 roads.
- Damage from unexpected severe weather events such as slides or slumps, which cannot be addressed with annual maintenance dollars unless the damage is large enough to qualify for alternative funding.

- Surface repair and surface rock replacement on ML 3 - 5 roads, which requires a large influx of funds for the year the rock is replaced (many of these roads require surface rock replacement at least every 10 years).
- Installation of large culverts, bridges and low water crossings.
- Bridge maintenance needs such as replacing running surfaces and guardrails.

3.2.3.2 Motorized Mixed Use

Motorized mixed use occurs when a NFSR is designated for use by both highway-legal and non-highway legal motor vehicles. Operators of highway-legal motor vehicles are subject to state traffic law, including requirements for operator licensing. When a Responsible Official proposes to depart from state traffic law by authorizing motorized mixed use where it would otherwise be prohibited, those decisions must be advised by documented engineering analysis conducted by a qualified engineer. The role of the qualified engineer is to analyze information on the road and road use and to recommend actions to mitigate safety risks. Motorized mixed use on NFSRs designed, operated, and maintained for high-clearance vehicles may be appropriate where the objectives of minimizing use conflicts and promoting public safety can be met.

Wyoming authorizes use by off-road vehicles on roadways and trails enrolled in the State ORV program. The State manages this system under its Trails Program. Table 30 below helps to illustrate the requirements for operating on different roads and motorized trails within Wyoming and under the State Trails Program. The Shoshone National Forest has enrolled all its roads in the State ORV program thus bypassing the need to conduct a motorized mixed-use engineering report. Additionally, no alternative considered under this project proposes motorized mixed-use roads (proposed NFSTs allowing for a broad range of users, would be treated as trails and not roads). If proposed future use departs from this management regime, from State law, or if monitoring for potential conflicting motor vehicle use indicates use conditions such as increase in speed, volume, composition or distribution of traffic, the Forest Service will consider whether to conduct an engineering analysis report for the given route.

Table 30: General Summary of Operation Requirements under Wyoming’s Off-Road Vehicle Program¹

Regulated Entity	Roads outside of the Wyoming ORV Program	Roads under the Wyoming ORV Program	Motorized Trails under the Wyoming ORV Program
Vehicle	Comply with State Law (i.e., Street Legal) and have a Vehicle License Plate ²	Obtain Wyoming ORV Program Permit and/or Have a Licensed Vehicle	Obtain Wyoming ORV Program Permit and/or Have a Licensed Vehicle
Operator	Must have a valid operator’s license and carry proof of liability insurance.	Must have a valid operator’s license and carry proof of liability insurance.	No driver’s license requirement.

¹ For more information on off-road vehicle use in Wyoming, please consult the Wyoming Parks Trails Program website.

² Vehicles with a license plate (including multi-purpose vehicle license plates) may operate on any roadway in Wyoming except interstate highways.

3.2.3.3 Alternative 1 – The No Action Alternative

Under Alternative 1 the existing road system would remain in place as is.

3.2.3.3.1 Direct and Indirect Effects

Alternative 1 would allow current road management and maintenance practices to continue with priority going to those NFSRs with higher traffic volumes, safety, and environmental concerns. No ground disturbing activities from construction of new roads would occur, and unneeded roads would not be decommissioned. No existing NFSRs would be converted to NFSTs.

The Forest would not perform maintenance, reconstruction, closing, or reclassification of unauthorized routes. Unauthorized routes, in many cases, have no drainage structures, poor alignment, and are located in drainage bottoms, on steep slopes, and in meadows, resulting in vegetation compaction and loss.

The TAP/TAR would be used to inform future road decisions on a case-by-case project basis in separate NEPA analyses. Seasonal or administrative closures, or road projects including reconstruction, realignment or decommissioning would be considered during those analyses. Table 31 displays the system miles and desired annual maintenance funding under this alternative.

Table 31: Alternative 1 – No Action Road System Miles and desired Annual Maintenance funding.

ML	Miles of Road (Rounded to Nearest Whole Mile)	Annual Maintenance (\$/Mile)	Desired Annual Funding Required to Meet Maintenance	Alt 1 Forest Plan Maintenance Objectives Annual Cost
ML 1	181	\$15	\$2,715	\$0
ML 2	761	\$160	\$121,760	\$6,080
ML 3 – 5	192	\$1,500	\$288,000	\$172,500
Total	1,134	\$1,675	\$412,475	\$178,580

3.2.3.4 Alternative 2 – The Proposed Action

This section analyzes the effects associated with Alternative 2. Alternative 2 proposes a minimum road system with a net reduction of 63 miles from Alternative 1 as shown in Table 32. The Alternative 2 minimum road system does not affect the operational ML 3 - 5 arterial and collector road system because of their high value for recreation, timber management, and other forest uses.

Table 32: The resulting minimum road system for Alternative 2 by Maintenance Level

ML	Alt 1 (Miles)	Alt 2 (Miles)	Difference between Alt 1 and Alt 2 (Miles)	TAP/TAR Recommendation by ML (Miles) *
ML 1	181	249	+68	210
ML 2	761	630	-131	719
ML 3 - 5	192	192	0	184
Total System Miles	1,134	1,071	-63	1,112

*Miles shown is the sum of roads listed as "Likely Needed" minus roads "Not Likely Needed". For example, ML 1 miles shown is 232 miles (Likely Needed) – 22 miles (Likely Not Needed) = 210 miles.

Key points of the minimum road system under Alternative 2 (by ML) and with reference to the TAP/TAR are set forth below (see Appendix B for a crosswalk between the TAP/TAR):

- ML 1 – Includes non NFSRs that will be put in storage and used for long term management needs.
- ML2 – Converts many ML 2 NFSRs to NFSTs. One NFSR that was identified as not needed in the TAP/TAR was FSR 480.1F, but it is being proposed as part of the minimum road system because it provides access to a barrow pit.
- ML 3 - 5 – Mileage differences reflect increased accuracy of mapping between the TAP/TAR and Travel Management.

3.2.3.4.1 Direct and Indirect Effects

The financial burden for annual maintenance of the resulting minimum road system under Alternative 2 would decrease compared with the current road system due to the reduction of miles of NFSRs and the increase in closed NFSRs. Converting 140 miles of NFSRs to NFSTs open to all vehicles and three miles to NFSTs open to vehicles 64 inches wide or less will provide motorized access while reducing reliance on NFSR funds to manage these routes. Furthermore, these NFSTs would be eligible for grants through the Wyoming State Trails program to address maintenance needs.

The conversion of non-NFS routes to ML 1 (68 miles) and ML 2 (10 miles) NFSRs will result in improved resource conditions. When the non-NFS route is brought onto the system and used during future management needs, the road will be maintained according to applicable road standards and Best Management Practices (BMPs). Appendix D contains detailed information on these BMPs. When ML 1 NFSRs are put into storage the road will be closed to all motorized travel. This management scenario improves overall road conditions by providing the Forest Service with a long-term strategy to address maintenance concerns on these currently non-NFS routes.

ML 2 NFSRs converted to administrative or permitted uses only (~9 miles) will result in decreased road maintenance needs due to decreased use.

Road Decommissioning is proposed on 10 miles of road and is estimated to cost \$15,000 per mile (based on NRM costs). This includes blocking the entrance and restoring vegetation.

Table 33: Detailed comparison of changes in road miles between Alternative 1 and 2.

Travel Management Decision	Alt 1 (miles)	Alt 2 (miles)	Discussion
Maintenance Level 1			
Conversion of unauthorized roads to ML 1 NFSRs (placed in long term storage)	0	68	Increase in 'new' NFSRs identified for future uses such as timber management. The costs to convert per BMPs will be borne by the benefitting resource.
Maintenance Level 2			
Conversion of ML 2 NFSRs to NFSTs open to all vehicles	0	140	Provides for continued motorized access while reducing reliance of road funds as these NFSTs would be eligible for grants. In the event that NFSTs are utilized by logging vehicles, the Forest may close the trail to the public for a short duration to avoid mixing logging traffic with motorized trail vehicles.
Conversion of ML 2 NFSRs to NFSTs open to vehicles 64 inches or less in width	0	3	Provides for continued motorized access while reducing reliance of road funds as these NFSTs would be eligible for grants. In the event that trails are utilized by logging vehicles, the Forest may close the trail to the public for a short duration to avoid mixing logging traffic with motorized trail vehicles.

Travel Management Decision	Alt 1 (miles)	Alt 2 (miles)	Discussion
Conversion of unauthorized roads to ML 2 NFSRs	0	10	9 miles to serve as connectors to allow for motorized loop opportunities; 1 mile to provide motorized access to dispersed camping sites.
ML 2 NFSRs converted to Administrative or Permitted Uses Only.	0	9	9 mile increase in ML 2 NFSRs managed intermittently for administrative or permitted uses. These roads will not be designated and shown on the MVUM.
Decommission of NFSRs	0	10	Predominantly focuses on decommissioning small spurs and minor routes with associated resource benefits (e.g., hydrologic resources, aquatic species, etc.).
Maintenance Level 3-5			
No changes proposed.	0	0	

Alternative 2 would result in a reduced amount of desired annual funding of \$19,940 when compared to the current road system. Table 34 below illustrates the miles of NFSRs and financial aspects of Alternative 1 and 2. The cost to meet Forest Plan objectives under Alternative 2 is also shown, which is a slight decrease of \$740 compared with Alternative 1. Estimated road decommissioning costs total \$150,000, and these roads will be decommissioned as funds become available or local projects dedicate funding to decommission the road once a project concludes.

Smaller deferred maintenance needs such culvert replacement will be addressed as funding is available. Large deferred maintenance items such as bridge replacement and road surfacing will require funding support from Congressional appropriations.

Table 34: Alternative 2 - Proposed Action transportation system miles of road and desired annual funding.

ML	Alt1 (Miles)	Alt 1 Desired Annual Funding	Alt 2 (Miles)	Alt 2 Desired Annual Funding	Alt 2 - Forest Plan Maintenance Objectives Annual Cost
ML 1	181	\$2,715	249	\$3,735	\$0
ML 2	761	\$121,760	630	\$100,800	\$5,040
ML 3 – 5	192	\$288,000	192	\$288,000	\$172,800
Total	1,134	\$412,475	1,071	\$392,535	\$177,840

3.2.3.4.2 Cumulative Impacts

Two types of projects are considered here: road maintenances projects and vegetation management projects. These projects are considered because they will impact the transportation resource at the same time and location. The following list of road maintenance projects have, are, or will be taking place in the Shoshone National Forest: Beartooth Highway Reconstruction, Loop Road Maintenance, WYDOT road maintenance, and Park County, Fremont County, and Hot Springs County Road Maintenance. Typical activities that take place with these projects are paving, slope stabilization, placing aggregate surfacing, grading gravel road surfaces, excavating, placing embankment, and road realignments. These projects have the potential to affect the Shoshone National Forest by utilizing embankment material from National Forest lands, increasing construction traffic, utilizing existing roads for construction purposes, and staging equipment on National Forest lands. The scope of these projects is typically short in duration and usually

limited to an area adjacent to the project site (occasional projects last longer than a year, though these are rare). The impacts to the Forest road system may result in short term road closures, construction delays, increased use and road maintenance performed by the project proponent. The long-term result is that impacted Forest roads will have reduced deferred maintenance and an improved travel corridor. In the event that designated NFSTs are utilized by construction vehicles, the Forest may close the trail to the public for a short duration to eliminate mixing construction traffic with wheeled vehicles.

Vegetation management projects such as timber sales generally include road reconstruction and road maintenance. Impacts associated with vegetation management projects are generally similar to the impacts described above. Timber Sales may last up to five years (and are extended occasionally as necessary). Complementary road work is completed shortly after the timber sale has sold, and then minor spurs and temporary roads are constructed as needed in the following years. The impacts to the Forest road system may result in: short term road closures, construction delays, increased use and road maintenance and/or reconstruction performed by the timber purchaser. The long-term result is that temporary roads will be closed and not increase the NFS road mileage. Roads utilized for timber haul will have reduced deferred maintenance and an improved travel corridor. In the event that NFSTs are utilized by logging vehicles, the Forest may perform a motorized mixed-use analysis and potentially close the trail to the public for a short duration to eliminate mixing logging traffic with wheeled vehicles.

3.2.3.5 Alternative 3

This section analyzes the effects associated with Alternative 3. This analysis considers differences in relation to Alternative 1. Alternative 3 proposes a minimum road system with a net reduction of 153 miles from Alternative 1 as shown in Table 35. The proposed minimum road system does not affect the operational ML 3 - 5 arterial and collector road system because of their high value for recreation, timber management and other forest uses.

Table 35: The resulting minimum road system for Alternative 3 by Maintenance Level.

ML	Alt 1	Alt 3 (Miles)	Change when compared to Alt 1	TAP/TAR Recommendation by ML (Miles)*
ML 1	181	185	4	210
ML 2	761	604	-157	719
ML 3 - 5	192	192	-	184
Total System Miles	1,134	981	-153	1,112
*Miles shown is the sum of roads listed as "Likely Needed" and "Not Likely Needed". For example, ML 1 miles shown is 232 miles (Likely Needed) – 22 miles (Likely Not Needed) = 210 miles.				

The differences between Alternative 3 and the TAP/TAR are similar to the differences described in Alternative 2 (again, *see* Appendix B for a crosswalk between the TAP/TAR and each alternative):

- ML 1 – Fewer non-NFSRs will be put in storage and used for long term management needs.
- ML2 – Converts many ML 2 NFSRs to NFSTs. One NFSR that was identified as not needed in the TAP/TAR was FSR 480.1F, but it is being proposed as part of the minimum road system because it provides access to a barrow pit (similar to Alternative 2).

- ML 3 - 5 – Mileage differences reflect increased accuracy of mapping between the TAP/TAR and Travel Management.

3.2.3.5.1 Direct and Indirect Effects

The financial burden for annual maintenance of the resulting minimum road system proposed under Alternative 3 would be reduced from the current road system due to the reduction of NFSR miles and the increase in NFSRs managed for administrative or permitted uses and closed roads. Converting 36 miles of NFSRs to NFSTs open to all vehicles and 117 miles to NFSTs open to vehicles 64 inches wide or less will continue to provide motorized access while reducing reliance on road funds to maintain these routes.

The conversion of non-NFS routes to ML 1 (four miles) and ML 2 (five miles) NFSRs will result in improved resource conditions. When the non-NFS route is used for management needs, the route will be brought to road standards utilizing BMPs. When ML 1 NFSRs are put into storage, the road will be closed to motorized travel.

ML 2 NFSRs converted to administrative or permitted uses only (11 miles) will result in decreased road maintenance needs and decreased use.

Road Decommissioning miles total 6 miles and is estimated to cost \$15,000 per mile (based on NRM costs). This includes blocking the entrance and restoring vegetation.

Table 36: Detailed comparison of changes in road miles between Alternative 1 and 3.

Travel Management Decision	Alt 1 (miles)	Alt 3 (miles)	Discussion
Maintenance Level 1			
Conversion of unauthorized roads to ML 1 NFSRs (placed in long term storage)	0	4	Increase in 'new' NFSRs identified for future uses such as timber management. The costs to convert per BMPs will be borne by the benefitting resource.
Maintenance Level 2			
Conversion of ML 2 NFSRs to NFSTs open to all vehicles	0	36	Provides for continued motorized access while reducing reliance of road funds as these NFSTs would be eligible for grants. In the event that NFSTs are utilized by logging vehicles, the Forest may close the trail to the public for a short duration to avoid mixing logging traffic with motorized trail vehicles.
Conversion of ML 2 NFSRs to NFSTs open to vehicles 64 inches or less in width	0	117	Provides for continued motorized access while reducing reliance of road funds as these NFSTs would be eligible for grants. In the event that trails are utilized by logging vehicles, the Forest may close the trail to the public for a short duration to avoid mixing logging traffic with motorized trail vehicles.
Conversion of unauthorized roads to ML 2 NFSRs	0	5	4 miles to serve as connectors to allow for motorized loop opportunities; 1 mile to provide motorized access to dispersed camping sites.
ML 2 NFSRs converted to Administrative or Permitted Uses Only.	0	11	11 mile increase in ML 2 NFSRs managed intermittently for administrative or permitted uses. These roads will not be designated and shown on the MVUM.
Decommission of NFSRs	0	6	Predominantly focuses on decommissioning small spurs and minor routes with associated resource benefits (e.g., hydrologic resources, aquatic species, etc.).
Maintenance Level 3-5			

Travel Management Decision	Alt 1 (miles)	Alt 3 (miles)	Discussion
No changes proposed	0	0	

Alternative 3 would reduce the amount of desired annual funding by \$25,060 when compared to the current road system. Table 37 below illustrates road miles and financial aspects of Alternative 3 when compared with Alternative 1. The cost to meet Forest plan objectives under Alternative 3 is also shown, which is a slight decrease in annual cost of \$948. Estimated road decommissioning costs total \$90,000, and these roads will be decommissioned as funds become available or local projects dedicate funding to decommission the road as the project concludes.

Smaller deferred maintenance needs such culvert replacement will be addressed as funding is available. Large deferred maintenance items such as bridge replacement and road surfacing will require funding support from Congressional appropriations.

Table 37: Alternative 3 - Transportation system miles of road and desired annual funding.

ML	Alt1 (miles)	Alt 1 Desired Annual Funding	Alt 3 (miles)	Alt 3 Desired Annual Funding	Forest Plan Maintenance Objectives Annual Cost
ML 1	181	\$2,715	185	\$2,775	\$0
ML 2	761	\$121,760	604	\$96,640	\$4,832
ML 3 – 5	192	\$288,000	192	\$288,000	\$172,800
Total	1,134	\$412,475	981	\$387,415	\$177,632

3.2.3.5.2 Cumulative Impacts

The past, present and foreseeable projects and the cumulative impacts for Alternative 3 will be the same as those identified in Alternative 2.

3.2.4 Consistency with Relevant Laws, Regulations, and Policy

3.2.4.1 Land and Resource Management Plan

The 2015 National Forest Land and Resource Management Plan (forest plan) provides goals, standards, and guidelines for roads across the Forest. These metrics for review are listed below, both generally and with respect to specific management areas. All Forest Standards are met with the proposed Alternatives. One particular area, Management Area 3.3C, raises an issue of consistency.

Management Area 3.3. C is managed for back country recreation wheeled motorized with winter non-motorized. For this area, the Forest Plan states:

- Prohibit new road construction or existing road reconstruction unless needed to honor existing rights. (MA3.3C-STAND-01)

The action alternatives, Alternatives 2 and 3, propose a road in this management area. The road is 0.22 miles in length. A non-NFS route exists in place and is used to access a Forest Service grazing allotment

and cow camp. The proposed road would bring this existing route onto the Forest road system, but would not alter overall road mileage in the area due to proposed decommissioning of roads in the management area. The proposal to add this road to the System will ensure existing maintenance and use standards apply to the route, while continuing to support grazing and other Forest uses.

Additional Forest Plan goals for roads are as follows:

- National Forest System roads and trails needed for long-term objectives and to meet desired conditions are constructed and maintained in a manner that provides for user safety and minimizes impacts to natural resources. (RDTR-GOAL-01)
- Road and trails not needed for long-term objectives are decommissioned, stabilized, and restored to a more natural state. (RDTR-GOAL-02)
- All System roads and trails open to wheeled motorized vehicles are shown on a motor vehicle use map that is available at no charge to the public. (RDTR-GOAL-03)
- Replace undersized culverts and bridges. (RDTR-GOAL-07)
- The road and motorized trail systems are established using the travel management planning process. (RDTR-GOAL-08)
- Resource impacts from use of unauthorized motorized routes are eliminated, along with the unauthorized route. (RDTR-GOAL-09)

Forest Plan Objectives for roads require:

- Maintenance occurs on at least 60 percent of maintenance levels 3, 4 and 5. At least 5 percent of maintenance level 2 miles of System roads annually. (RDTR-OBJ-01)
- There are fewer than 1,400 miles of System roads on the Shoshone. (RDTR-OBJ-04)

Standards for roads:

- Maintain roads at a minimum maintenance level that meets the management objectives for the area. (RDTR-STAND-01)

Guidelines for roads:

- Gates installed on System roads should be a minimum of 14 feet in length in order to facilitate passage of equipment, such as snow groomers, yarders, heavy equipment, etc. (RDTR-GUIDE-03)
- Unauthorized routes should be closed and rehabilitated as soon as practical. (RDTR-GUIDE-04)

The 2015 National Forest Land and Resource Management Plan (forest plan) also provides standards and guidelines for roads within various Management Areas (MAs). These are described below.

Management Area 1.3 Roads and trails

- Prohibit new National Forest System road construction or reconstruction unless necessary to honor valid existing rights. (MA1.3-STAND-01)

- Limit all motorized use, including snowmobile use, to authorized administrative, law enforcement, search and rescue, fire suppression, and emergency purposes. (Administrative purposes include motorized use authorized by special use authorization.) (MA1.3-GUIDE-04)

Management Area 1.5A – Clarks Fork of the Yellowstone Wild River

- New roads, campgrounds, picnic areas, and trailheads are not allowed. (MA1.5A-STAND-11)
- Wheeled motorized vehicles are restricted to Forest Roads 110, 119, 165, 174, 178. 1A, and 178.1B. In the lower corridor, motorized traffic is not permitted off designated routes for the purpose of dispersed camping or any other generally permitted activity. This excludes snowmobiles traveling over snow. (MA1.5A-STAND-14)
- The designated motorized routes within the river corridor should be maintained as primitive routes for off-highway vehicles or high clearance vehicles. (MA1.5A-GUIDE-19)

Requirements for specific management areas with respect to NFS routes are listed below. Management Area 2.2A – Line Creek Plateau Research Natural Area

- Roads and other facilities shall not be constructed in these areas, except within 250 feet of the centerline of U S Highway 212.27 (MA2.2A-STAND-13)
- Do not permit new roads, trails, fences, structures, or signs unless they contribute to the desired conditions or to the protection of the research natural area, except within the highway easement. (MA2.2A-STAND-16)

Management Area 3.1A – Swamp Lake Botanical Area

- Road construction is prohibited. Road maintenance is limited to that needed for safety and resource protection. (MA3.1A-STAND-03)

Management Area 3.1B – Proposed Little Popo Agie Geological Area

- New road construction is prohibited. Road reconstruction and maintenance is limited to that needed for safety and resource protection. (MA3.1B-STAND-02)

Management Area 3.3A – Back country recreation year-round motorized

- Prohibit new System road construction or existing road reconstruction unless needed to honor existing rights. (MA3.3A-STAND-02)

Management Area 3.3B – Back country recreation summer non-motorized with winter motorized

- Prohibit new National Forest System road construction or existing road reconstruction unless needed to honor existing rights. (MA3.3B-STAND-01)

Management Area 3.3C – Back country recreation wheeled motorized with winter non-motorized

- Prohibit new road construction or existing road reconstruction unless needed to honor existing rights. (MA3.3C-STAND-01)

Management Area 3.5A-D – Back country recreation and forest restoration

- Prohibit new System road construction or existing road reconstruction unless needed to honor existing rights. (MA3.5-STAND-03)

Management Area 3.6B – Nez Perce (Nee-Me-Poo) National Historic Trail

- Do not construct roads within non-auto tour sections of the Trail corridor. (MA3.6B-STAND-09)

3.2.5 Conclusion

Table 38 summarizes the effects under the alternatives with respect to engineering and NFSR resources, and Table 39 summarizes the travel management designation by Alternative. Of the alternatives presented in this discussion:

- Alternative 2 will result in the largest NFSR system and require the largest amount of annual funding.
- Alternative 3 will result in the fewest number and miles of NFSRs and have the lowest annual maintenance costs.
- The required funding to meet Forest Plan objectives is substantively similar across the alternatives.
- Future funding levels are anticipated to remain at current levels.
- The TAR will inform priority road maintenance work for NFSRs included in a future system.
- In all alternatives the Forest’s deferred maintenance backlog will not be sustainably addressed on a yearly basis and the Forest should pursue external funding sources to accomplish this work.

Table 38: Summary of all alternatives.

ML	Alt1 (Miles)	Alt 1 Desired Annual Funding	Alt 2 (Miles)	Alt 2 Desired Annual Funding	Alt 2 - Forest Plan Maintenance Objectives Annual Cost	Alt 3 (miles)	Alt 3 Desired Annual Funding	Alt 3 - Forest Plan Maintenance Objectives Annual Cost
ML 1	181	\$2,715	249	\$3,735	\$0	185	\$2,775	\$0
ML 2	761	\$121,760	630	\$100,800	\$5,040	604	\$96,640	\$4,832
ML 3 - 5	192	\$288,000	192	\$288,000	\$172,800	192	\$288,000	\$172,800
Total System Miles/Cost	1,134	\$412,475	1,071	\$392,535	\$177,840	981	\$387,415	\$177,632

Table 39: Travel Management by Alternative

Designation	Alt. 1 (Miles)	Alt. 2 (Miles)	Alt. 3 (Miles)
NFSRs in Storage (ML 1)	181	249	185
NFSRs for Administrative Only Wheeled Vehicle Use (ML 2 – 5)	70	79	81
Total miles of NFSRs Closed to Public Wheeled Vehicle Use	251	328	266

Designation	Alt. 1 (Miles)	Alt. 2 (Miles)	Alt. 3 (Miles)
NFSRs Open to All Wheeled Vehicles (ML 2 - 5)	883	743	715
NFSRs Open to Highway-Legal Wheeled Vehicles Only (ML 2 - 5)	0	0	0
Total miles of NFSRs Designated Open to Public Wheeled Vehicle Use	883	743	715
Total	1,134	1,071	981

3.3 Recreation: the Shoshone Motorized Trail Network and Recreation Opportunities

3.3.1 Introduction

Dovetailing with the analysis of the Forest Service road system and the effects of that system is the analysis of effects to recreation. A focus of this analysis is on the National Forest System trail network, with consideration of the road system when appropriate. The Forest continues to aim to provide outdoor recreation opportunities with minimized impacts to natural resources, consistent with the Forest Plan (2015).

3.3.1.1 Methodology

This section includes a description of the methods and data used in this analysis. The analysis area for proposes of assessing impacts to recreation under the alternatives is the SNF excluding designated wilderness and management areas where motorized use is prohibited. Adjacent private and public lands are incorporated into the analysis. This analysis was conducted at the landscape scale.

A suite of analytical tools was used to assess impacts. Statistical use data derived from the Forest Service National Visitor Use Monitoring database (USFS 2019), geographic information system (GIS) data including Natural Resource Manager (NRM – formally INFRA) road and trail information, Motor Vehicle Use Maps (MVUM), and public input informed the analysis. And the Recreation Opportunity Spectrum assisted in comparing conflict potential for recreation uses—specifically for wheeled vehicle recreation.

The analysis produced metrics used to compare the alternatives (e.g., miles of routes designated per alternative). Qualitative considerations were also incorporated into the analysis, including user opportunities, experiences, goals, and conflicts. Analysis examined access, ingress/egress per alternative, goal interference, user displacement, and the resulting social conflicts. Proposals under each alternative were considered in the context of the applicable key management areas (e.g., inventoried roadless managed as Management Area 3.5 A – C, Continental Divide National Scenic Trail, and the Nez Perce (Nee-Me-Poo) National Historic Trail) consistent with the Forest Plan.

3.3.1.2 Resource Indicators and Measures

Table 40: Resource condition indicators and measures for assessing effects

Issue	Indicator or Measure	Source
Decommission roads and trails.	Miles of roads and miles of trails decommissioned.	Forest Plan goal RDTR-GOAL-02
Summer motorized trail loop opportunities.	Miles of new loop trail, including for youth users.	Forest Plan goal RDTR-GOAL-04 & Forest Plan objective RDTR-OBJ-05
Continued recreational use.	Miles and opportunities for recreation use on roads and trails across user groups.	Forest Plan guideline RDTR-GUIDE-01
Management of unauthorized routes.	Miles closed and rehabilitated under alternatives.	Forest Plan guideline RDTR-GUIDE-04
Over-snow motorized use.	Miles of OSV use and acres open to OSV use, including tracked ATV/UTVs.	Forest Plan Guideline REC-GUIDE-03; Forest Plan Guidance SPLC-GUIDE-04 Forest Plan Table 22, "General suitability for wheeled vehicular recreation and motorized travel route construction"
Management of motorized use on the CDNST	Miles of motorized routes managed as roads, trails, mix-use, and OSV use including tracked ATV/UTVs	MA3.6A-STAND-04; MA3.6A-STAND-06
Management of motorized use on the Nez Perce	Miles of motorized routes managed as roads, trails, mix-use, and OSV use including tracked ATV/UTVs	MA3.6B-STAND-01; MA3.6B-STAND-05; MA3.6B-STAND-08; MA3.6B-STAND-09; MA3.6B-GUIDE-03
Management of motorized use within the Inventoried Roadless Areas	Miles of motorized routes managed as roads, trails, mix-use, and OSV use including tracked ATV/UTVs	2001 Roadless Area Conservation Rule

3.3.2 Environmental Consequences

3.3.2.1 Context for Analysis

The Forest Service monitors the quantity and quality of recreation visitor data on National Forest Service lands, using the National Visitor Use Monitoring (NVUM) program. This information is required for Land and Resource Management Plans by Executive Order 12862 and the National Recreation Agenda. NVUM information assists Congress, Forest Service leaders, and program managers in making sound decisions that best serve the public and protect valuable natural resources. Data from NVUM provides reliable information about the type, quantity, quality, and location of use of public lands.

The most recent NVUM data (Forest Service, 2019) related to transportation indicates the following:

- 22.2 percent of SNF visitors drove on roads for pleasure
- 4.8 percent of SNF visitors used OSV vehicles

- 3.4 percent of SNF visitors were active on motorized trails, including using OHVs

Additionally, the NVUM data indicates that SNF visitors used certain special facilities during their visits, as follows (Forest Service, 2019):

- 29.4 percent of SNF visitors used forest roads
- 22.3 percent of SNF visitors used a scenic byway
- 15.8 percent of SNF visitors used a designated off-road vehicle area
- 8.4 percent of SNF visitors used motorized dual track trails
- 7.9 percent of SNF visitors used motorized single track trails

The motorized recreation report analyzes NFSRs open to all vehicles, and all NFSTs for wheeled vehicle use, including NFSTs open to all vehicles, NFSTs open to vehicles 50 inches wide or less, and NFSTs open to motorcycles (single-track). Other classes of routes, namely NFSRs, are analyzed in the transportation report. Definitions for NFSRs and NFSTs are set forth above.

The 2015 SNF Revised Forest Plan provides general directions, standards, and guidelines for the construction and maintenance of roads and motorized trails including management direction specific to designated management areas. These directions, standards, and guidelines informed the analysis of recreational opportunities under each alternative.

Nonmotorized trails and dispersed camping (which refers to camping 300 feet from the centerline of a designated NFS route) are accessed via the motorized route network on designated routes throughout the SNF; nonmotorized recreation is outside the scope of this analysis and not included in the discussion unless relevant and explicitly referenced (including reference to non-motorized wheeled recreation, such as mountain biking, and similar nonmotorized recreation activities).

3.3.2.1.1 Recreation Opportunity Spectrum

The recreation opportunity spectrum (ROS) provides a framework to evaluate relationships and interactions of users, recreation activities, and forest conditions (Forest Service 2018). The ROS is a classification system that considers natural setting (vegetation, landscape, topography, and scenery), recreational use (levels and type of use), and management conditions (development, roads, regulations). The Shoshone National Forest has established a recreation opportunity spectrum for wheeled vehicle use but has not established an ROS for OSV use. (See Shoshone LMP, 2015)

Maintaining a broad spectrum of classes across the Forest is very important to provide users with choices to facilitate desired recreation experiences. ROS values that reflect seven standard classes were applied to the Forest. These values and their composition are set forth below.

Table 41: ROS Class Across the Forest

ROS class	Acres in 2008	Percentage of the Shoshone
Rural	21,378	1%
Roaded natural	207,615	8%
Semi-primitive motorized	291,560	12%

ROS class	Acres in 2008	Percentage of the Shoshone
Semi-primitive non-motorized	572,312	23%
Primitive	1,365,154	56%

Rural—Accessible by all travel modes and road classes. Remoteness has little relevance to this classification. Facilities constructed primarily for user comfort; synthetic materials may be used in construction, but appearance should be harmonious with the natural environment. Moderate to high levels of contact with other users in developed sites on roads and trails. SNF has 21,378 acres ranked as rural (1%).

Roaded Natural—Accessible by all travel modes and road classes, but primarily maintenance level 4 and 3 roads (smaller paved roads and unpaved but maintained roads). Remoteness has little relevance to this classification. Facilities are rustic and provide some comfort to the user. They must be constructed from native materials, but refinement may be evident in the design. Moderate to high contact levels on roads, moderate to low contact on trails and developed sites. SNF has 207,615 acres ranked as roaded natural (8%).

Semi-primitive Motorized—Accessible by cross-country travel, nonmotorized trails, motorized trails, and primitive roads. Human activity distant. Facilities are rudimentary, constructed from native materials and primarily for site protection. Limited contact with other parties on trails or in campsites. SNF has 291,560 acres ranked as semi-primitive motorized (12%).

Semi-primitive Nonmotorized—Accessible by cross-country travel and primarily nonmotorized trails only. Signs of human activity should be visible or audible only in the distance. Facilities are rudimentary, constructed from native materials and primarily for site protection. Limited contact with other users on trails or in campsites. SNF has 572,312 acres ranked as semi-primitive nonmotorized (23%).

Primitive—Accessible by cross-country travel and nonmotorized trails only, out of sight and sound of human activity. Any site facilities are minimal, constructed from natural materials, and are for site protection only. Very limited contact with other users on trails or in campsites. SNF has 1,365,154 acres ranked as primitive (56%).

In analyzing affects to recreation from the proposed travel management prescriptions per alternative, it is important to quantify and compare the miles of available NFS routes within each ROS class. This comparison assists in easily identifying and comparing the changes per ROS class per alternative. The tables below illustrate this comparison for both wheeled (Subpart B) and over-snow (Subpart C) vehicle use within each ROS class.

Table 42: Subpart B - Comparison of Miles of NFS Routes Open to Wheeled Vehicles by ROS Class

ROS Class	Alternative A	Alternative B	Alternative C
Miles of Roads Open to Motorized Vehicle Use			

Primitive	0	0	0
Semiprimitive Nonmotorized	1.32	1.32	1.32
Semiprimitive Motorized	345.59	260.73	250.47
Roaded Natural	458.91	397.06	391.23
Rural	0.015	0.015	0.015
Urban	0	0	0
No Data	76.86	72.86	88.96
Subtotal Roads	882.8*	731.99*	731.99*
Miles of Trails Open to Motorized Vehicle Use			
Primitive	0.07	0.07	0.07
Semiprimitive Nonmotorized	0	0	0
Semiprimitive Motorized	22.49	128.87	123.14
Roaded Natural	13.09	68.00	70.22
Rural	0	0	0
Urban	0	0	0
No Data	0.37	1.05	4.08
Subtotal Trails	36.02*	197.99*	197.51*
Total All Routes Open to Public Motorized Recreation	918.72**	929.98**	929.5**

Source: Forest Service GIS 2020

*Subtotals do not include certain NFS routes being analyzed that fall outside the SNF boundary or are SNF-maintained routes that cross private land, and therefore no ROS class is available for these routes.

**Total does include those SNF routes that have no available ROS data.

Table 43: Subpart C - Comparison of Miles of OSV Trails by ROS Class

ROS Class	Alternative A	Alternative B	Alternative C
Miles of Groomed Trails			
Primitive	0	0	0
Semiprimitive Nonmotorized	8.95	8.95	8.95
Semiprimitive Motorized	68.6	68.6	68.60
Roaded Natural	110.85	110.85	110.85
Rural	0.00	0.00	0.00

Urban	0.00	0.00	0.00
No Data	12.8	12.8	12.80
Subtotal Groomed Trails	201.20*	201.20*	201.20*
Miles of ungroomed Trails Open to Motorized Vehicle Use			
Primitive	0	0	0.00
Semiprimitive Nonmotorized	21.68	24.40	21.68
Semiprimitive Motorized	33.08	34.71	33.08
Roaded Natural	31.70	37.21	31.70
Rural	0.00	0.00	0.00
Urban	0.00	0.00	0.00
No Data	1.23	1.49	1.23
Subtotal Ungroomed Trails	87.69*	97.82*	87.69*
Total Groomed/Ungroomed Trails Open to Public Over-Snow Motorized Recreation	288.88**	299.01**	289.89**

Source: Forest Service GIS 2020

*Subtotals do not include certain NFS routes being analyzed that fall outside the SNF boundary or are SNF-maintained routes that cross private land, and therefore no ROS class is available for these routes.

**Total does include those SNF routes that have no available ROS data.

3.3.2.1.2 Management Areas

The SNF Forest Plan defines management areas in the SNF that are designated to promote, protect, or highlight different resources or uses. Management areas associated with motorized and nonmotorized recreation on the SNF are summarized as follows (Forest Service 2015):

- Management Area 3.3A, Back country recreation year-round motorized. Management of use within this specific recreation setting focuses on sustainability and providing high-quality motorized experiences. A variety of experiences may be provided, ranging from off-highway vehicle use on existing roads to single-track motorcycle trails.
- Management Area 3.3B, Back country recreation summer non-motorized with winter motorized. Management of uses within this specific recreation setting focuses on sustainability and providing high-quality non-motorized summer and motorized winter experiences.
- Management Area 3.3C, Back country recreation wheeled motorized with winter non-motorized. Management of uses within this specific recreation setting focuses on sustainability and providing high-quality motorized summer and non-motorized winter experiences.
- Management Area 3.5A - C, Back country recreation and forest restoration. Management of uses within this specific setting focuses on sustainability and restoration of forests and wildlife habitat and providing high-quality non-motorized and motorized experiences depending upon management area allocation. In areas where motorized recreation is suitable a variety of

experiences may be provided, ranging from off-highway vehicle use on existing motorized trails to single-track motorcycle trails. Back country motorized activities are generally allowed on designated routes in both the winter and summer. Except for exempted areas, over-the-snow winter activities are not permitted in big game crucial winter range areas.

- Management Area 3.6A, Continental Divide National Scenic Trail. Management of uses within this specific recreation setting focuses on sustainability and providing high-quality non-motorized experiences, especially within 0.5 mile of the Trail’s travel route.
- Management Area 3.6B, Nez Perce (Nee-Me-Poo) National Historic Trail. Management of uses with this specific recreation setting focuses on protecting the historic values for which the Trail was designated and providing high quality non-motorized experiences on the sections off existing roads.
- Inventoried Roadless Areas (IRA) - There are 684,800 acres identified as inventoried roadless on the Shoshone. The areas were identified as part of the 1978 Roadless Area Review and Evaluation. In 2001, the Roadless Area Conservation Rule formally designated these areas as inventoried roadless areas and established national direction for timber harvest, road construction, and road reconstruction within these areas.
- The management approach for IRAs is defined by the Roadless Area Conservation Rule and generally guided by the management area to which the individual IRA is allocated. Where inventoried roadless area direction conflicts with other direction in the Plan, the more restrictive direction applies.

To further analyze proposed travel management prescriptions per alternative for consistency with the management area’s Goals, Standards, and Guidelines, the management areas were combined with the ROS classes and IRAs. The resulting data illustrated in Table 44 captures the management state of the project area by identifying the acres of ROS Class within each management area and percentage located in an IRA.

Table 44: Acres of ROS and percentage of IRA within each Management Area

Management Area	ROS	Acres	Wheeled Motorized on Designated Routes	Over-Snow Motorized	National Forest System Road Construction	Temporary Road Construction	Motorized Trail Construction
3.3A Back country year-round motorized	SPM	55,8798 (100%) (34% in IRA)	Yes	Yes	No	Yes	Yes
3.3B Back country summer non-motorized, winter motorized	SPNM	135,087 (100%) (90% in IRA)	No	Yes	No	Yes	No
3.3C Back country wheeled motorized, winter non-motorized	SPM	69,423 (100%)	Yes	No	No	Yes	Yes

Management Area	ROS	Acres	Wheeled Motorized on Designated Routes	Over-Snow Motorized	National Forest System Road Construction	Temporary Road Construction	Motorized Trail Construction	
		(80% in IRA)						
3.5A Back country recreation and forest restoration year – round motorized	SPM	29,137 (100%) (100% in IRA)	Yes	Yes	No	Yes	Yes	
3.5B Back country recreation and forest restoration winter – motorized	SPM	8,026 (100%) (100% in IRA)	No	Yes	No	Yes	No	
3.5C Back country recreation and forest restoration year – wheeled motorized	SPM	13,311 (100%) (100% in IRA)	Yes	No	No	Yes	Yes	
3.6A Continental Divide National Scenic Trail (18.25 miles in the Shoshone NF. 1.64 miles located on motorized routes)	SPM	1.64 (100%) (70% of CDNST in IRA, 0% of CDNST managed as open to motorized use in IRA)	Yes, Outside wilderness where it does not interfere with the nature and purposes of the Trail	Yes, outside wilderness where it does not interfere with the nature and purposes of the Trail and may be restricted in big game crucial winter range	No	Yes	No	
3.6B Nez Perce National Historic Trail (59.9 miles within the Forest, with 11.3 miles occurring on existing roads, only 6.7 open to public use)	6.7 miles are open to public motorized use	P	0	Yes, outside wilderness where it does not interfere with the nature and purposes of the Trail	Yes, outside wilderness where it does not interfere with the nature and purposes of the Trail and may be restricted in big game crucial	No	Yes	No
		SPNM	0					
		SPM	5.48 (61% in IRA)					

Management Area	ROS	Acres	Wheeled Motorized on Designated Routes	Over-Snow Motorized	National Forest System Road Construction	Temporary Road Construction	Motorized Trail Construction
3.6B Nez Perce National Historic Trail - Corridor (37,435 acres within the Forest) 18.35 miles of roads within the corridor. 10.54 miles are open to public motorized use	10.54 Miles of roads within Nez Perce corridor	SPNM	0.03 (100% in IRA)				
		SPM	6.46 (64% in IRA)				
		RN	2.58 (41% in IRA)				
		NonFS	1.47				
				winter range.			

3.3.2.1.3 Resources Present, But Not Analyzed in Detail

3.3.2.1.3.1 Continental Divide National Historic Trail (CDNST)

18.25 miles of the CDNST passes through the Shoshone National Forest. 1.64 miles are located on existing roads: 0.79 mile in the Wind River Ranger District and 0.85 mile in the Washakie Ranger District. Alternatives 2 and 3 prescribe a new seasonal restriction on the 0.85 mile segment in the Washakie Ranger District. Travel Management prescriptions along the 1.65 miles of the CDNST will not deter from the desired recreational experiences or beneficial outcomes attained by those who visit the CDNST. Impacts to recreation due to this proposed management action are expected to be negligible and will not be analyzed in further detail. Effects will not be analyzed in greater detail.

Approximately 4.37 miles of the CDNST located in the Wind River Ranger District (Togwotee Pass, Upper Warm Springs, and Union Pass) are open to OSV use, of which all are groomed OSV trails. This over-snow management prescription does not change across the alternatives. OSV use along the CDNST will continue into the future, and potential conflicts between users are anticipated to be minimal if non-existent. Effects will not be analyzed in greater detail.

3.3.2.1.3.2 Nez Perce National Historic Trail (NPNHT) – Public Route and Bannock Trail (Side Route)

Just under 60 miles of the NPNHT's Public Route and Bannock Trail winds through the Shoshone National Forest. Roughly 11 miles (11.36 miles) are co-located on existing NFSRs, of which 6.71 miles are open to the public. 2.1 miles are managed under seasonal restrictions (Open from May 1 – December 15). These open NFS routes allow users to attain desired experiences. The ML 2 road management surface (natural surface) will continue to cater to the desired semi-primitive settings which surround the corridor. Social

conflicts such as encounters with motorized and non-motorized users may occur along the sections open to wheeled vehicle use. No changes in management are proposed across the alternatives. Impacts to the NPNHT related to travel management are expected to be negligible, and effects will not be analyzed in greater detail.

5.74 miles of the NPNHT are located in areas designated as open to OSV use. Proposed travel management actions do not change across the alternatives, and use would continue into the future as it currently occurs. Impacts to the NPNHT from OSV use are expected to be negligible, and effects will not be analyzed in greater detail.

3.3.2.1.3.3 Nez Perce National Historic Trail (NPNHT) Corridor

A two-mile corridor surrounds the NPNHT. This corridor helps to maintain desired settings and protect the integrity of the NPNHT. NFSRs and NFSTs located within the NPNHT corridor were analyzed for effects and impacts. Existing NFS routes on the Forest total 18.35 miles and are located within 37,435 acres of corridor. Of the 18.35 miles, only 10.54 miles are open to the public, with the remaining 7.81 miles closed or administrative use only. Impacts from motorized use under Alternative 1 are not expected to affect the settings or integrity of the NPNHT. Alternatives 2 and 3 would establish a new seasonal restriction along 317 feet of the 10.54 miles of public roads within the corridor. These alternatives would have marginally greater resource protection values, but this increase in value is negligible and impacts are expected to be similar as analyzed under Alternative 1.

Approximately 3,008.65 acres of the NPNHT corridor are open to OSV use. There are no groomed or ungroomed trail located within the corridor. These over-snow travel management prescriptions are consistent across the alternatives, with negligible impacts to the NPNHT expected. Effects will not be analyzed in greater detail.

3.3.2.2 Impacts Common to All Alternatives

3.3.2.2.1 Management Areas

The routes proposed under the alternatives intersect different management areas with unique Forest Plan Goals, Standards, and Guidelines. The effects of under the Alternatives are similar for many of the routes. The following list captures those management areas with similar effects expected with the associated management proposed under the alternatives.

MA 1.3 – Back country recreation year-round non-motorized recreation: Just less than a mile (0.94 miles) of road open to all motorized use is proposed across all alternatives. Small discrete spur roads within the management area account for this mileage, including 0.27 miles near the Trail Creek Trailhead in the Wind River RD, 0.58 miles along Phelps Mountain Road in the Clarks Fork RD, and 0.1 miles near the Lodgepole Trail in the Clarks Fork RD. User conflict may occur between motorized and nonmotorized users; however, these impacts would be minor as these routes serve as trailheads or access routes/parking areas allowing users to enjoy the back country non-motorized experiences.

MA 3.3C - Back country recreation wheeled motorized with winter non-motorized: MA3.3C-GOAL-01 states, "Provide quality wheeled motorized and winter non-motorized recreation opportunities."; and MA3.3C-GUIDE-03 states, "Manage for an adopted recreation opportunity spectrum class of semi-primitive motorized in the summer and semi-primitive non-motorized in

the winter.” Proposed travel management actions under Alternatives 2 and 3 do not allow for OSV recreation. Potential conflicts between motorized and non-motorized users within this area are expected to be minimal.

3.3.2.3 Environmental Consequences of Alternative 1: No Action

Alternative 1 reflects routes published on the latest MVUMs. Consistent with Subpart B, under Alternative 1 the Forest Service would maintain 882.70 miles of NFSRs, 2.04 mile of NFSTs open (including to single-track, and 33.98 miles of trails open to vehicles 50 inches wide or less.⁹ The Forest currently provides 918.72 miles of NFS routes open to wheeled vehicle recreation. Consistent with Subpart C motorized use, the Forest Service would continue to allow OSV use on 288.88 miles of trails and across 522,970 acres.

Table 45: Alternative 1 Summary

Route Class	Miles (unless otherwise indicated)
Subpart B – Designated Wheeled NFS Routes	
NFSRs open to all vehicles	882.70
NFSTs open to vehicles 50 inches wide or less	33.98
NFSTs open to vehicles 64 inches wide or less	0
NFSTs open to single-track	2.04
<i>Total Motorized Routes</i>	918.72
Subpart C – OSV Use	
Miles of OSV Groomed Trails	201.19
Miles of OSV Ungroomed Trails	87.69
<i>Total Miles of Over-Snow Trails</i>	288.88
Area available for cross-country OSV use	522,970 Acres

Miles of motorized routes open to public within ROS Class, Management Area, and IRA within the Shoshone NF were quantified. ROS Classes were categorized as ROS Compliant and ROS Noncompliant and supplemented with miles identified in each ROS Class and IRA. Compliance was determined by intersecting the routes within each ROS class and evaluated according to whether the route segments were located within a ROS setting where wheeled vehicle use was permitted (Semiprimitive motorized, Roded natural, Rural, or Urban) versus where such use is not permitted (Primitive and Semiprimitive nonmotorized). The following table illustrates impacts to ROS for both Subparts B and C per alternative, with mileage within each ROS class as in indicator for impacts.

Table 46: Subpart B - Routes Open to Wheeled Vehicle Use by ROS Class in Alternative 1

Compliance	ROS Class	Miles	Miles in IRA	Management Areas
NFSRs Open to Wheeled Vehicle Use				

⁹ An additional 68.79 miles of roads are used for administrative purposes only and are not open to the public.

ROS Noncompliant	Primitive	0	0	N/A
	Semiprimitive nonmotorized	1.32	0.29	1.3, 1.6A, 3.3B
ROS Compliant	Semiprimitive motorized	345.59	6.9	1.5A, 3.1B, 3.3A, 3.3C, 3.5B, 3.5C, 5.1, 5.2, 5.4
	Roaded natural	458.91	100.63	3.1A, 4.2, 4.3, 4.5A, 5.1, 5.4
	Rural	0.015	0	8.2
	Urban	0	0	N/A
N/A	No data	76.86		Non FS, No Data
Subtotal Roads		882.8	107.82	N/A
NFTs Open to Wheeled Vehicle Use				
ROS Noncompliant	Primitive	0.07	0	1.1
	Semiprimitive nonmotorized	0	0	N/A
ROS Compliant	Semiprimitive motorized	22.49	2.82	3.3A, 3.3C, 5.1, 5.4
	Roaded natural	13.09	6.5	4.3, 5.1
	Rural	0	0	N/A
	Urban	0	0	N/A
N/A	No data	0.37	0	Non FS, No Data
Subtotal Trails		36.02	9.33	
<i>Subtotal ROS Noncompliant:</i>		<i>1.39</i>	<i>0.29</i>	<i>N/A</i>
<i>Subtotal ROS Compliant:</i>		<i>840.10</i>	<i>116.85</i>	<i>N/A</i>
<i>No data:</i>		<i>77.23</i>	<i>0</i>	<i>N/A</i>
Total All NFS Routes Open to Wheeled Vehicle Use		918.72	117.14	N/A

Table 47: Subpart C - Miles open for OSV Recreation by ROS Class in Alternative 1

Compliance	ROS Class	Miles	Management Areas
OSV Groomed Trails			
ROS Noncompliant	Primitive	0	N/A
	Semiprimitive nonmotorized	8.95	3.3B
ROS Compliant	Semiprimitive motorized	68.6	3.1B, 3.3A, 3.5A, 5.1, 5.2, 5.4
	Roaded natural	110.85	4.2, 4.3, 5.1, 5.4
	Rural	0.00	N/A
	Urban	0	N/A
N/A	No data	12.8	Non FS, No Data
Subtotal Groomed Trails		201.19	N/A
OSV Ungroomed Trails			
ROS Noncompliant	Primitive	0	N/A
	Semiprimitive nonmotorized	21.68	1.6A, 3.3B
ROS Compliant	Semiprimitive motorized	33.08	3.1C, 3.3A, 3.5B, 5.1
	Roaded natural	31.7	4.2, 4.3, 5.1, 5.4
	Rural	0	N/A
	Urban	0	N/A
N/A	No data	1.23	Non FS, No Data
Subtotal Ungroomed Trails		87.69	
<i>Subtotal ROS Noncompliant:</i>		<i>30.63</i>	<i>N/A</i>
<i>Subtotal ROS Compliant:</i>		<i>244.22</i>	<i>N/A</i>
<i>No data:</i>		<i>26.07</i>	<i>N/A</i>
Total Miles of Open OSV Trails		288.88	N/A
Acres Open to OSV Use			
ROS Noncompliant	Primitive	6.5	1.1
	Semiprimitive nonmotorized	152,936	1.3, 1.5A, 1.6A, 2.2A, 3.1B, 3.3B, 4.2, 4.5A
ROS Compliant	Semiprimitive motorized	277,721	1.3, 1.5A, 3.1B, 3.1C, 3.3A, 3.3C, 3.5A, 3.5B, 4.2, 5.1, 5.2, 5.4
	Roaded natural	92,306	3.1A, 3.3A, 4.2, 4.3, 4.5A, 5.1, 5.2, 5.4
	Rural	0	N/A
	Urban	0	N/A
N/A	No data	0	N/A

	Subtotal	522,970	
	<i>Subtotal ROS Noncompliant:</i>	152,942	
	<i>Subtotal ROS Compliant:</i>	370,028	
	<i>No data:</i>	0	
Total Acres Open to Cross-Country OSV Use		522,970	

Currently, seasonal restrictions apply to 300.75 miles of NFSRs across the ranger districts—seasonal restrictions do not currently apply to any system NFSTs. Most of these seasonal restrictions apply to NFSRs within the semi primitive motorized ROS—these NFSRs are open primarily to high clearance vehicles. Other seasonal restrictions apply to areas within the roaded natural ROS, including the Loop Road/Limestone Road, Dickinson Park, Wood and Greybull River roads, Carter Mountain, and areas within Sunlight Basin.

Table 48: Seasonal Restrictions under Alternative 1

Other Management Actions	Clarks Fork RD	Greybull RD	Wapiti RD	Washakie RD	Wind River RD	Total Miles
NFSRs under seasonal restriction	102.11	39.51	42.98	72.16	43.98	300.75

3.3.2.3.1 Direct and Indirect Effects of Alternative 1

Decommission roads and trails. Alternative 1 does not identify routes suitable for decommissioning. The alternative does include roads—both closed to all (ML 1 – stored roads) and closed to all non-administrative use—but none of these closed roads are identified for decommissioning.

Summer motorized trail loop opportunities. The current NFS route system provides approximately 239.4 miles of NFSRs and NFSTs as loop opportunities. These loop opportunities, which are available through ML 2 NFSRs and through NFSTs, provide access into the Forest and a desired experience for users. Loop opportunities also tend to reduce conflicts between user groups, as users encounter each less frequently.

Continued recreational use. Current use would continue into the future. Seasonal restrictions would limit recreational use as currently established. The restrictions directly minimize impacts to other resources, such as wildlife, soils, and hydrology, while meeting desired settings conducive to semi-primitive settings. These seasonal restrictions have a secondary benefit of minimizing risk of social conflicts between motorized and non-motorized access and use.

Management of unauthorized routes. It would be anticipated that unauthorized wheeled vehicle use would continue into the future, with enforcement as appropriate to deter use of unauthorized roads and trails.

Management of special areas, including IRAs. Roadless areas currently contain 108 miles of NFSRs open for wheeled vehicle use, and 9.3 miles of NFSTs. Roads open year-round total 51 miles, with 57 miles managed under seasonal restrictions (the majority on the Clarks Fork Ranger District along the South Beartooth Highway). The NFSTs are open year-round. These routes (both open NFSRs and NFSTs) provide access to wheeled vehicle users to semi-primitive type settings. Simultaneously, seasonal restrictions achieve desired settings, characteristics, and supplemental recreational resources and values within the IRAs. These seasonal restrictions also decrease the potential for recreational conflict while allowing multiple user groups to utilize the area.

OSV use. Consistent with the Forest Plan, OSV use is allowed when snow is present. Areas of use are currently limited to NFSRs and NFSTs open to wheeled vehicles consistent with law and regulations, groomed OSV trails, designated ungroomed OSV trails, and within identified winter range exemption areas. The primary areas of OSV use occur southwest of Lander in the Washakie Ranger District, north of Dubois in the Wind River Ranger District, and northwest of Cody in the Clarks Fork Ranger District. Class 2 OSV use is also allowed along groomed and ungroomed trails. Areas open to OSV use include open slopes and bowls in high elevation areas. Current use includes 257,336 acres of IRAs designated open to OSVs, with 51 miles of trails within these areas, all of which are open to Class 2 OSVs. OSV use will continue as it currently occurs. These areas contain the recreational settings sought after by visitors: expansive areas allow for users to build riding experience, test their riding abilities, enjoy experiences in groups with friends and families, and seek more solitude-type experiences. Social conflicts with nonmotorized user may occur, but such conflicts are infrequent and not expected to increase in the future.

3.3.2.4 Environmental Consequences of the Alternative 2

This section discloses the environmental impacts of the Alternative 2. This Alternative proposes changes in the transportation system such as converting NFSRs to NFSTs, adding 11 miles of new roads to the NFSR system, providing 45 additional miles of loop opportunities, changing the size restriction on 18 miles of existing NFSTs to accommodate vehicles up to 64 inches wide or less, adding seasonal restrictions to NFS routes, designating NFSRs as “administrative use only,” and decommissioning existing NFS routes.

Table 49: Alternative 2 Summary

Route Class	Miles (unless otherwise indicated)
Subpart B – Designated Wheeled NFS Routes	
NFSRs open to all vehicles	731.99
NFSTs open to all vehicles	139.92
NFSTs open to vehicles 50 inches wide or less	15.87
NFSTs open to vehicles 64 inches wide or less	40.16
NFSTs open to single-track	2.04
<i>Total Motorized Routes</i>	<i>929.98</i>
Decommissioned Road Miles	10.35
Subpart C – OSV Use	
Miles of OSV Groomed Trails	201.19
Miles of OSV Ungroomed Trails	97.82
<i>Total Miles of Over-Snow Trails</i>	<i>299.00</i>
Area available for cross-country OSV use	521,616 Acres

The following table illustrates Alternative 2 potential impact with respect to ROS class under Subparts B and C.

Table 50: Routes Open to Motorized Recreation by ROS Class in Alternative 2

Compliance	ROS Class	Miles	Miles in IRA	Management Areas
NFSRs Open to Wheeled Vehicle Use				
ROS Noncompliant	Primitive	0	0	N/A
	Semiprimitive nonmotorized	1.32	0.29	1.3, 1.6A, 3.3B
ROS Compliant	Semiprimitive motorized	260.73	5.96	1.5A, 3.1B, 3.3A, 3.3C, 3.5B, 3.5C, 5.1, 5.2, 5.4
	Roaded natural	394.59	86.28	3.1A, 4.2, 4.3, 4.5A, 5.1, 5.4
	Rural	0.015	0	8.2
	Urban	0	0	N/A
N/A	No data	72.863	0	Non FS, No Data
Subtotal Roads		729.52	92.53	N/A
NFSRs Open to Wheeled Vehicles 64 Inches Wide or Less				
ROS Noncompliant	Primitive	0	0	N/A
	Semiprimitive nonmotorized	0	0	N/A
ROS Compliant	Semiprimitive motorized	0	0	N/A
	Roaded Natural	2.47	0	4.2, 4.3
	Rural	0	0	N/A
	Urban	0	0	N/A
Subtotal Roads open to 64" Motorized Vehicles		2.47	0	N/A
Subtotal Roads		731.99	92.53	
Subtotal No Data		72.863	0	Non FS, No Data
NFSRs Open to All Wheeled Vehicles				
ROS Noncompliant	Primitive	0	0	N/A
	Semiprimitive nonmotorized	0	0	N/A
ROS Compliant	Semiprimitive motorized	85.39	0.88	3.1B, 3.3A, 3.3C, 5.1, 5.2, 5.4
	Roaded natural	53.85	12.5	4.2, 4.3, 5.1, 5.4
	Rural	0	0	N/A
	Urban	0	0	N/A
N/A	No data	0.28	0	Non FS
Subtotal Trails		139.52	13.38	
NFSTs Open to Wheeled Vehicles 50 Inches Wide or Less				
ROS Noncompliant	Primitive	0.07	0	1.1
	Semiprimitive nonmotorized	0	0	N/A
ROS Compliant	Semiprimitive motorized	8.68	4.07	*3.3A , 5.1, 5.4
	Roaded natural	6.88	3.68	4.3
	Rural	0	0	N/A
	Urban	0	0	N/A
N/A	No data	0.24	0	NonFS
Subtotal 50" Trails		15.87	7.75	
NFSTs Open to Wheeled Vehicles 64 Inches Wide or Less				
ROS Noncompliant	Primitive	0	0	N/A
	Semiprimitive nonmotorized	0	0	N/A
ROS Compliant	Semiprimitive motorized	32.82	1.08	3.3A, 3.3C, 5.1, 5.4
	Roaded natural	7.21	0.19	4.3, 5.1, 5.4
	Rural	0	0	N/A
	Urban	0	0	N/A
N/A	No data	0	0	N/A
Subtotal 64" Trails		40.03	1.27	
NFSTs Open to Single-Track				
ROS Noncompliant	Primitive	0	0	N/A
	Semiprimitive nonmotorized	0	0	N/A
ROS Compliant	Semiprimitive motorized	1.98	1.87	3.3A, 3.3C

	Roaded natural	0.06	0	4.3
	Rural	0	0	N/A
	Urban	0	0	N/A
N/A	No data	0	0	N/A
Subtotal Single Track		2.04	1.87	
Subtotal No Data		1.05	0	NonFS, No Data
Subtotal Motorized Trails		197.99	24.27	
	<i>Subtotal ROS Noncompliant:</i>	<i>1.39</i>	<i>0.29</i>	<i>N/A</i>
	<i>Subtotal ROS Compliant:</i>	<i>854.68</i>	<i>116.51</i>	<i>N/A</i>
	<i>No data:</i>	<i>73.91</i>	<i>0</i>	NonFS, No Data
Total All NFS Routes Open to Wheeled Vehicle Use		929.98	116.8	N/A

Table 51: Miles open for OSV Recreation by ROS Class in Alternative 2

Compliance	ROS Class	Miles	Management Areas
OSV Groomed Trails			
ROS Noncompliant	Primitive	0	N/A
	Semiprimitive nonmotorized	8.95	3.3B
ROS Compliant	Semiprimitive motorized	68.6	3.1B, 3.3A, 3.5A, 5.1, 5.2, 5.4
	Roaded natural	110.85	4.2, 4.3, 5.1, 5.4
	Rural	0	N/A
	Urban	0	N/A
N/A	No data	12.78	Non FS, No Data
Subtotal Groomed Trails		201.19	N/A
OSV Ungroomed Trails			
ROS Noncompliant	Primitive	0	N/A
	Semiprimitive nonmotorized	24.40	1.3, 1.6A, 3.3B
ROS Compliant	Semiprimitive motorized	34.71	3.1C, 3.3A, 3.5B, 5.1, 5.4
	Roaded natural	37.21	4.2, 4.3, 5.1, 5.4
	Rural	0	N/A
	Urban	0	N/A
N/A	No data	1.49	Non FS, No Data
Subtotal Ungroomed Trails		97.82	
	<i>Subtotal ROS Noncompliant:</i>	<i>33.35</i>	<i>N/A</i>
	<i>Subtotal ROS Compliant:</i>	<i>251.37</i>	<i>N/A</i>
	<i>No data:</i>	<i>14.29</i>	<i>N/A</i>
Total Miles of Open OSV Trails		299	N/A
Acres Open to OSV Use			
ROS Noncompliant	Primitive	6.5	1.1
	Semiprimitive nonmotorized	152,902	1.3, 1.5A, 1.6A, 2.2A, 3.1B, 3.3B, 4.2, 4.5A
ROS Compliant	Semiprimitive motorized	272,595	1.3, 1.5A, 3.1B, 3.1C, 3.3A, 3.3C, 3.5A, 3.5B, 4.2, 5.1, 5.2, 5.4
	Roaded natural	96,112	3.1A, 3.3A, 4.2, 4.3, 4.5A, 5.1, 5.2, 5.4
	Rural	0	N/A
	Urban	0	N/A
N/A	No data	0	N/A
Subtotal		521,616	
	<i>Subtotal ROS Noncompliant:</i>	<i>152,908</i>	
	<i>Subtotal ROS Compliant:</i>	<i>368,708</i>	
	<i>No data:</i>	<i>0</i>	
Total Acres Open to Cross-County OSV Use		521,616	

Alternative 2 proposes seasonal restrictions for 360.28 miles of NFSRs and 158.05 miles of NFSTs (many of the motorized trails subject to seasonal restrictions are previously designated roads subject to seasonal restrictions).

Table 52: Seasonal Restrictions under Alternative 2

Other Management Actions	Clarks Fork RD	Greybull RD	Wapiti RD	Washakie RD	Wind River RD	Total Miles
NFSRs under seasonal restriction	109.53	48.88	39.88	102.77	59.22	360.28
NFSTs under seasonal restriction	8.38	0.00	0.00	133.15	16.52	158.05

These restrictions will limit impacts to other forest resources, minimizing potential wildlife harassment, soil compaction and rutting, and promoting desired settings conducive to semi-primitive settings. Expanded seasonal restrictions are also expected to minimize safety risks by potentially limiting collisions. Seasonal restrictions may displace users wishing to access areas subject to a restriction. This displacement may concentrate additional use in adjacent areas not subject to seasonal restrictions.

3.3.2.4.1 Direct and Indirect Effects of Alternative 2

Decommission roads and trails. Alternative 2 identifies 10.35 miles for decommissioning: 2.65 miles on the Clarks Fork Ranger District, 1.54 miles on Wapiti, 1.14 on Washakie, and 5.02 miles on Wind River. The Clarks Fork and Wapiti roads proposed for decommissioning were identified through the Travel Analysis Process/Travel Analysis Report (TAP/TAR) as being likely not necessary. The Washakie roads include roads identified as being likely not necessary through the TAP/TAR and non-system roads created by users that cause resource issues. And the Wind River roads identified a short dead-end route suitable for decommissioning. These restrictions will decrease resource impacts with negligible impact to user experiences. These decommissioned roads are analyzed more fully in the Transportation section (and consult Appendix B for a crosswalk from the TAP/TAR recommendations to the proposed routes under the alternatives).

Management action under this Alternative also includes NFST reconstruction to minimize unauthorized motorized use access or route proliferation along the Popo Agie and Fitzpatrick Wilderness boundaries. Washakie Ranger District has 3.24 miles of trails and Wind River Ranger District has 1.91 miles proposed for reconstruction. Rerouting the NFSTs will address impacts to wilderness characteristics, primarily naturalness. These actions will have negligible impacts to recreation.

Summer motorized trail loop opportunities. Alternative 2 proposes adding 45 miles to the existing 239 miles of motorized trail loop opportunities on Forest Service routes. These opportunities increase access to the Forest and improve desired experiences for users. The additional loop miles will further minimize the frequency of user encounters versus on a non-looping system, thereby decreasing the likelihood of user conflicts, possible collisions, or other impacts created by negative encounters.

Continued recreational use. Alternative 2 proposes changing designations of roads and trails to provide increased motorized opportunities for all user groups, while applying seasonal restrictions as necessary to limit impact to other Forest resources. If selected, Alternative 2 would designate 198 miles of NFSTs, 143 miles of which are currently NFSRs. Designating these routes as NFSTs will provide additional funding mechanisms for trails, as trails enrolled in Wyoming’s State Trails Program have the opportunity to apply for grants to address maintenance and other issues. These trails will also increase opportunities for youth

operators, which will promote group rides (friends and families) and support desired experiences and outcomes. This alternative may see an increase in potential user conflicts by allowing riders lacking experience to operate a vehicle on NFSTs at the same time experienced riders, or having inexperienced riders safely operate on NFSTs that are beyond their skills and abilities. These conflicts and situations are expected to be low due to the existing NFST design, which promotes low-speed operation. Additional outreach and education efforts will inform riders of safe operation practices and lead to responsible use on these routes.

Alternative 2 further designates 22 miles of NFST open to vehicles 64 inches wide or less. These trails will potentially decrease social conflicts by reducing the presence of motorized vehicles, primarily full-sized vehicles, promoting additional driving opportunities for youth operators, and limiting impacts to routes and the surrounding environments from full-sized vehicles. The designation may displace users who have traditionally enjoyed accessing these areas in vehicles greater than 64 inches wide.

Alternative 2 proposes to add 10.57 miles of new designated NFSRs to the transportation system, of which 5.65 miles is located in the Wind River Ranger District. These roads will enhance user opportunities within the Forest, provide access to dispersed campsites, and establish new routes that maintain a more sustainable system and minimize impacts. These aspects of Alternative 2 are anticipated to improve the motorized route system for a broad range of user groups.

Roads currently open to the public that would be converted to administrative only use total 6.10 miles (the additional 67.81 miles would be added to the road system as ML 1 roads, and be closed to all use). Closing 6.10 miles of routes to public use will minimize resource impacts from continuous use, while also enhancing the semi-primitive to primitive settings of the Shoshone National Forest. The proposed transition to administrative-only use will also limit impacts to wilderness areas and key management areas. This action will minimize the social impacts on natural settings, thereby achieving a more primitive type of user experience. Closing 6.10 miles of routes to the public (and designating as administrative-use only) may via these routes and cause displacement to alternative areas, but these results are unlikely due to the small number of routes affected and availability of alternative access.

Management of unauthorized routes. Effects are similar to those analyzed under Alternative 1.

Consistency with Management Areas. Proposed travel management actions will impact the Standard established in Management Area 3.3C "Back country recreation wheeled motorized with winter non-motorized" by proposing to construct 743 feet of new road to complete a turn-around loop on Rattlesnake Mountain, and 266 feet in the East Fork TH to access a dispersed camp site. The Management Area's Goal is to "prohibit new road construction or existing road reconstruction unless needed to honor existing rights. (MA3.3C-STAND-01)". Linear footprints are already present in these two areas which are the result of off-road use with the intent of completing a turn-around and accessing a dispersed campsite. Focusing construction efforts to these spurs will address further impacts created by vehicle use off of a hardened footprint, and allow users to attain desired recreational experiences and opportunities within this management area. Impacts to the management area are negligible in the context of the amount of roads throughout the Forest.

Management of special areas, including IRAs. Alternative 2 has similar effects to those analyzed under Alternative 1. Alternative 2 proposes a seasonal restriction from December 1 to April 30 along 0.84 miles of the CDNST. Some impacts to recreational use may occur based on the seasonal restriction, though the effects of this impact are likely small.

Under Alternative 2, a net loss of 2.23 miles of motorized routes would occur within IRAs (4.83 miles of roads and motorized trails decommissioned, 1.88 miles of new administrative-only, and 4.48 miles of new motorized trails and roads). And approximately 13.5 miles of NFSRs within IRAs are proposed to be converted to NFSTs. Finally, 44 miles of NFS routes would be subject to seasonal restrictions. Converting 13.5 miles of NFSRs to NFSTs will aid in maintaining the Natural Integrity Apparent Naturalness of IRAs more effectively than under the no-action alternative due to the availability of funding sources to mitigate current route conditions. Different maintenance requirements apply to NFSTs, and these routes require different vehicle standards that may not be as stringent as highway operation; furthermore, these trails will provide access to a variety of user groups, including youth operators.

OSV use. Alternative 2 proposes an addition 11 miles of groomed and ungroomed OSV trails on top of the existing 288.88. Alternative 2 would add 10.12 miles of ungroomed OSV trails in the Clarks Fork Ranger District (5.52 miles) and Wind River Ranger District (4.60 miles). The total mileage open to Class 1 OSVs would be 299 miles. The addition of ungroomed trails will increase riding opportunities and OSV access into the Forest. Alternative 2 would also allow Class 2 OSVs to operate on 258.03 miles of snowmobile trails.

This proposal would close 1,354 acres to OSV use in the Wind River Ranger District. This closure would prohibit OSV use in a cross-country ski area, thereby reducing potential user conflict between motorized and non-motorized use. This proposed closure would displace some OSV users, but adjacent groomed and ungroomed trails provide ample OSV use opportunities. The anticipated effects are therefore minimal.

3.3.2.5 Environmental Consequences of Alternative 3

This section discloses the environmental impacts of Alternative 3. Alternative 3 proposes minor changes that differ from current use under Alternative 1 and from proposals under Alternative 2. The overall effect of these changes is indicated in Table 53.

Table 53: Alternative 3 Summary

Route Class	Miles (unless otherwise indicated)
Subpart B – Designated Wheeled NFS Routes	
NFSRs open to all vehicles	718.35
NFSTs open to all vehicles	36.16
NFSTs open to vehicles 50 inches wide or less	36.01
NFSTs open to vehicles 64 inches wide or less	120.30
NFSTs open to single track	2.04
<i>Total Motorized Routes</i>	<i>912.86</i>
Decommissioned Road Miles	5.76
Subpart C – OSV Use	
Miles of Groomed OSV Trails	201.19
Miles of Ungroomed OSV Trails	87.69

Route Class	Miles (unless otherwise indicated)
<i>Total Miles of Over-Snow Trails</i>	288.88
Area available for cross-country OSV use	512,442 Acres

Similar effects are expected from seasonal restrictions to NFS routes as those analyzed under Alternative 2. Total miles of NFSRs subject to seasonal restrictions decreases under Alternative 3—though the total NFSR miles decreases as well. NFSTs subject to seasonal restrictions increases slightly, and the effects associated with these restrictions are similar to those analyzed under Alternative 2.

Table 54: Seasonal Restrictions under Alternative 3

Other Management Actions	Clarks Fork RD	Greybull RD	Wapiti RD	Washakie RD	Wind River RD	Total Miles
NFSRs under seasonal restriction	102.26	51.71	41.34	103.84	64.54	353.37
NFSTs under seasonal restriction	7.09	0.00	1.96	131.10	20.20	160.36

Using the same methodology as described in Alternative 1, the following table illustrates analysis for Alternative 2.

Table 55: Routes Open to Motorized Recreation by ROS Class in Alternative 3

Compliance	ROS Class	Miles	Miles in IRA	Management Areas
NFSRs Open to Wheeled Vehicle Use				
ROS Noncompliant	Primitive	0	0	N/A
	Semiprimitive nonmotorized	1.32	0.29	1.3, 1.6A, 3.3B
ROS Compliant	Semiprimitive motorized	250.47	5.58	1.5A, 3.1B, 3.3A, 3.3C, 3.5B, 3.5C, 5.1, 5.2, 5.4
	Roaded natural	391.23	86.37	3.1A, 4.2, 4.3, 4.5A, 5.1, 5.4
	Rural	0.015	0	8.2
	Urban	0	0	N/A
N/A	No data	75.32	0	Non FS, No Data
Subtotal Roads		718.35	92.24	N/A
NFSTs Open to All Wheeled Vehicle Use				
ROS Noncompliant	Primitive	0	0	N/A
	Semiprimitive nonmotorized	0	0	N/A
ROS Compliant	Semiprimitive motorized	27.33	0.38	3.3A, 5.1,
	Roaded natural	8.46	1.37	4.2, 4.3, 5.1, 5.4
	Rural	0	0	N/A
	Urban	0	0	N/A
N/A	No data	0.37	0	Non FS, No Data
Subtotal Trails		36.16	1.75	
NFSTs Open to Wheeled Vehicles 50 Inches Wide or Less				
ROS Noncompliant	Primitive	0.07	0	1.1
	Semiprimitive nonmotorized	0	0	N/A
ROS Compliant	Semiprimitive motorized	22.54	0.95	3.3A, 5.1, 5.4
	Roaded natural	13.03	6.5	4.3, 5.1
	Rural	0	0	N/A
	Urban	0	0	N/A
N/A	No data	0.37	0	NonFS, No Data
Subtotal 50" Trails		36.01	7.45	
NFSTs Open to Wheeled Vehicles 64 Inches Wide or Less Trails				

ROS Noncompliant	Primitive	0	0	N/A
	Semiprimitive nonmotorized	0	0	N/A
ROS Compliant	Semiprimitive motorized	71.29	2.2	3.1B, 3.3A, 3.3C, 5.1, 5.2, 5.4
	Roaded natural	48.8	12.5	4.2, 4.3, 5.1, 5.4
	Rural	0	0	N/A
	Urban	0	0	N/A
N/A	No data	0.21	0	NonFS
Subtotal 64" Trails		120.30	14.7	
NFSTs Open to Single-Track				
ROS Noncompliant	Primitive	0	0	N/A
	Semiprimitive nonmotorized	0	0	N/A
ROS Compliant	Semiprimitive motorized	1.98	1.87	3.3A, 3.3C
	Roaded natural	.06	0	4.3
	Rural	0	0	N/A
	Urban	0	0	N/A
N/A	No data	0	0	N/A
Subtotal Single Track		2.04	1.87	
Subtotal No Data		0.95	0	NonFS, No Data
Subtotal Motorized Trails		194.51	25.77	
<i>Subtotal ROS Noncompliant:</i>		<i>1.39</i>	<i>0.29</i>	<i>N/A</i>
<i>Subtotal ROS Compliant:</i>		<i>835.21</i>	<i>117.72</i>	<i>N/A</i>
<i>No data:</i>		<i>76.27</i>	<i>0</i>	<i>N/A</i>
Total All NFS Routes Open to Wheeled Vehicle Use		912.87	118.01	N/A

Table 56: Miles open for OSV Recreation by ROS Class in Alternative 3

Compliance	ROS Class	Miles	Management Areas
OSV Groomed Trails			
ROS Noncompliant	Primitive	0	N/A
	Semiprimitive nonmotorized	8.95	3.3B
ROS Compliant	Semiprimitive motorized	68.60	3.1B, 3.3A, 3.5A, 5.1, 5.2, 5.4
	Roaded natural	110.85	4.2, 4.3, 5.1, M 5.4
	Rural	0	N/A
	Urban	0	N/A
N/A	No data	12.80	Non FS, No Data
Subtotal Groomed Trails		201.20	N/A
OSV Ungroomed Trails			
ROS Noncompliant	Primitive	0	N/A
	Semiprimitive nonmotorized	21.68	1.6A, 3.3B
ROS Compliant	Semiprimitive motorized	33.08	3.1C, 3.3A, 3.5B, 5.1
	Roaded natural	31.70	4.2, 4.3, 5.1, 5.4
	Rural	0	N/A
	Urban	0	N/A
N/A	No data	1.23	Non FS, No Data
Subtotal Ungroomed Trails		87.69	
<i>Subtotal ROS Noncompliant:</i>		<i>30.63</i>	<i>N/A</i>
<i>Subtotal ROS Compliant:</i>		<i>244.22</i>	<i>N/A</i>
<i>No data:</i>		<i>14.03</i>	<i>N/A</i>
Total Miles of Open OSV Trails		288.88	N/A
Acres Open to OSV Use			
ROS Noncompliant	Primitive	0.0	N/A
	Semiprimitive nonmotorized	143,841	1.3, 1.5A, 1.6A, 2.2A, 3.1B, 3.3B, 4.2, 4.5A
ROS Compliant	Semiprimitive motorized	272,595	1.3, 1.5A, 3.1B, 3.1C, 3.3A, 3.3C, 3.5A, 3.5B, 4.2, 5.1, 5.2, 5.4

	Roaded natural	96,005	3.1A, 3.3A, 4.2, 4.3, 4.5A, 5.1, 5.2, 5.4
	Rural	0	N/A
	Urban	0	N/A
N/A	No data	1	No Data
	Subtotal	512,441	
	<i>Subtotal ROS Noncompliant:</i>	143,841	
	<i>Subtotal ROS Compliant:</i>	368,601	
	<i>No data:</i>	1	
	Total Acres Open to Cross-Country OSV Use	512,442	

3.3.2.5.1 Direct and Indirect Effects of Alternative 3

Decommission roads and trails. Alternative 3 identifies 5.76 miles for decommissioning: 1.17 miles on the Clarks Fork Ranger District, 1.54 miles on Wapiti, and 3.06 miles on Wind River. No trails are identified for decommissioning. This Alternative proposes roughly 5 miles less roads for decommissioning than Alternative 2, but overall effects are similar to those analyzed under Alternative 2.

Summer motorized trail loop opportunities. Alternative 3 proposes adding 14 miles to the existing 239 miles of currently existing motorized trail loop opportunities on the Forest, for a total of 253 miles. Proposals include loops in the Line Creek Area and Brooks Lake Area (adding 1.4 and 8 miles, respectively). These routes limit use to vehicles 64 inches wide or less. Effects are similar to those analyzed under Alternative 2.

Continued recreational use. Alternative 3 proposes similar changes to NFSTs as Alternative 2. Alternative 3 does propose, different from Alternative 2, to convert 117.16 miles of NFSRs to NFSTs open to vehicles 64 inches wide or less (versus NFSTs open to all under Alternative 2). These trails will provide opportunities to youth riders while reducing potential for hazardous conflicts such as collisions with full sized vehicles. Converting NFSRs to NFSRs open to wheeled vehicles 64 inches wide or less may potentially displace some users. Alternative 3 proposes 35.8 miles of NFSTs open to all wheeled vehicles, trails that are located on the Clarks Fork and the Wind River Ranger Districts. Alternative 3 does not propose NFSTs open to all in the remainder of the Ranger Districts. The effects from these proposals are similar effects to those analyzed under Alternative 2.

Alternative 3 proposes several additions to the motorized route network on the Forest. These additions include 5 miles of new NFSRs (3 miles across the North Zone Ranger Districts, and 2 miles in the Washakie Ranger District), 2 miles of new NFSTs open to wheeled vehicles 50 inches wide or less (for a motorized loop system on the Wind River Ranger District), 3 miles of new NFSTs trails open to wheeled vehicles 64 inches wide or less (across the Clarks Fork and Wapiti Ranger Districts). These additions enhance recreational access. The loop opportunities and new access are expected to minimize user conflict by decreasing potential interactions between user groups.

Similar to Alternative 2, Alternative 3 also proposes converting roads to administrative-use only and closing them to public use. Roads currently open to the public and transferred to administrative only use total 10.07 miles. Closing these routes to public use will minimize resource impacts from continuous use, while also enhancing the semi-primitive to primitive settings of the SNF. Anticipated effects are similar to those analyzed under Alternative 2 and any difference from the slight increase in mileage under Alternative 3 which would decrease more opportunities for the public to access desired areas in the Forest

than Alternative 2, but would have negligible impacts in context with the total mileage throughout the Forest.

Management of unauthorized routes. Effects are similar to those analyzed under Alternative 1.

Consistency with Management Areas. Alternative 3 proposes to construct 743 feet of new road to complete a turn-around loop on Rattlesnake Mountain, which conflicts with the management area 3.3C Standard as established in the Forest Plan. Impacts would be the same as analyzed in Alternative 2, only to a lesser degree for Alternative 2 proposes to construct an additional 266 feet of new road to access a dispersed site within the East Fork TH. Impacts to the management area are negligible in the context of the amount of roads throughout the Forest.

Management of special areas, including IRAs. Alternative 3 proposes the same management actions as under Alternative 2 with respect to the NPNHT and CDNST, and the effects would be the same here as set forth under Alternative 2.

Under Alternative 3, the footprint for motorized routes within IRAs does not significantly change compared to Alternatives 1 and (118 miles under Alternative 3 compared with 117 miles under Alternative 1 and 116.8 under Alternative 2). Alternative 3 proposes designating 1.6 miles of administrative NFSRs, 4.3 miles of new or reconstructed NFSTs, and 0.61 mile of NFS routes decommissioned and/or administratively closed. Approximately 15 miles of NFSRs would be converted to motorized trails (13 miles of which would be open to wheeled vehicles 64 inches wide or less). And seasonal restrictions would apply to 26.4 miles of NFS routes under this alternative. These proposals would benefit wilderness type characteristics of IRAs—even the proposed 4.3 miles of NFS routes would mitigate resource impacts by relocating an NFST to a suitable surface. Generally speaking, the effects under this alternative would be similar to those analyzed under Alternative 2.

Seasonal restrictions proposed under this alternative (Table 54) will aid in enhancing the desired settings, characteristics, and supplemental recreational resources and values within the IRAs. The additional seasonal restrictions will maintain the IRAs' Natural Integrity, Apparent Naturalness, and offer more Opportunities for Primitive Recreation Experience and Solitude when compared to Alternative 1. Effects to recreation resources are generally similar to the effects analyzed under Alternative 2.

Over-snow motorized vehicle use. The effects to recreation from use of OSV groomed and ungroomed trails are similar to those analyzed under Alternative 1, with no new groomed and ungroomed snowmobile trails proposed. Alternative 3 does propose closing 9,175 acres to OSV use in addition to the 1,354 acres proposed under Alternative 2. The additional closure is proposed for the High Lakes Wilderness Study Area. Further explanation of the effects of this closure is addressed in section 3.7. The effects under Alternative 3 will resemble those under Alternative 2.

3.3.2.6 Cumulative Impacts of Alternatives 2 and 3

Past, present, and reasonably foreseeable actions on the Forest are described above in Table 26. The Beartooth Highway Reconstruction, Loop Road Maintenance project, and winter use projects contribute to the overall effects to recreation. These projects promote and sustain recreational opportunities and experiences by enhancing access for both winter and summer seasons. The proposed management actions in Alternatives 2 and 3 are in sync with these actions. Cumulative range and vegetative actions may interfere with recreational opportunities and experiences by restricting or limiting access through

temporary road closures; these closures may displace users to other areas. Any potential impacts are expected to be slight. Alternatives 2 and 3 are not expected to have any adverse effects to recreation within the Forest when considered with these actions.

Overall, the effects of the cumulative actions on recreation and recreation-related resources are minor at the forest-wide scale. The primary land use practices and actions that affect recreation on the Forest include transportation projects and vegetation management. These categories of activity directly affect transportation and motorized routes across the forest, through the rehabilitation and maintenance of existing routes or the construction of new routes (e.g., for timber harvest or fire suppression activities). All of these projects tend to be temporal, with effects to users typically lasting from several hours to several weeks or months, before those effects subside. These short-term impacts (often associated with heavy machinery, motor vehicles, and power equipment) are often short in duration and dispersed. Combined effects under both Alternative 2 and 3 are, therefore, not very likely.

Timber projects can have additional impacts, in temporarily closing areas off to public use when harvest activities, fire suppression, and related projects are occurring. Temporary to short-term road and trail restrictions may occur, but the effect to recreation at the Forest-scale will be minimal. Other effects of grazing, special uses, and other stakeholder activities (private landowners, other federal and state entities) are not anticipated to cumulatively effect recreation when considered with Alternative 2 and 3.

3.3.3 Consistency with Relevant Laws, Regulations, and Policy

3.3.3.1 Land and Resource Management Plan

The SNF operates under the direction of its Revised Land and Resource Management Plan (Forest Plan) (2015). The Forest Plan is a long-range program for natural resource management activities on the Forest and establishes management requirements to be used in implementation. The purpose of the Forest Plan is to provide a management program reflecting a mix of management activities that allows use and protection of the Forest's resources, fulfills legislative requirements, and addresses other issues. To accomplish this, the Forest Plan implements the following:

- Establishes management direction and long-range goals and objectives
- Specifies direction and the timing and location of the practices needed to achieve this direction
- Establishes monitoring and evaluation requirements needed to ensure that the direction is carried out
- Makes determinations on wilderness suitability and provides management direction on oil and gas leasing availability

The Forest Plan's management requirements guide how other undertakings are planned on the SNF, such as this travel management PEA. These other planning activities are always evaluated with respect to their conformance with the direction in the Forest Plan, as listed in Table 57.

The Shoshone National Forest's recreation Goals, Standards, and Guidelines, and roads and trails goals and objectives are established to sustain the diverse recreational opportunities, and to provide new opportunities consistent with recreation settings responding to public demand while meeting desired conditions for other resources. The following table further details these Goals, Standards, Guidelines and Objectives. Refer to Table 58 for compliance with the SNF Forest Plan.

Table 57: Recreation Goals, Standards, and Guidelines

Goals	Seek increased tourism that will enhance local economies by providing information and a broad spectrum of high quality outdoor recreation opportunities for visitors. (REC-GOAL-01)
	Education opportunities are used to minimize conflicts between user groups. (REC-GOAL-02)
	Opportunities for consumptive and non-consumptive wildlife uses are provided. (REC-GOAL-03)
	Recreation management is responsive to the needs of forest users, within other management constraints. (REC-GOAL-04)
Standard	Manage recreation use to stay within the capacity allowed for the prescribed recreation opportunity spectrum objectives (Forest Plan, Table 17). (REC-STAND-01)
Guidelines	Group size limits should be established where needed to meet management goals. (REC-GUIDE-01)
	Campsites should be at least 200 feet from trails, lakes, or wet meadows, and 100 feet from streams or creeks. (REC-GUIDE-02)
	Motorized use on cross-country ski trails may be restricted. (REC-GUIDE-03)
Pertinent Roads and Trails Goals and Objectives	
Goals	National Forest System roads and trails needed for long-term objectives and to meet desired conditions are constructed and maintained in a manner that provides for user safety and minimizes impacts to natural resources. (RDTR-GOAL-01)
	All System roads and trails open to wheeled motorized vehicles are shown on a motor vehicle use map that is available at no charge to the public. (RDTR-GOAL-03)
	A variety of wheeled motorized trail loops are provided for riders of different abilities. (RDTR-GOAL-04)
	The road and motorized trail systems are established using the travel management planning process. (RDTR-GOAL-08)
Objective	At least three new, wheeled motorized trail loop opportunities are available. (RDTR-OBJ-05)

Table 58: Compliance with the Shoshone Forest Plan Pertinent Forest Plan Goals, Standards, and Guidelines*

Forest-wide Goals, Standards, Guidelines					
Forest Plan Direction			ALT A	ALT B	ALT C
Recreation	Guidelines	Motorized use on cross-country ski trails may be restricted. (REC-GUIDE-03)	YES	YES	YES
Roads and Trails	Goals	A variety of wheeled motorized trail loops are provided for riders of different abilities. (RDTR-GOAL-04)	YES	YES	YES
		The road and motorized trail systems are established using the travel management planning process. (RDTR-GOAL-08)	YES	YES	YES
		Resource impacts from use of unauthorized motorized routes are eliminated, along with the unauthorized route. (RDTR-GOAL-09)	YES	YES	YES
	Guidelines	Management activities that impact existing trails should allow for existing recreation use to continue when possible. (RDTR-GUIDE-01)	YES	YES	YES
Management Area 1.3 – Back country recreation year-round non-motorized	Standards	Prohibit new National Forest System road construction or reconstruction unless necessary to honor valid existing rights. (MA1.3-STAND-01)	YES	YES	YES
	Guidelines	Limit all motorized use, including snowmobile use, to authorized administrative, law enforcement, search and rescue, fire suppression, and emergency purposes.(Administrative purposes include motorized use authorized by special use authorization.)(MA1.3-GUIDE-04)	YES	YES	YES
Management Area 3.3A – Back	Goals	Provide year-round motorized recreation opportunities. (MA3.3A-GOAL-01)	YES	YES	YES

Forest-wide Goals, Standards, Guidelines					
country recreation year-round motorized		Increase diversity of motorized experiences. (MA3.3A-GOAL-02)	YES	YES	YES
	Standards	Motorized travel, except for snowmobiles, is restricted to designated travelways. (MA3.3A-STAND-01)	YES	YES	YES
		Prohibit new System road construction or existing road reconstruction unless needed to honor existing rights. (MA3.3A-STAND-02)	YES	YES	YES
	Guidelines	Some trails may be restricted to non-motorized use. (MA3.3A-GUIDE-02)	YES	YES	YES
		Manage for an adopted recreation opportunity spectrum class of semi-primitive motorized. (MA3.3A-GUIDE-03)	YES	YES	YES
Management Area 3.3B – Back country recreation summer non-motorized with winter motorized	Goals	Provide quality summer non-motorized and winter motorized recreation opportunities. (MA3.3B-GOAL-01)	YES	YES	YES
	Standards	Prohibit new National Forest System road construction or existing road reconstruction unless needed to honor existing rights. (MA3.3B-STAND-01)	YES	YES	YES
	Guidelines	Manage for an adopted recreation opportunity spectrum class of semi-primitive motorized in the winter and semi-primitive non-motorized in the summer. (MA3.3B-GUIDE-02)	YES	YES	YES
Management Area 3.3C – Back country recreation wheeled motorized with winter non-motorized	Goals	Provide quality wheeled motorized and winter non-motorized recreation opportunities. (MA3.3C-GOAL-01)	YES	YES	YES
	Standards	Prohibit new road construction or existing road reconstruction unless needed to honor existing rights. (MA3.3C-STAND-01)	YES	YES (<i>see discussion in 3.2.4</i>)	YES (<i>see discussion in 3.2.4</i>)
	Guidelines	Motorized use on some trails may be restricted. (MA3.3C-GUIDE-02)	YES	YES	YES
		Manage for an adopted recreation opportunity spectrum class of semi-primitive motorized in the summer and semi-primitive non-motorized in the winter. (MA3.3C-GUIDE-03)	YES	YES	YES
Management Area 3.5A-D – Back country recreation and forest restoration (3.5A – year-round motorized, 3.5B – winter motorized, 3.5C	Goals	Provide motorized recreation opportunities consistent with designations ²⁸ . (MA3.5-GOAL-01)	YES	YES	YES
	Standards	Motorized travel, except for over-the-snow vehicles, is restricted to designated travelways. (MA3.5-STAND-02)	YES	YES	YES
		Prohibit new System road construction or existing road reconstruction unless needed to honor existing rights. (MA3.5-STAND-03)	YES	YES	YES
	Guidelines	Some trails may be restricted to non-motorized use. (MA3.5-GUIDE-02)	YES	YES	YES

Forest-wide Goals, Standards, Guidelines					
– wheeled motorized, 3.5D – year-round non-motorized)		Manage for an adopted recreation opportunity spectrum class of semi-primitive motorized ²⁹ . (MA3.5-GUIDE-03)	YES	YES	YES
Management Area 4.3 – Back country access corridor	Goals	Provide motorized access to back country management areas. (MA4.3-GOAL-01)	YES	YES	YES
	Guidelines	Manage for an adopted recreation opportunity spectrum class of semi-primitive motorized with possible seasonal restrictions. (MA4.3-GUIDE-01)	YES	YES	YES
		Seasonal or annual road restrictions are permitted for resource protection and safety. (MA4.3-GUIDE-03)	YES	YES	YES
Management Area 5.1 – Managed forests and rangelands	Guidelines	Manage for an adopted recreation opportunity spectrum class of semi-primitive motorized to roaded natural. (MA5.1-GUIDE-02)	YES	YES	YES
Management Area 5.2 – Public water supply – water quality emphasis	Guidelines	Manage for an adopted recreation opportunity spectrum class of semi-primitive motorized to roaded natural. (MA5.2-GUIDE-04)	YES	YES	YES
Management Area 5.4 – Managed big game crucial winter range	Guidelines	Manage for an adopted recreation opportunity spectrum class of semi-primitive motorized to roaded natural. (MA5.4-GUIDE-05)	YES	YES	YES
Management-area Specific Goals, Standards, Guidelines					
Management Area 1.5A – Clarks Fork of the Yellowstone Wild River	Standards	New roads, campgrounds, picnic areas, and trailheads are not allowed. (MA1.5A-STAND-11)	YES	YES	YES
		Wheeled motorized vehicles are restricted to Forest Roads 110, 119, 165, 174, 178. 1A, and 178.1B. In the lower corridor, motorized traffic is not permitted off designated routes for the purpose of dispersed camping or any other generally permitted activity. This excludes snowmobiles traveling over snow. (MA1.5A-STAND-14)	YES	YES	YES
	Guidelines	The designated motorized routes within the river corridor should be maintained as primitive routes for off-highway vehicles or high clearance vehicles. (MA1.5A-GUIDE-19)	YES	YES	YES
Management Area 1.6A – High Lakes Wilderness Study Area	Goals	Continue to provide motorized winter recreation opportunities. (MA1.6A-GOAL-01)	YES	YES	YES
	Standards	Manage for an adopted recreation opportunity spectrum class of semi-primitive non-motorized in the summer and semi-primitive motorized in the winter. (MA1.6A-STAND-03)	YES	YES	YES
Management Area 1.6B –	Standards	Vehicular travel, both motorized and mechanized, is prohibited. (MA1.6B-STAND-02)	YES	YES	YES

Forest-wide Goals, Standards, Guidelines					
Dunoir Special Management Unit	Guidelines	Manage for an adopted recreation opportunity spectrum class of semi-primitive non-motorized. (MA1.6B-GUIDE-03)	YES	YES	YES
Management Area 2.2A – Line Creek Plateau Research Natural Area	Standards	Roads and other facilities shall not be constructed in these areas, except within 250 feet of the centerline of U S Highway 212.27 (MA2.2A-STAND-13)	YES	YES	YES
	Guidelines	Manage for an adopted recreation opportunity spectrum class of semi-primitive non-motorized. (MA2.2A-GUIDE-30)	YES	YES	YES
Management Area 2.3 – Proposed research natural areas	Guidelines	Manage for an adopted recreation opportunity class of semi-primitive non-motorized. (MA2.3-GUIDE-06)	YES	YES	YES
Management Area 3.1A – Swamp Lake Botanical Area	Standards	Road construction is prohibited. Road maintenance is limited to that needed for safety and resource protection. (MA3.1A-STAND-03)	YES	YES	YES
Management Area 3.1B – Proposed Little Popo Agie Geological Area	Standards	New road construction is prohibited. Road reconstruction and maintenance is limited to that needed for safety and resource protection. (MA3.1B-STAND-02)	YES	YES	YES
	Guidelines	Manage for an adopted recreation opportunity spectrum class of semi-primitive motorized. (MA3.1B-GUIDE-08)	YES	YES	YES
Management Area 3.1C – Proposed Sawtooth Peatbed Geological Area	Guidelines	Manage for an adopted recreation opportunity spectrum class of non-motorized. (MA3.1C-GUIDE-03)	YES	YES	YES
Management Area 3.6A – Continental Divide National Scenic Trail	Standards	Allow guided over-snow and winter activities that do not interfere with the nature and purposes of the Trail. (MA3.6A-STAND-03)	YES	YES	YES
		Snowmobile use is allowed. New sections of the Trail shall not be located coincidentally with snowmobile trails. (MA3.6A-STAND-04)	YES	YES	YES
Management Area 3.6B – Nez Perce (Nee-Me-Poo) National Historic Trail	Standards	Outside the sections of the Trail that are identified as auto tour routes, manage the Trail as a non-motorized route for primitive hiking and horseback riding. (MA3.6B-STAND-05)	YES	YES	YES
		Do not construct roads within non-auto tour sections of the Trail corridor. (MA3.6B-STAND-09)	YES	YES	YES

*Alternatives are consistent with Roadless area management as spelled out in the 2001 Roadless Area Conservation Rule as defined by the 2015 Forest Plan, and 36 CFR Part 294

3.3.4 Other Relevant Law, Regulation, or Policy

3.3.4.1 Federal Law

3.3.4.1.1 2001 Roadless Area Conservation Rule direction

In 2001, the Roadless Area Conservation Rule formally designated 684,800 acres as inventoried roadless areas and established national direction for timber harvest, road construction, and road reconstruction within these areas. The 2001 Roadless Area Conservation Rule as it pertains to travel management are as follows:

Road construction and reconstruction in inventoried roadless areas on National Forest System lands is prohibited, except:

- To protect health and safety in cases of an imminent threat of flood, fire, or other catastrophic event that, without intervention, would cause the loss of life or property
- To conduct environmental cleanup required by Federal law
- To allow for reserved or outstanding rights provided by statute or treaty
- To prevent irreparable resource damage by an existing road
- To rectify existing hazardous road conditions
- Where a road is part of a Federal Aid Highway project
- Where a road is needed in conjunction with the continuation, extension, or renewal of a mineral lease on lands that are under lease, or for new leases issued immediately upon expiration of an existing lease (IRA-02)

3.3.4.1.1.1 Management approach

The management approach for inventoried roadless areas is generally guided by the management area to which the individual roadless area is allocated. Management direction is sometimes more restrictive than the direction in the Roadless Area Conservation Rule. In other cases, the specific management direction is less restrictive. In those cases, Roadless Area Conservation Rule direction is followed.

The exceptions that allow new road construction and reconstruction in inventoried roadless areas apply to both system roads and temporary roads. For the exceptions related to health and safety, temporary roads may be particularly appropriate in that they may make it easier to protect roadless characteristics in the long term. Nothing in this Plan is meant to restrict the interpretation of what new roads are allowed under the roadless rule exceptions.

The construction, reconstruction, and maintenance of motorized trails are consistent with the Roadless Area Conservation Rule. Development of such trails is guided by management area direction and the suitability designations for each management area.

3.3.4.1.2 *Executive Order 11644, "Use of Off-Road Vehicles," as amended by Executive Order 11989*

These executive orders provide for regulations governing use of off-road vehicles on federal lands to protect natural resources, promote public safety, and minimize conflicts between uses.

3.3.4.2 State and Local Law

3.3.4.2.1 *Wyoming State Statutes Governing Off-Road Vehicle, All-Terrain Vehicle, And Multi-Purpose Vehicle Use*

Title 31 of the Wyoming State Statutes governs motor vehicles. All chapters of this title govern and apply to users of motor vehicles on the Shoshone National Forest.

3.3.4.3 Other Authorities

3.3.4.3.1 *FSM 7700: Travel Management*

Describes the authority, objectives, policy, responsibility, and definitions for planning, constructing, reconstructing, operating, and maintaining NFS transportation facilities and for managing motor vehicle use on NFS lands.

3.3.4.4 The Amended Continental Divide National Scenic Trail Comprehensive Plan

Advises relevant Forest Service units to regulate uses to the extent necessary to provide for user and public safety; to protect natural, cultural, and historical resources; to minimize conflict and maximize responsible use; to achieve recreation experience objectives; and to comply with Federal and State laws. The Manual was amended to incorporate the Continental Divide National Scenic Trail Comprehensive Plan, the authority, and sets forth the responsibilities for Forest and Grassland Supervisors to manage the CDNST.

3.3.5 Conclusion

Seasonal restrictions provide the most notable impacts to recreation under Alternatives 2 and 3, especially under Alternative 2. Alternative 2 proposes an additional 60 miles of NFSRs and 158 miles of NFSTs be under a seasonal restriction compared to Alternative 1. The other proposed management prescription that would impact recreation is the identification of 75 miles of roads as administrative use only in Alternative 2 (though this only closes roughly 9 miles of currently open roads). Some impacts to recreation could be observed from this closure, though any impact is likely minimal. Seasonal restrictions and closing routes to administrative use will benefit the recreational natural settings within the prescribed ROS classes and Management Areas by minimizing route proliferation, off-road use, and decrease user conflicts between motorized and non-motorized users in these areas.

The conversion of NFSRs to NFSTs will generally impact recreation under Alternatives 2 and 3. Over 190 miles of NFSTs open to wheeled vehicles throughout the Shoshone will allow for an extensive network driving opportunities for youth riders, more riding experiences for groups and families, and opportunities for skill building opportunities. User conflicts, such as collisions with inexperienced riders, may increase. However, overall user experiences and recreational use is expected to benefit. The increase of looping opportunities under Alternatives 2 and 3 will further improve access to the Forest for a wide range of users.

Travel management prescriptions to NPNHT, CDNST, and IRAs across the alternatives would be very minimal. Proposed travel management actions in each alternative are consistent with the management areas' goals, standards, and guidelines, and consistent with the 2001 Roadless Area Conservation Rule.

Routes analyzed are generally within ROS compliance, and consistent with the IRAs' desired conditions. Impacts to desired recreational experiences and beneficial outcomes from travel management prescriptions are expected to be minimal in that the management actions support the desired ROS settings.

OSV management actions across the Alternatives will continue to support OSV use. Although Alternative 2 proposes closing 1,300 acres to OSV use, this management action will protect the values of the current cross-country ski area, minimize social conflicts, and maintain recreational experiences and outcomes. Management actions pertaining to groomed and ungroomed OSV trails are fairly consistent throughout the alternatives, with Alternative 2 having a proposed addition of 10 miles of ungroomed OSV trails.

3.4 Socio-Economics

3.4.1 Introduction

This report evaluates the social and economic consequences of designating public motor vehicle access routes and areas and establishing a minimum road system consistent with the Forest Plan, Executive Orders 11644 and 11989, and the travel management regulations at 36 C.F.R. part 212, subparts A, B, and C. This analysis focuses on the designated motorized system, as it is anticipated to have the largest interaction with socio-economic analysis. In general, it is believed that people who engage in recreation on the Shoshone National Forest will continue to find recreation opportunities and will continue to support the types of businesses that cater to their needs. Fluctuations in the number of visitors to the Forest can cause positive or negative economic impacts to local businesses; but these fluctuations are also influenced by much larger trends. The economy and social aspects are affected by a variety of factors including population growth, location of new magnet industries, recession, tax and other economic policies, the amount of wildfires and smoke in the area, the strength of the national economy, and even changing preferences like people preferring shorter vacations to long vacations. The management of motorized travel on the Shoshone NF is expected to have a relatively small effect to the economic and social aspects of the local area when compared with these kinds of variables.

Public comments received during the public scoping periods in 2016 and 2017 revealed much about the values, beliefs, and attitudes of the communities that the Forest serves. Values are "relatively general, yet enduring, conceptions of what is good or bad, right or wrong, desirable or undesirable." Beliefs are "judgments about what is true or false – judgments about what attributes are linked to a given object. Beliefs can also link actions to effects." Attitudes are "tendencies to react favorably or unfavorably to a situation, individual, object, or concept. They arise in part from a person's values and beliefs regarding the attitude object" (Allen et al. 2009). The issues raised by the public and reflective of these values, beliefs, and attitudes helped to refine the socio-economic analysis conducted of the alternatives under this Travel Management Project.

3.4.1.1 Issues Addressed

This section includes issues pertaining to socio-economic resources that have been identified for detailed analysis. “An issue is a statement of cause and effect linking environmental effects to actions” (FSH 1909.15).

Issue 1: Whether and to what extent motorized use under the Alternatives would affect economic activity associated with the Forest.

Issue 2: Whether and to what extent motorized use under the Alternatives would affect environmental justice and civil rights associated with the Forest.

3.4.2 Methodology

This section includes a description of the methods and data used in this analysis. This analysis focuses on two components: economic activity and environment justice.

3.4.2.1 Economic Activity Methodology

Economic contributions from recreation visitation were modeled using IMPLAN Professional Version 3.1 with 2017 data. IMPLAN is an input-output model, which estimates the economic impacts of projects, programs, policies, and economic changes on a region. IMPLAN analyzes the direct, indirect, and induced economic impacts. Direct economic impacts are generated by the activity itself, such as recreation visitation. Indirect employment and labor income contributions occur when a sector purchases supplies and services from other industries in order to produce a product or offer a service. Induced contributions are the employment and labor income generated as a result of spending new household income generated by direct and indirect employment. The employment estimated is defined as any part-time, seasonal, or full-time employment. In the economic contributions table, direct, indirect and induced contributions are included in the estimated impacts. The IMPLAN database describes the economy in 536 sectors using federal data from 2017.

As with nearly all economic reporting, a time lag associated with data collection prevents real-time reporting of economic conditions. The most recent data is typically one or two years old before it is published. Therefore, efforts to describe the existing situation describe the recent past. This delay is not a large problem since many changes happen slowly, and recent data can reflect current conditions. However, sudden changes can affect the overall condition (e.g., the recent impact of the coronavirus upon the U.S. economy). Much of the data needed to describe these changes will not be available for several years. As a result, some of the data in the tools used in this analysis may not reflect current conditions.

Another limitation of most economic data is the scale at which it is collected and summarized. The smallest level most data are reported at is the county level. County-level data represents the average of all the individuals and communities within that county. County-level data may not capture different experiences and conditions across the county, such as variability of economic conditions.

3.4.2.2 Resource Indicators and Measures

General measures of recreation visitation and subsequent economic activity used in this analysis include:

- Designated NFSRs open to the public (miles)
- Designated NFSTs open to the public (miles)

- Designated OSV Class 1 trails (miles)
- Designated OSV Class 2 trails (miles)
- Areas designated open for OSV Class 1 cross-country travel (acres)

These measures also guide the analysis of impacts to individuals with mobility limitations or low incomes. These populations may be particularly affected by changes in the designated NFS route system, as these populations are likely to have fewer options to engage in substitute behavior (e.g., traveling to another site or engaging in a substitute activity) due to physical and financial constraints.

Table 59: Resource condition indicators and measures for assessing effects

Issue	Indicator or Measure	Source
Economic activity	Employment, income, tax revenue: NFS wheeled route miles & OSV route miles and acres	FSM 1970
Environmental justice and civil rights	Accessibility of motorized recreation opportunities: NFS wheeled route miles & OSV route miles and acres	EO 12898, USDA-DR 4300-4

3.4.2.3 Assumptions

- Generally, non-local visitor spending is considered more impactful to local economies. This assumption is based on two true premises: (1) travelers have greater needs for goods and services when farther from home and (2) local spending alternatives (i.e., substitutions) often exist within the same local economy. Local spending is still a contributing factor to overall economic impacts but is proportionally smaller than impacts felt from people who travel farther distances. NVUM data (USDA 2019) supports this assumption and is incorporated into the analysis below.
- Increases in miles of open NFSRs lead to increases in recreation visitation, which leads to more people spending money in the local area on goods and services.
- Quantitative changes in recreation visitation due to variation in management across alternatives cannot defensibly be estimated. Therefore, economic effects related to recreation visitation are discussed qualitatively.
- The temporal boundaries for analyzing the direct and indirect effects is ten years. Beyond this period, other variables, such as changes in recreational preferences or technology, are expected to produce socio-economic conditions and associated uses that differ substantially from existing conditions.

3.4.3 Environmental Consequences

3.4.3.1 Baseline Conditions

3.4.3.1.1 Demographic Conditions and Trends

The analysis area counties are designated as non-metropolitan, with no cities or towns exceeding 20,000 inhabitants (USDA ERS 2013). Table 60 displays population change between the 2010 decennial census and 2014-2018 American Community Survey population estimates. These data indicate that overall the

analysis area is growing, albeit at a slower rate than Wyoming as a whole. The smallest counties in the analysis area, Hot Springs and Sublette, both experienced population decline since 2010; Teton County, conversely, grew rapidly over this period at more than twice the rate of the state.

Table 60: Population Change

Location	2014-2018 5-Year Estimate Population	2010 Population	Percent Change
Fremont County, WY	40,076	40,123	-0.1%
Lander	7,621	7,487	1.8%
Wind River Reservation	26,855	26,490	1.4%
Hot Springs County, WY	4,680	4,812	-2.7%
Park County, WY	29,121	28,205	3.2%
Cody	9,761	9,520	2.5%
Sublette County, WY	9,951	10,247	-2.9%
Teton County, WY	23,059	21,294	8.3%
Analysis Area	106,887	104,681	2.1%
Wyoming	581,836	563,626	3.2%

Source: U.S. Census Bureau 2000 and U.S. Census Bureau 2020

Despite the small population in the analysis area, the Shoshone National Forest receives substantial recreational use. Indeed, the fiscal year 2014 National Visitor Use Monitoring survey of the forest recorded more than three times as many recreational visits (366,000) as people who reside in the analysis area (USDA 2019). One person may visit the Forest multiple times; therefore, the number of visits does not indicate the number of people who traveled to the Forest.

Motorized recreation opportunities may be particularly important to older individuals and people with mobility limitations. Table 61 displays the share of the population aged 65 and older as well as the share of the population reporting ambulatory difficulty (mobility limitations).

Table 61: Age and Disability

Location	Share of Population Age 65+	Share of Population with Ambulatory Difficulty
Fremont County, WY	17.2%	7.8%
Lander	20.2%	6.6%
Wind River Reservation	14.7%	7.9%
Hot Springs County, WY	24.9%	8.3%
Park County, WY	21.4%	5.5%
Cody	20.0%	5.9%
Sublette County, WY	16.7%	6.6%
Teton County, WY	13.6%	3.3%
Wyoming	15.1%	6.4%

Source: U.S. Census Bureau 2020

Most counties relevant to this analysis have larger shares of senior residents and people with mobility limitations than the state overall.

3.4.3.1.2 Economic Conditions and Trends

An overview of Wyoming’s economy and workforce is presented here, followed by county-level information on employment and wages.

Economic downturns have affected the socioeconomic picture of Wyoming through the first decades of the 21st Century, with two major slumps. The first occurred from 2009 through 2010 and was an extended slump that grew from the Great Recession. A second more recent downturn from 2015 into 2016 caused the state to lose 3.8 percent of all non-agricultural wage and salary employments (during the same period, the U.S. economy consistently added jobs nationally). (NBER 2010; WYDWS 2018) This downturn is attributed to an energy price decrease in late 2014. As energy prices rebounded, economic data show that Wyoming’s unemployment rate dropped slightly in the first quarter of 2018 to 4 percent, with nearly all private industrial sectors experiencing job increases. (Liu 2018)

Both economic downturns involved job losses throughout the state. The mining and energy sector was particularly affected, losing 12.8% and 20.9% of jobs (relative to the start of the downturn) during the respective periods. During these same periods, the leisure and hospitality sector gained or lost minimal jobs (+2.3 % and -1.1 %, respectively). (WYDWS 2018) Table 62 and Table 63 show county-level employment and annual average wages for all salary workers. The lowest paying sector is leisure & hospitality while the highest paying jobs exist in the utilities and mining/energy sectors.

Table 62: County-level Employment by Industries (salary and wage workers), 2016

	Fremont County, WY	Hot Springs County, WY	Park County, WY	Sublette County, WY	Teton County, WY	Wyoming
Total	15,541	2,011	13,814	4,008	20,077	271,823
Private	10,159	1,450	10,300	2,927	17,658	205,049
Agriculture	100	13	350	94	62	2,668
Mining and Energy Extraction	539	197	344	782	8	18,778
Utilities	69	8	65	42	31	2,542
Construction	834	82	1,007	445	2,097	21,108
Manufacturing	250	77	552	32	162	9,230
Wholesale Trade	355	19	264	14	187	8,499
Retail Trade	1,873	169	1,705	358	2,195	30,673
Transportation & Warehousing	283	82	256	206	391	9,550
Information	186	22	239	17	203	3,743
Financial Activities	549	63	468	118	958	10,834
Professional Services	602	73	726	216	1,912	17,794
Educational & Health Services	2,490	272	1,479	182	1,155	26,476

Leisure & Hospitality	1,578	321	2,553	349	7,707	35,865
Other Services	453	53	296	74	591	7,293
Government	5,382	561	3,514	1,081	2,419	66,774
Federal Government	472	15	765	121	422	7,504
State Gov't	735	75	205	82	94	12,936
Local Gov't	4,174	471	2,545	878	1,904	46,334

Source: Wyoming Department of Workforce Services and U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages, 2016

Table 63: County-level Average Annual Wages by Industries, 2016

	Fremont County, WY	Hot Springs County, WY	Park County, WY	Sublette County, WY	Teton County, WY	Wyoming
Total	\$39,000	\$34,205	\$39,041	\$54,355	\$44,210	\$44,988
Private	\$36,485	\$32,325	\$36,490	\$56,462	\$42,428	\$43,813
Agriculture	\$26,334	\$41,553	\$32,684	\$34,262	\$35,559	\$33,576
Mining and Energy Extraction	\$91,604	\$61,527	\$79,197	\$101,819	\$355,887	\$84,440
Utilities	\$78,189	\$72,356	\$70,939	\$77,123	\$83,205	\$88,361
Construction	\$40,711	\$42,066	\$42,772	\$51,712	\$50,242	\$50,358
Manufacturing	\$36,433	\$27,322	\$50,136	\$38,252	\$37,491	\$64,018
Wholesale Trade	\$42,869	\$59,078	\$49,741	\$34,257	\$71,807	\$57,085
Retail Trade	\$26,201	\$21,816	\$26,693	\$27,337	\$33,462	\$27,605
Transportation & Warehousing	\$43,315	\$46,273	\$47,021	\$64,458	\$37,025	\$47,899
Information	\$37,498	\$15,181	\$36,620	\$64,687	\$68,232	\$45,494
Financial Activities	\$44,764	\$28,483	\$44,615	\$42,438	\$82,475	\$52,412
Professional Services	\$52,596	\$29,986	\$46,305	\$50,204	\$67,986	\$48,528
Educational & Health Services	\$36,402	\$34,643	\$46,802	\$31,813	\$47,500	\$41,301
Leisure & Hospitality	\$15,452	\$14,097	\$19,437	\$18,589	\$29,473	\$19,357
Other Services	\$34,160	\$23,520	\$31,155	\$30,702	\$40,795	\$34,499
Government	\$43,747	\$39,069	\$46,518	\$48,649	\$57,223	\$48,595
Federal Government	\$65,412	\$49,236	\$55,471	\$60,830	\$60,398	\$63,525
State Gov't	\$47,924	\$46,007	\$54,023	\$60,032	\$55,767	\$55,119
Local Gov't	\$40,565	\$37,617	\$43,219	\$45,919	\$56,591	\$44,356

Source: Wyoming Department of Workforce Services and U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages, 2016

3.4.3.1.3 Economic Contributions

All recreationists, including outfitters and guides, benefit directly from National Forest land, while local businesses benefit from spending by forest visitors. Total spending by visitors to the Shoshone is about

\$20 million annually. (USDA 2019) The economic contributions of recreation visitation can differ based on the distance visitors travel. Approximately 55% of visitors to the Forest were non-local and traveled more than 50 miles from the Forest boundary. (USDA 2019) These visitation data translate into jobs and income for communities around the Forest.

Jobs supported by National Forests are often in small, rural towns and counties, and these jobs contribute to the economic and social sustainability of these communities. Table 6 shows that the total estimated local economic contributions stemming from recreation visitation¹⁰ is 206 jobs and \$6.8 million in labor income on an annual average basis. This is less than three percent of total employment in the analysis area. (IMPLAN 2017) These jobs and income exist by and large in the private sector.

Table 64: Local Economic Contribution: Direct and secondary¹¹ annual average jobs¹² and labor income supported by the Shoshone National Forest

Recreation Visitation Type	Direct Jobs	Secondary Jobs	Direct Labor Income (\$2016)	Secondary Labor Income (\$2016)
Local	41	12	\$1.3 million	440,000
Non-Local	120	33	\$3.8 million	\$1.2 million
Total	161	45	\$5.1 million	\$1.7 million

Source: IMPLAN 2017 with data from NVUM 2014

The latest NVUM data (USDA 2019) shows that roughly five percent of visitors reported that OSV use was their main activity while visiting the Shoshone National Forest, 0.1 percent of visitors reported motorized trail activity as their main activity, and one percent of visitors reported OHV use as their main activity (main activity percentages differ from the participation percentages, which are used in the Recreation analysis above). The activities that visitors reported most as their main activity were viewing natural features, hiking, and cross-country skiing. Many visitors to the Forest participate in activities related to the enjoyment of wildlife (hunting, fishing, and wildlife viewing), with 18 percent of all visitors reporting that wildlife-related activities are the primary reason for visiting the Shoshone NF. These data demonstrate the popularity of non-motorized recreation activities on the Forest. Management actions that affect the availability of these recreation activities could deter visitation and, therefore, affect economic activity.

3.4.3.1.4 Environmental Justice & Civil Rights

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, requires that federal agencies identify and address any disproportionately high and adverse human health or environmental impacts of their programs, policies, and activities on minority and low-income populations and Native Americans. Environmental justice is the fair treatment and meaningful involvement of people of all races, cultures, and incomes, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. The emphasis of environmental justice is on health effects and/or the benefits of a healthy environment. The CEQ has interpreted health effects broadly to "include ecological, cultural, human health, economic or social

¹⁰ Recreation visitation information is from National Visitor Use Monitoring (NVUM) Round 3 for the Shoshone NF (FY 2014). (USDA 2019)

¹¹ Secondary effects include indirect and induced effects.

¹²Jobs is the estimate of average annual full-time, part-time, temporary, and seasonal jobs.

impacts on minority communities, low-income communities or Indian Tribes . . . when those impacts are interrelated to impacts on the natural or physical environment” (CEQ 1997).

According to USDA DR5600-002 (USDA 1997), environmental justice, minority, minority population, low-income, and human health and environmental effects, are defined as follows:

Environmental Justice means that, to the greatest extent practicable and permitted by law, all populations are provided the opportunity to comment before decisions are rendered on, are allowed to share in the benefits of, are not excluded from, and are not affected in a disproportionately high and adverse manner by, government programs and activities affecting human health or the environment.

Minority means a person who is a member of the following population groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic.

Minority Population means any readily identifiable group of minority persons who live in geographic proximity to, and, if circumstances warrant, migrant farm workers and other geographically dispersed/transient persons who will be similarly affected by USDA programs or activities.

Low-Income Population means any readily identifiable group of low-income persons who live in geographic proximity to, and, if circumstances warrant, migrant farm workers and other geographically dispersed/transient persons who will be similarly affected by USDA programs or activities. Low-income populations may be identified using data collected, maintained and analyzed by an agency or from analytical tools such as the annual statistical poverty thresholds from the Bureau of the Census' Current Population Reports, Series P-60 on Income and Poverty.

Human Health and/or Environmental Effects as used in this Departmental Regulation include interrelated social and economic effects.

Table 65 and Table 66 display data on the share of individuals in poverty and the racial and ethnic characteristics of the population according to the 2014-2018 5-year American Community Survey estimates.

Table 65: Poverty Rate

Location	Poverty Rate
Fremont County, WY	13.7%
Lander	10.3%
Wind River Reservation	16.2%
Hot Springs County, WY	14.5%
Park County, WY	7.7%
Cody	7.8%
Sublette County, WY	8.4%

Teton County, WY	7.1%
Wyoming	11.1%

Source: U.S. Census Bureau 2020

Table 66: Population by Race and Ethnicity

Location	White	Black	American Indian	Asian	Native Hawaiian and Pacific Islander	Some Other Race	Two or More Races	Hispanic/Latino
Fremont County, WY	72.8%	0.6%	21.3%	0.1%	0.0%	1.4%	3.8%	6.9%
<i>Lander</i>	<i>87.8%</i>	<i>0.2%</i>	<i>5.0%</i>	<i>0.1%</i>	<i>0.1%</i>	<i>0.8%</i>	<i>5.9%</i>	<i>4.3%</i>
<i>Wind River Reservation</i>	<i>64.6%</i>	<i>0.6%</i>	<i>29.7%</i>	<i>0.1%</i>	<i>0.0%</i>	<i>1.7%</i>	<i>3.4%</i>	<i>8.4%</i>
Hot Springs County, WY	96.2%	0.0%	2.4%	0.0%	0.0%	0.6%	0.7%	3.1%
Park County, WY	94.4%	0.2%	1.1%	0.6%	0.0%	1.4%	2.3%	5.4%
<i>Cody</i>	<i>92.3%</i>	<i>0.3%</i>	<i>1.7%</i>	<i>0.6%</i>	<i>0.0%</i>	<i>1.1%</i>	<i>4.0%</i>	<i>6.3%</i>
Sublette County, WY	96.3%	0.0%	0.4%	0.1%	0.0%	0.0%	3.2%	7.3%
Teton County, WY	90.3%	1.2%	0.3%	1.2%	0.2%	6.0%	0.8%	14.9%
Wyoming	91.4%	1.0%	2.4%	0.8%	0.1%	1.6%	2.7%	9.8%

Source: U.S. Census Bureau 2020

Fremont and Hot Springs counties are considered environmental justice communities. Fremont County has both the highest share of minority residents and the highest poverty rate in the analysis area (and a higher share of minority residents and people living in poverty than the state average). The Wind River Reservation encompasses much of Fremont County. Hot Springs County also has a higher poverty rate than the state. The other counties have comparable or lower shares of minority residents and people living in poverty. These data indicate the presence of environmental justice communities in the analysis area. Therefore, the environmental consequences analysis addresses the potential for Forest Service management actions to disproportionately and adversely affect minority and low-income populations.

3.4.4 Environmental Consequences of Alternative 1

This section discloses the environmental impacts of Alternative 1, which entails continuing current management.

3.4.4.1 Direct and Indirect Effects of Alternative 1

The direct (same time and place) and indirect (occurs later in time or further in space) impacts of the no-action alternative involve impacts to economic activities and environmental justice concerns. Each issue is addressed in turn.

Issue 1: Whether and to what extent continued motorized use under Alternative 1 would affect economic activity associated with the Forest.

Recreation visitation on the Shoshone NF contributes about 200 jobs and \$6.8 million in labor income annually, on average, to the analysis area (IMPLAN 2017, USDA 2019). Alternative 1 is expected to sustain these existing conditions. Alternative 1 has the greatest miles of NFSRs designated open to the public (883 miles) and the least amount of NFSTs designated open to the public (36 miles) compared to the other alternatives. Alternative 1 also has the greatest acreage available for OSV use (522,970). This motorized route system would likely result in no change to recreation-related employment, labor income, and tax revenue in the local area.

Issue 2: Whether and to what extent continued motorized use under Alternative 1 would affect environmental justice and civil rights associated with the Forest.

Alternative 1 is not anticipated to raise any environmental justice or civil rights issues. Alternative 1 would not affect the cost to participate in motorized recreation opportunities on the Shoshone NF. Therefore, low income residents would not be disproportionately affected by management actions under this alternative. Alternative 1 would not disproportionately or adversely affect minority populations. The motorized travel system would not change and, therefore, individuals with mobility limitations could expect continued use and access opportunities consistent with current management.

3.4.5 Environmental Consequences of the Alternative 2

This section discloses the environmental impacts of Alternative 2.

3.4.5.1 Direct and Indirect Effects of Alternative 2

The direct and indirect impacts of the Alternative 2 relate to the increased NFST designations under this alternative. The conversion of NFSRs to NFSTs implicates economic and environmental justice issues, though effects are expected to be similar as those described in Alternative 1.

Issue 1: Whether and to what extent motorized use proposed under Alternative 2 would affect economic activity associated with the Forest.

The effects from travel management on the Shoshone National Forest are unlikely to have a measurable impact on the economic conditions given the state of NFSRs converted to NFSTs, the overall change to the motorized route system, and the small contribution of the Forest to local economic conditions (approximately about 200 annual jobs, which accounts for less than three percent of total analysis area employment). That said, several factors related to the motorized system proposed under Alternative 2 may slightly affect economic conditions in the area. First, decreases in NFSRs open to the public may lead to less recreation visitation, with corresponding effects to local economies. Second, increases in NFSTs open to wheeled vehicle use may displace users seeking non-motorized recreation opportunities (though this displacement is expected to be rare, given that the increase in NFSTs is mainly due to the conversion from existing NFSRs where wheeled vehicle use regularly occurs). Overall, any impact is likely to be marginal given the only slight increase in the NFS route system (1.1%) when compared with Alternative 1. Finally, while more users may be able to access and use the NFSTs open to wheeled vehicle use, no metrics currently exist to quantify the relationship between the reduction in miles of NFSRs and increase in miles of NFSTs with respect to economic activity.

The economic impacts associated with OSV use are similar to those analyzed under Alternative 1. Alternative 2 proposes increasing motorized OSV trails (~10 miles), but this increase is not expected to impact economic conditions measurably. Class 2 OSV use would be brought into alignment with the

Forest Plan, which authorizes use on designated NFS routes (under the MVUM) and on groomed OSV trails. This change would make approximately 201 miles of groomed trails open to Class 2 OSVs (in addition to NFS routes designated open on MVUMs). Alternative 2 would also close a small portion of area in the Wind River Ranger District to OSV travel, though this closure is not anticipated to impact OSV use measurably.

Any economic impacts from proposals to wheeled vehicle use and OSV use under Alternative 2 would not differ measurably from the impacts analyzed under Alternative 1.

Issue 2: Whether and to what extent motorized use proposed under Alternative 2 would affect environmental justice and civil rights associated with the Forest.

Increased costs associated with purchase of State ORV permit may disproportionately affect low-income visitors. Alternative 2 would decrease the miles of NFSRs designated open to the public and increase the miles of NFSTs open to the public. Use of an off-road vehicle (ORV) on designated NFSTs requires either the purchase of an annual Wyoming ORV permit from the State or that the vehicle be licensed and street legal. Although the cost of the permit is modest (\$15 in 2020), the requirement to purchase a permit may disproportionately affect low income recreation users.

Alternative 2 is not expected to affect minority populations disproportionately or adversely.

Individuals with mobility limitations may be displaced from some sites. Although Alternative 2 proposes a slight increase in NFS route miles, the reduction in miles of NFSRs may displaced some users (though any displacement is expected to be slight, due to the continued ability to utilize licensed vehicles on designated NFSTs). Consistent with the Americans with Disabilities Act, mobility devices (designed solely for use by a mobility-impaired person for locomotion) would continue to be allowed wherever foot travel is permitted.

3.4.5.2 Cumulative Impacts of Alternative 2

The cumulative impacts relevant to Alternative 2 include potential future designation of non-motorized NFSTs for mountain bike use and past, present, and future vegetation management projects.

Increased non-motorized NFSTs for mountain bike use may shift mountain bike use from shared NFSTs to purpose-built non-motorized NFSTs. This shift may decrease potential conflict between motorized and non-motorized users on the Shoshone NF route system. As a result, both motorized and non-motorized users may have improved recreation experiences. Improved recreation visitor experiences may increase visitation, which may offset any slight potential for decreased economic activity under Alternative 2.

Vegetation management on the Shoshone NF has the potential to temporarily displace recreation visits from areas adjacent to treatment areas. These vegetation management activities could interact with the Alternative 2 management regime to displace recreation visitors from some sites. However, displacement would be short-term and replacement opportunities would be available. Therefore, economic activity is not expected to decline relative to what is described above in the direct and indirect effects analysis

3.4.6 Environmental Consequences of Alternative 3

This section discloses the environmental impacts of Alternative 3. Alternative 3 would decrease the miles of NFSRs designated open to the public to 718 miles, a 165-mile reduction (19 percent) compared with

the no action alternative. This alternative proposes increasing NFSTs open to wheeled vehicle use by 159 miles compared to the no action alternative (slightly less than under alternative 2). Amongst the alternatives, Alternative 3 proposes the fewest miles of Class 2 OSV use allowed on OSV trails and the fewest total acres available for OSV travel.

3.4.6.1 Direct and Indirect Effects of Alternative 3

The direct and indirect impacts of Alternative 3 relate to the NFSTs designated under this Alternative. The conversion of NFSRs to NFSTs has some implications for economic and environmental justice issues, though effects to recreation will generally be similar as those described in Alternative 2.

Issue 1: Whether and to what extent motorized use proposed under Alternative 3 would affect economic activity associated with the Forest.

The anticipated effects to economic conditions under Alternative 3 are similar to those analyzed under Alternative 2. Different than Alternative 2, Alternative 3 proposes to NFSRs to NFSTs open to wheeled vehicles 64 inches wide or less rather than NFSTs open to all wheeled vehicles. The 64-inch designation is more restrictive than Alternative 2 (or when compared to current NFSRs under Alternative 1), and this designation could limit visitation and associated economic activity. However, any impact is likely minimal, and economic conditions are anticipated to resemble those described under Alternative 2 with respect to wheeled vehicle use.

The economic impacts related to OSV use under Alternative 3 are similar to those analyzed under Alternative 2 with one exception: Alternative 3 proposes restricting OSV use in a portion of the High Lakes Wilderness Study Area. Effects related to this closure are analyzed separately. In addition, Alternative 3 proposes a smaller portion of trails open to Class 2 OSVs: 146 miles. The decrease in available Class 2 OSV trails may impact economic conditions, but such impacts are not expected to be measurable.

Issue 2: Whether and to what extent motorized use proposed under Alternative 3 would affect environmental justice and civil rights associated with the Forest.

Effects under this alternative are similar to those analyzed and described under Alternative 2.

3.4.6.2 Cumulative Impacts of Alternative 3

The cumulative impacts of alternative 3 are similar those analyzed with respect to Alternative 2. The conclusions with respect to the latter alternative apply here.

3.4.7 Consistency with Relevant Laws, Regulations, and Policy

3.4.7.1 Land and Resource Management Plan

The Shoshone National Forest Land and Resource Management Plan (Forest Plan) does not provide standards and guidelines for the social and economic environment. The Forest Plan does identify, nonetheless, management challenges related the social and economic environment. The Forest Plan states,

The Shoshone contributes to local economies through the provision of tourism, grazing, hunting, logging, water, and mineral extraction. The Shoshone plays a major role in the Greater Yellowstone Ecosystem by

contributing to the large, intact ecosystem with outstanding wildlife habitat, scenery, wildland recreation opportunities, clean water, and clean air. Balancing the demand for forest-based goods and services with the need for ecosystem health and protection is a management challenge. The challenge includes determining those management activities and strategies that are in line with the physical and biological capabilities of the land and ensuring the ability of ecosystems to meet the needs of future generations. (Forest Plan, pg. 20)

The Forest Plan also incorporates goals and objectives under various resources (e.g., recreation) that tie resource uses to social and economic well-being.

3.4.7.2 Other Relevant Law, Regulation, or Policy

3.4.7.2.1 Federal Statutes

National Environmental Policy Act of 1969. (83 Stat. 852; 42 U.S.C. 4321, 4331-4335, 4341-4347). This act requires the use of natural and social sciences in planning and decision-making to fulfill the social, economic, and other requirements of present and future generations of Americans.

National Forest Management Act establishes the requirement to use economic and other sciences in the land management planning process.

3.4.7.2.2 Federal Regulations

The Travel Management Rule (36 C.F.R. pt. 212) requires designation of roads, trails, and areas that are open to motor vehicle use. These regulations implement Executive Order (E.O.) 11644 (February 8, 1972), "Use of Off-Road Vehicles on the Public Lands," as amended by E.O. 11989 (May 24, 1977). These executive orders are described below.

3.4.7.2.3 Executive Orders

Environmental Justice, EO 12898 of February 11, 1994

EO 12898 directs federal agencies to consider and address the potential of proposed management actions to cause disproportionate and adverse effects to low-income and minority populations.

Use of Off-Road Vehicles on Public Lands, EO 11644 of February 8, 1972, as amended by EO 11989 of May 24, 1977

EO 11644 and EO 11989 establish policies and provide for procedures to ensure that the use of off-road vehicles on public lands is controlled and directed so as to protect the resources of those lands, to promote the safety of all users of those lands, and to minimize conflicts among the various uses of those lands.

3.4.8 Conclusion

The social and economic landscape on the Shoshone National Forest is dynamic. Since recreation on the Forest currently contributes about 200 annual jobs (less than three percent of total analysis area employment), any changes in economic activity resulting from the proposed alternatives would likely affect a minor component of the overall area economies. Changes in demand for recreation and

differences in motorized and non-motorized and local and non-local user spending could influence the economic activity, though these effects are unknown. Localized effects on economic activity could be concentrated in areas with high levels of motorized use and have greater relative impacts on those small towns than the overall effects for the Forest and analysis area. Alternative 3 proposes the least amount of open NFSRs and the least amount of available area for OSV travel. Therefore, the potential impacts to economic activity and environmental justice would be the greatest under Alternative 3, though not likely significant. The least potential for impacts would be under Alternative 1. Note, however, that no metrics currently exist to quantify the relationship between the reduction in miles of NFSRs and economic activity.

3.5 Special Areas Effects: Research Natural Areas and Special Interest Areas

3.5.1 Introduction

The purpose of this report is to analyze and disclose potential impacts to special areas from the existing and proposed National Forest System routes open to wheeled vehicle use, as well as designated trails and areas open to OSV use. The special areas included in this analysis are all Research Natural Areas (RNA) and Special Interest Areas (SIA) identified in the 2015 Shoshone National Forest Land and Resource Management Plan (Forest Plan). The High Lakes Wilderness Study Area is analyzed separately.

The 2015 Forest Plan established eight new RNAs (establishment reports pending), adding to the one existing RNA, Line Creek Plateau RNA. The Forest Plan also proposed adding three new SIAs to the one existing, Swamp Lake Botanical Area. Table 67 displays each RNA and SIA, unique resource values, and size. RNAs exist to provide examples of important forest, shrubland, alpine, aquatic, and geological types that have special or unique characteristics of scientific interest and importance and that are needed to complete the national network of RNAs. The RNAs represent the Shoshone’s vegetative diversity and landscapes. The Shoshone’s position in the middle of the continent enables the area to act as a connector for many plant and animal species from north to south and east to west, and its elevation differences and varieties of soils types also account for the diversity of species across the Forest. RNAs are selected for their abilities to provide representative samples of vegetation or biological communities that management activities have not affected (USFS, 2015).

SIAs, meanwhile, are managed to protect or enhance their special interest values. On the Shoshone, the SIAs represent special botanical, geological, and historical special interest values.

Table 67: Shoshone National Forest Special Areas.

Special Area Name	Unique Resource Values	Acres	Estimated Acres in Wilderness	Ranger District
Arrow Mountain RNA	Sagebrush steppe; limestone and dolomite mountains; alpine tundra; subalpine forests	14,398	14,216	Wind River
Bald Ridge RNA	Limber pine; bluebunch wheatgrass meadows	3,115	0	Clark’s Fork
Beartooth Butte RNA	Alpine tundra; barren slopes; meadows	2,447	1,250	Clark’s Fork

Special Area Name	Unique Resource Values	Acres	Estimated Acres in Wilderness	Ranger District
Grizzly Creek RNA	Sagebrush Steppe; Douglas fir woodlands	11,687	7,998	Wapiti
Kirwin SIA	Historical mining area	4,549	0	Greybull
Lake Creek RNA	Engelmann spruce; lodgepole pine; subalpine forests; fens and willow carrs	5,859	5,859	Clark's Fork
Line Creek Plateau RNA	Alpine turf; alpine wetland; alpine snowbed; and subalpine forest	3,053	0 (Does overlap with Wilderness Study Area)	Clark's Fork
Little Popo Agie SIA	Geological area; Piedmont moraine stalled at high elevation; unique species assemblages and 154 kettle ponds	1,714	0	Washakie
Pat O'Hara RNA	Engelmann Spruce; subalpine forests	4,243	4,000	Clark's Fork
Roaring Fork RNA	Alpine tundra; subalpine forests; meadows	13,451	13,451	Washakie
Sawtooth Peatbeds SIA	Geological area; only known palsa fen in the lower 48 states; permafrost	577	0	Clark's Fork
Sheep Mesa RNA	Douglas fir woodlands; Englemann spruce; lodgepole pine; alpine plateaus; whitebark pine	15,665	7,800	Wapiti
Swamp Lake SIA	Unique wetlands and fens; endemic and rare plant species found nowhere else in Wyoming	580	0	Clark's Fork

3.5.1.1 Issues Addressed

This section states the guiding issues analyzed herein pertaining to special areas that have been identified for detailed analysis. "An issue is a statement of cause and effect linking environmental effects to actions" (FSH 1909.15).

Issue 1: Whether and to what extent interactions with and effects to special areas due to wheeled vehicle use proposed under the Alternatives occur?

Issue 2: Whether and to what extent interactions with and effects to special areas due to OSV travel proposed under the Alternatives occur?

3.5.2 Methodology

This section includes a description of the methods and data used in this analysis. The decision area includes all lands within the Forest boundary, 2,468,048 acres. The area of analysis for special areas is confined to the boundaries of the nine RNAs and four SIAs within the Forest Boundary. The total analysis area is approximately 78,000 acres.

A simple GIS analysis first determined how the eight RNAs and four SIAs interacted with the existing condition (Alternative 1) and then whether they interacted with either of the action alternatives. If a special area had an interaction with only Alternative 1, it was evaluated only for that alternative. If it did not interact with any alternatives, it was dropped from further analysis. RNAs and SIAs were analyzed against their respective criteria below, which are derived from FSM guidance on establishment criteria for RNAs and SIAs. Only criteria that have a direct link to travel related effects were considered as relevant resource indicators for this exercise.

3.5.2.1 General Assumptions

- Specific effects analysis, such as wildlife, hydrology, botany, soils, and invasive species can be found in the effects analysis section that pertain to those resources. This analysis only addresses the indicators listed above within the geographic bounds of the special area.
- The current maintenance conditions of NFSRs and NFSTs open to wheeled vehicle use would stay the same.
- Any routes not included in the decision are not precluded from being added, modified, or removed from the Forest transportation system in future travel management decisions.
- Increased use from both motorized and non-motorized recreational users may occur if populations increase.
- NFS routes in all alternatives that provide access to RNAs and SIAs, but fall outside their boundaries, were considered as having a "meaningful interaction" with the respective RNA/SIA and carried forward into in-depth analysis.
- Public wheeled vehicle use would be limited to those routes and areas proposed under the alternatives for inclusion in the MVUMs.
- Reducing routes available to public wheeled vehicle use may concentrate that use.
- Decisions made in the Forest Plan are incorporated into this analysis. This includes forest-wide management areas that allow for public motorized and non-motorized travel.
- Use of unauthorized routes is not included in this analysis.
- Temporary roads, trails, and areas built to support emergency operations, or those roads, trails, and areas temporarily authorized under contracts, permits, administrative use, or leases, are not intended for public use. Any proposal to add these temporary roads, trails, and areas to the NFS will require a separate NEPA decision and is not part of this analysis.

3.5.2.2 Resource Indicators and Measures

Resource indicators and/or measures were developed specifically for Research Natural Areas and Special Interest Areas. These indicators and measures help to define the effect and consider the frequency, distribution, area of impact, and magnitude.

Table 68. Resource condition indicators and measures for assessing effects

Issue	Indicator or Measure	Source
Resource Indicators for Research Natural Areas		
Maintain Natural Conditions	Natural conditions and processes are maintained in the special area. Human activities do not directly or indirectly modify integrity of ecological processes.	Forest Plan MA2.2A-GOAL-01, FSM 2372
Limit Potentially Impactful Activities	Recreational use is restricted or prohibited if it threatens or interferes with the objectives for which the area was established.	Forest Plan MA2.2A-STAND-1, FSM 2372
Limit Construction and Ground Disturbing Activities	No new roads, trails, fences, signs, or buildings are established unless contributing to the objectives or to the protection of the area.	Forest Plan MA2.2A-STAND-12, MA2.2A-STAND-13, MA2.2A-STAND-16, FSM 2372
Resource Indicators for Special Interest Areas		
Maintain Area Values	Occupancy and use of the area's resources neither interfere with the primary values for which the areas was established nor negatively affects the visitor's experience	FSM 2372
Limit Construction and Ground Disturbing Activities	No roads or other improvements on or through geological formations are built unless it is the only alternative to meet management objectives for the area.	FSM 2372
Limit Potentially Impactful Activities	Roads, trails, and other facilities are kept to a minimum necessary for public enjoyment of the area and without disturbing the special features of the established area. .	Forest Plan MA3.1A-STAND-03, MA3.1A-Guide-10, FSM 2372

3.5.3 Environmental Consequences

The preliminary screening of special areas established those potentially affected by proposals under this Travel Management Project and, therefore, suitable for further analysis (*see* Table 69).

Table 69: Shoshone National Forest Special Areas and Travel Management Alternatives

Special Area Name	District	Does Special Area Interact with Alternatives?					
		Wheeled Alt 1	Wheeled Alt 2	Wheeled Alt 3	OSV Alt 1	OSV Alt 2	WinterOSV Alt 3
Arrow Mountain	Wind River	No	No	No	No	No	No
Bald Ridge	Clark's Fork	Yes	No	No	No	No	No

Beartooth Butte	Clark's Fork	No	No	No	No	No	No
Grizzly Creek	Wapiti	No	No	No	No	No	No
Kirwin	Greybull	No	No	No	No	No	No
Lake Creek	Clark's Fork	No	No	No	No	No	No
Line Creek Plateau	Clark's Fork	Yes	No	No	Yes	Yes	Yes
Little Popo Agie	Washakie	Yes	Yes	Yes	Yes	Yes	Yes
Pat O Hara	Clark's Fork	No	No	No	No	No	No
Roaring Fork	Washakie	No	No	No	No	No	No
Sawtooth Peatbeds	Clark's Fork	Yes	No	No	Yes	Yes	Yes
Sheep Mesa	Wapiti	No	No	No	No	No	No
Swamp Lake (SIA)	Clark's Fork	Yes	No	No	No	No	No

Five areas were carried forward for detailed analysis. With respect to interactions under Alternative 1 – the no action alternative, areas included the Swamp Lake SIA and Bald Ridge RNA. Preliminary screening indicated that these areas have potential meaningful interaction with Alternative 1 travel routes and motorized use. Three other areas had potential interactions with Alternative 1 and at least one portion of an action alternative. These areas are Line Creek Plateau, Little Popo Agie, and Sawtooth Peatbeds. More detailed analysis of effects follows below.

The remaining areas were not carried forward for further analysis due to the lack of interaction with any of the alternatives under consideration. These areas are: Beartooth Butte RNA, Lake Creek RNA, Pat O'Hara RNA, Sheep Mesa RNA, Grizzly Creek RNA, Roaring Fork RNA, Kirwin SIA, and Arrow Mountain RNA.

3.5.3.1 Environmental Consequences with Respect to Special Areas under Alternative 1

Swamp Lake Botanical Area and Bald Ridge RNA have small interactions with routes under wheeled vehicle use proposals from Alternative 1 only. The following discussion explains these interactions and associated effects.

3.5.3.1.1 Swamp Lake Botanical Area

Swamp Lake SIA has one closed NFSR at its southern boundary, which is not open to any wheeled vehicle traffic. It does not receive active use currently, though may be used in the future for timber access to upslope locations. Any timber operations using this road would be subject to additional NEPA analysis for the respective project and would incorporate special project design features to mitigate risks to resources in the RNA. Continuing management in its current form is consistent with FSM and Forest Plan guidance. No effects are expected from travel management in Swamp Lake Botanical Area.

3.5.3.1.2 *Bald Ridge RNA*

Bald Ridge RNA contains no motorized NFS routes within its boundaries, but does have seasonal routes that extend to its boundaries from main travel corridors. These routes are open to the public and are used for grazing management, hunting access, recreational access, and access to the RNA. While there may be small indirect effects from wheeled vehicle use at the edge of the RNA from compaction and soil disturbance, continuing management in its current form is consistent with FSM and Forest Plan guidance. No effects are expected from travel management in Bald Ridge RNA.

3.5.3.2 Environmental Consequences with Respect to Special Areas under All Alternatives

The analysis below considers interactions of wheeled vehicle and OSV use with special areas under all alternatives. Analysis considers potentially affected special areas in turn.

3.5.3.2.1 *Line Creek Plateau RNA*

The Line Creek Plateau Research Natural Area was created in 2000 as a jointly managed RNA, with southern portions spanning the Shoshone National Forest and northern portions in the Custer Gallatin National Forest. There are two portions of the RNA on the Forest: an eastern (~1000 acres) and a western portion (~2000 acres). The unique characteristics for which it was created include the vast alpine resources including alpine turf, alpine wetlands, krummholz vegetation, and subalpine forests. Most of the Shoshone National Forest portion contains alpine turf and wetlands (USFS, 2015). A significant portion also overlaps with the High Lakes Wilderness Study Area. Line Creek Plateau Research Natural Area is managed as Management Area 2.2A under the Forest Plan.

3.5.3.2.1.1 Interactions and Effects Associated with Wheeled Vehicle Use

Just outside the RNA, the Beartooth Gravel Pit access road (N155) currently exists on the ground, though is not a system road. While not directly in the RNA, this road may have indirect effects to the RNA because it provides limited access to the edge of the RNA. Under Alternative 1, the access road would remain in place but would have no restrictions and would continue to be used by the public as a parking area and an access route to the RNA. Lack of limitations in the area leads to localized effects to soils and vegetation from compaction and surface disturbance to both plants and soils at the edge of the route. Alternative 2 and 3 propose to add the road to the system as an administrative access only NFSR. The effects under Alternative 2 and 3 will likely be beneficial as access for the general public would be moved to the highway, instead of near sensitive locations.

There are no other wheeled vehicle use proposals in any of the alternatives directly within the RNA, and therefore there are no anticipated effects from wheeled vehicle use proposals.

3.5.3.2.1.2 Interactions and Effects Associated with OSV Use

Under Alternatives 1 and 2, the Forest authorizes OSV use in approximately 1,000 acres of the western portion of the RNA, limiting use to the south end of Twin Lakes Basin, the southern two thirds of the plateau, and to within the 250-foot centerline easement of U.S. Highway 212. Sensitive species and soils are found throughout these areas, though they are largely snow-covered during the winter season of OSV use—bighorn sheep winter range exists on the northern end through Twin Lakes basin and up onto the Line Creek Plateau, and potential impacts are considered separately in the wildlife analysis.

Localized damage to vegetation and soils may occur from OSV use, particularly during shoulder seasons when windswept and exposed ridges with little snow cover become exposed due to melting and wind scour. OSVs may cross these exposed areas to access deeper snow. Damage is not believed to be widespread or to be affecting the integrity of ecological functions of the RNA as a whole; however, any impact may persist on the landscape indefinitely. If damage is found, line officers have authority to limit or restrict cross-country OSV use throughout the RNA.

Alternative 3 further restricts OSV use in the western portion of the RNA by another 500 acres, leaving about 500 acres accessible to OSV use. There are no natural boundaries demarcating allowed use, thus enforcement would be very difficult. Localized effects as described above would likely be the same as for Alternative 3 as they are for Alternative 1 and 2.

3.5.3.2.2 Sawtooth Peatbeds SIA

Sawtooth Peatbeds SIA exists to protect its unique palsa fen, the only known palsa fen in the lower 48 states. A palsa fen is a remnant of a true bog formed under past climates. It may be the southernmost example of the Gelisol soil order. It is raised above the surrounding wetlands and contains permafrost to a depth of around 22 inches (Heidel et al, 2017). It is an extremely sensitive soil type.

The area is managed as Management Area 3.1C under the Forest Plan. The Forest allows motorized use year-round in the area, including OSV use when snow is present.

3.5.3.2.2.1 Interactions and Effects Associated with Wheeled Vehicle Use

Forest Service Road (FSR) 120 forms a portion of the northeast boundary of the SIA. This NFSR is open seasonally under all alternatives. Under all alternatives, wheeled vehicle use along the current route on the RNA boundary would be expected to continue consistent with current use. The RNA may experience localized and indirect effects caused by increasing “creep” of parking off roadways and expanding width of routes through the wetland complexes. These actions may compact soils and or cause rutting, further impacting vegetation where traffic is concentrated. These impacts are likely permanent, but also are unlikely to change the overall ecological functioning of the fen. No new construction is expected other than routine maintenance.

3.5.3.2.2.2 Interactions and Effects Associated with OSV Use

During winter months, an ungroomed OSV Class 1 trail runs through the northeast corner of the SIA. Under all alternatives, this trail would be relocated to the road alignment. Over-snow travel on the roadway would protect extremely sensitive soils from any risk posed by incidental use when there are inadequate snow depths (e.g., in shoulder seasons). With the realignment, the recreational OSV use is not likely to impact the geological or biological features at the site and would maintain the unique values for which the site was created.

3.5.3.2.3 Little Popo Agie SIA

The Little Popo Agie SIA is a piedmont moraine located north of Louis Lake in the southern Wind River Range. It is a rare feature in both the Wind River and middle Rocky Mountains due to glacial ice stalling at about 8,300 feet while it was retreating. Unique habitats formed in this piedmont moraine, supporting adapted species different from those found at lower elevations (USFS, 2015).

Little Popo Agie SIA is managed as Management Area 3.1B under the Forest Plan. The Forest allows motorized use year-round in the area, including OSV use when snow is present.

3.5.3.2.3.1 Interactions and Effects Associated with Wheeled Vehicle Use

FSR 354 currently bisects the SIA, while it is bound on the west side by FSR 300 and a very small portion on the east side by FSR 367. Seasonal restrictions would apply to all NFS routes under both Alternatives 2 and 3. And under both alternatives, FSR 354 and FSR 367 would convert from NFSRs to NFSTs open to all wheeled vehicles. Under Alternatives 2 and 3, FSR 300 would have a seasonal restriction from May 1 to November 30. It is a ML 3 road, with a gravel and or crushed aggregate surface. The underlying native soil erosion class is moderate. Also under Alternatives 2 and 3, FSR 354 would convert from an NFSR to an NFST open to wheeled vehicles 64 inches wide or less, with operational dates from May 1 to November 30. FSR 367 would also convert from an NFSR to NFST open to wheeled vehicles 64 inches wide or less, with operational dates from May 1 to November 30. Both 354 and 367 are currently native material surfaced roads and have an erosion hazard rating of moderate. No new routes are proposed. Changes from NFSRs to NFSTs have no effect on the primary values of the SIA. Seasonal restrictions may limit ground disturbing activities associated with wet conditions that can lead to increased erosion, compaction, and sedimentation to waterways. The effects of these restrictions may be beneficial to the SIA and are consistent with the resource indicators for SIAs.

3.5.3.2.3.2 Interactions and Effects Associated with OSV Use

Cross country OSV use by Class 1 vehicles is allowed in the SIA under all three alternatives. In addition, groomed OSV routes following FSR 300 and FSR 354 are also included under all three alternatives. The use of OSVs for cross country travel and on groomed routes is consistent with maintaining the unique values for which the SIA was formed. OSV travel on the roadway would protect sensitive wetlands and soils from any risk posed by incidental use when there are inadequate snow depths in shoulder seasons. Groomed OSV trails encourage users to stay within a route footprint that may also minimize potential impacts due to inadequate snow coverage during shoulder seasons.

3.5.4 Cumulative Impacts Related to Special Areas

This analysis summarizes effects to special areas, but a list of specific projects from past, present, and future management are included at section 3.2.3.4.2 of the EA. Cumulative impacts are only analyzed for those areas that had potential impacts from the alternatives.

3.5.4.1 NFS Wheeled Vehicle Route Management

The localized direct and indirect effects to special areas from NFSRs and NFSTs are expected to continue, as previously described in each special area. Most primary NFSRs have been engineered and designed to limit erosion and sedimentation. In some locations however, lack of maintenance leads to rutting and loss of surfacing, if present, and increased erosion and sedimentation (USFS, 2009). Erosion of NFSRs and NFSTs will continue at vulnerable locations, especially at the current level of maintenance, which is not adequate to address fully erosion concerns on all designated routes on the Forest. This level of maintenance is not expected to change in the foreseeable future. NFSTs may have differing levels of use, but the travel way is usually bare and compacted with the risk of accelerated erosion and sedimentation as well (Meyer, 2002). For those routes that do intersect with special areas, design features and watershed conservation practices (USFS, 2006) are put in place when route maintenance can occur to minimize detrimental effects.

3.5.4.2 Vegetation Management

Timber harvest is generally not a permissible activity in research natural areas, unless absolutely needed to restore critical functions for which the area was designated. No timber harvest is slated to occur in either Bald Ridge or Line Creek RNA. Sawtooth Peatbeds SIA and Swamp Lake Botanical Area are also not managed for timber resources. Little Popo Agie SIA does allow for mechanical vegetation treatments when necessary to reduce excessive fuels, maintain or restore natural conditions, or enhance the values for which the area was designated. Impacts could occur through normal timber harvest activities such as building and using temporary roads, slash disposal, skidding, and yarding logs. Forest Plan guidance indicates that no new roads should be built within the Little Popo Agie SIA. Any timber management projects within the boundaries of the SIA would require standard project design features to minimize each of the impacts listed above as well as special design features specific to the unique resource values in this area.

As it pertains to fire, management in RNAs is minimal. Prescribed fire is not a management objective in RNAs or SIAs and thus would have no cumulative impacts. Wildfire should be suppressed when it threatens the values for which the RNA was established. For those unwanted fires that threaten to burn into RNAs, the appropriate management response should consist of strategies and tactics that keep fires from burning into RNAs. Any fire that threatens the Swamp Lake Botanical Area or Sawtooth Peatbeds should be suppressed. Initial attack tactics and any ground disturbing actions are to be kept to an absolute minimum to protect the unique values in these locations, namely the rare and sensitive plants and the unique soils that support them. Cumulative impacts from suppression activities could occur, particularly in Swamp Lake Botanical Area and Sawtooth Peatbeds due to their remote nature and access time required.

3.5.4.3 Grazing Management

Commercial livestock grazing is not allowed in Line Creek RNA and Sawtooth Peatbeds SIA. In the Little Popo Agie SIA and Swamp Lake Botanical Area, incidental commercial grazing is allowed, but specifically directed in the Forest Plan to protect riparian and wetland ecosystems and should not conflict with the reason the special area was developed. Commercial grazing is allowed within the boundaries of Bald Ridge RNA, but is naturally restricted to small portions due to steep cliffs. Livestock movement patterns in those pastures also tend to shift south, away from the RNA, decreasing grazing pressure in those areas. No cumulative impacts from commercial grazing are expected in any RNAs or SIAs.

Cumulative impacts may occur to special areas from a variety of sources from past, present, and future management actions for all alternatives, but would likely be minimal. The effects would likely be localized and small in magnitude, though they may persist over time.

3.5.5 Consistency with Relevant Laws, Regulations, and Policy

3.5.5.1 Land and Resource Management Plan

The Shoshone National Forest Land and Resource Management Plan (Forest Plan) provides standards and guidelines for special areas. The Goals, Standards, and Guidelines from the Forest Plan as they pertain to special areas are found below and are identified by their original unique identifiers. The Standards and Guidelines in particular dictate management direction for specific projects and are also addressed by incorporation into project design features that aim to minimize resource impacts.

- MA2.2A-GOAL-01 (Line Creek RNA) and MA2.3-GOAL-01 (All other RNAs): The ecological integrity of the research natural area, including processes, composition, and structure are maintained.
- MA2.2A-STAND-11 (Line Creek RNA): Recreation use is not prohibited, but shall not be encouraged. However, recreation use can be prohibited or restricted by special orders if such use threatens or interferes with the objectives or purposes for which the research natural area was established.
- MA2.2A-STAND-12 (Line Creek RNA): Trails shall not be constructed within these areas. Existing System trails may be maintained. Reconstruction will be allowed for public safety and/or protection of soil and water resources.
- MA2.2A-STAND-13 (Line Creek RNA): Roads and other facilities shall not be constructed in these areas, except within 250 feet of the centerline of US Highway 212.
- MA2.2A-STAND-14 (Line Creek RNA): Existing public roads may be retained (US Hwy 212 bisects the Line Creek Plateau RNA). Reconstruction will be allowed for public safety and protection of soil and water resources. Staging areas for materials and stockpiles and equipment will continue to occur within the easement limits for future highway maintenance projects within both Montana and Wyoming.
- MA2.2A-STAND-16 (Line Creek RNA): Do not permit new roads, trails, fences, structures, or signs unless they contribute to the desired conditions or to the protection of the RNA, except within the highway easement.
- MA2.3-GUIDE-05 (All RNAs): Recreation trails should be located to avoid impacting the ecological conditions and processes that led to establishment of the RNA.
- MA3.1A-STAND-03 (Swamp Lake Botanical Area) and MA3.1B-STAND-02 (Little Popo Agie Geological Area): Road construction is prohibited. Road maintenance is limited to that needed for safety and resource protection.
- MA3.1A-GUIDE-10 (Swamp Lake Botanical Area) and MA3.1B-GUIDE-10 (Little Popo Agie Geological Area): New trail construction should be for the purpose of interpretation.

All alternatives would remain consistent with the management direction set forth under the Forest Plan.

3.5.5.2 Other Relevant Law, Regulation, or Policy

3.5.5.2.1 *Forest Service Manual Direction (FSM 2372)*

Guidance from FSM 2372 issues guidance for special areas that are designated administratively for their outstanding natural characteristics or unique recreation or cultural values.

3.5.6 Conclusion

Alternatives 1, 2, and 3 have very little differences from each other in regard to impacts to special areas. If effects do occur from any of the alternatives, they are likely to be small and localized, though potentially long lasting. The only major proposal difference between alternatives is in cross-country OSV use across the Line Creek Plateau RNA, which would limit an additional 500 acres in Alternative 3 beyond the 500

already being closed to use under Alternatives 1 and 2. The ecological integrity for Line Creek Plateau RNA would likely remain intact under all three alternatives.

3.6 Wild & Scenic River Effects: The Clarks Fork

3.6.1 Introduction

The following section considers impacts to Wild & Scenic Rivers, including those rivers eligible for designation as wild and or scenic. The primary focus of this analysis is the section of the Clarks Fork River within the Forest designated as a wild river. National Wild and Scenic Rivers System retain free-flowing status, water quality, and outstandingly remarkable values consistent with their classifications.

3.6.1.1 Clarks Fork WSR

Congress initially authorized the study of the Clarks Fork as a wild and scenic river in 1975. Pub. L. 93-621 (1975). The Forest Service prepared an environmental statement in 1979 that recommended designating the Clarks Fork as a wild river under the National Wild and Scenic Rivers System. Congress eventually passed the Clarks Fork Wild and Scenic River Designation Act in 1990. (Clarks Fork Wild and Scenic River Designation Act of 1990, Pub. L. 101-628 (Nov. 28, 1990)) The Act designated 20.5 miles of the Clarks Fork as a wild river, with a river corridor of 0.25 miles on each side of the river's high-water mark. (Pub. L. 101-628 § 1302) Wild rivers are those rivers or sections of rivers that are free of impoundments, protect the outstandingly remarkable values and water quality of the rivers, and have essentially primitive shorelines.

Three Outstandingly Remarkable Values (Values) have been identified for the Clarks Fork WSR:

Scenic—deep chasms, soaring cliffs, and whitewater provide outstanding scenery in the canyon. The overall setting has stunning vistas of mountain scenery, magnificent geology and landforms, and outstanding opportunities for wildlife viewing.

Recreational—the canyon provides high potential for challenging and superb whitewater kayaking. Recreation based on natural beauty, relative solitude, and the opportunity to view natural settings and wildlife abound in the river corridor.

Historical—Chief Joseph and the Nez Perce are said to have escaped through the mouth of the lower canyon as they eluded the U.S. cavalry in 1877. The Clarks Fork is named for William Clark of the Lewis and Clark Expedition.

The 2015 revision to the Forest Plan set forth specific management direction for the Clarks Fork,¹³ which centers on maintaining the identified Values while providing opportunities for recreation including, dispersed, primitive, river-oriented activities and semi-primitive, non-motorized, and motorized recreation on designated routes. (USDA 2015) Motorized recreation is limited to designated NFS routes existing at the time the river was designated (consistent with MA1.5A-STAND-13), such as to access private property and in support of recreational pursuits. (USDA 2015) The Forest Plan specifically identified Forest Road 119, one of the existing and very popular NFSRs with a footprint within the WSR corridor, to be subject to

¹³ In 2009, the Forest issued a management plan for the Clarks Fork. USDA, Comprehensive River Management Plan for the Clarks Fork of the Yellowstone Wild and Scenic River (Sept. 2009), https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5329142.pdf. The 2015 Revision of the Forest Plan incorporated the management direction set forth in this Plan.

regulations if impacts to the Values are observed: “Long-term motorized access on Forest Road 119 would be subject to regulation or closure if monitoring indicates adverse impacts to the outstandingly remarkable values of the river corridor are occurring.” (Shoshone LMP, 133)

3.6.1.2 Eligible Wild and Scenic Rivers

The Forest has also identified 16 rivers eligible for designation under the National Wild and Scenic Rivers System. An eligible river is defined as “A river segment that has been evaluated, and found to be free-flowing and, in combination with its adjacent land area, possesses one or more outstandingly remarkable values.” (FSH 1909.12 § 80.5) Seven Outstandingly remarkable values that are regionally (the value is important in the Greater Yellowstone Area) or nationally (the value is important nationally) significant have been identified for the 16 eligible rivers:

1. *Scenery*—The landscape elements of landform, vegetation, water, color, and related factors result in notable or exemplary visual features and/or attraction within the nation or region. When analyzing scenic values, additional factors such as seasonal variations in vegetation, scale of cultural modifications, and the length of time negative intrusions are viewed may be considered. Scenery and visual attractions may be highly diverse over the majority of the river or river segment.

Attributes for scenery outstandingly remarkable values— Consider the presence of high relief landforms with unusual or outstanding topographic features and still or cascading water that is dominant in the landscape. River corridors with the greatest diversity and variety of views, both foreground and background, are of higher value. River corridors with high relief and focal points that are visually striking, particularly memorable, or rare in the region are of higher value. River corridors with the greatest seasonal variation and diversity are of higher value. Viewsheds that are free from aesthetically undesirable sights and influences are generally of higher values.

2. *Recreation*—Recreation opportunities are or have the potential to be unique enough to attract visitors from outside the geographic region. Visitors would be willing to travel long distances to use the river resources for recreational purposes. River-related opportunities could include, but are not limited to sightseeing, wildlife observation, camping, photography, hiking, tubing, floating, boating, paddling, fishing, and hunting. Interpretive opportunities may be exceptional and attract or have the potential to attract visitors from outside the geographic region. The river may provide or have the potential to provide settings for national or regional competitive events.

Attributes for recreation outstandingly remarkable values—Consider the amount of time the river corridor is used or available for recreation purposes, the number and variety of recreation uses, the number of similar experiences available in the region, availability of private and public access points, and the ability to attract visitors from outside the region. Rivers with the longest season of use are of higher value. Rivers that provide for the largest number and diversity of recreation uses are of higher value. Rivers that provide the most unique opportunities are of higher value. Rivers or corridors highly used by anglers, hunters, and wildlife viewers are usually of higher value.

3. *Geology*—The river or corridor contains an example of a geologic or hydrologic feature, process, or phenomenon that is rare or unique to the region, or an outstanding example of a commonly occurring feature. The feature may represent a textbook example.

Attributes for geology outstandingly remarkable values—Consider landforms and geologic setting with unusual or outstanding geologic features, the number and variety of special geologic features, and the value of these features to the region. River corridors with an abundance of unusual, unique, and distinctive geologic features to the region are of higher value. River corridors with the greatest diversity of geologic features are of higher value.

4. *Fish*—Fish values may be judged on the relative merits of fish populations, habitat, or a combination of these factors. Consideration should be given to potential as well as existing values.

Attributes for fish outstandingly remarkable values— Consider the presence, extent, and carrying capacity of spawning areas, rearing areas, and adult habitat. Consider the number and variety of species present and the value of these species. Areas with the greatest amount and best habitat are of higher value. Rivers with more fish and/or that have sizeable runs are of higher value. Rivers highly used by anglers or that offer unusual recreation experiences for the region are of higher value.

5. *Wildlife*—Wildlife values may be judged on the relative merits of wildlife populations, habitat, or a combination of these factors. Consideration should be given to potential as well as existing values. River corridor contains nationally or regionally important populations of resident or indigenous wildlife species dependent on the river environment.

Attributes for wildlife outstandingly remarkable values— Consider the presence, extent, and carrying capacity of a variety of wildlife habitats, including winter range, summer range, transition zones, travel corridors, and calving areas. Consider the number and variety of species present and the value of these species. River corridors with the greatest and best habitat and habitat for rare species are of higher value. River corridors with the greatest diversity of species or the greatest number of wildlife are of higher value.

6. *Prehistory*—the river, or area within the corridor, contains a site or sites where there is evidence of occupation or use by Native Americans.

7. *History*—the river, or area within the corridor, contains a site or feature associated with a significant event, an important person, or a cultural activity of the past that was rare or one-of-a-kind in the region.

Table 70: Eligible rivers on the Shoshone National Forest

River	Segment	Outstandingly Remarkable Value(s) Rating	Classification
Bear Creek	South of Wilderness Boundary to Forest Boundary	Prehistory high regional	Scenic
Clarks Fork	Montana State Line to Clarks Fork Wild and Scenic River	Scenery high regional Recreation high regional	Recreational
Crandall Creek	Headwaters to Clarks Fork Wild and Scenic River	History high regional	Wild/Recreational
Dinwoody Creek	Headwaters to Forest Boundary	Scenery high regional Geology high regional	Wild

River	Segment	Outstandingly Remarkable Value(s) Rating	Classification
		Wildlife high regional	
Greybull River	Headwaters to ~0.5 Miles Past Wilderness Boundary	Fish high regional	Wild
Middle Fork Popo Agie River	Wilderness Boundary to Trailhead	Geology high regional Recreation high regional	Wild/Recreational
North Fork Popo Agie River	Headwaters to Wilderness Boundary	Scenery high regional Geology high regional	Wild
North Fork Shoshone River	Wilderness Boundary to Forest Boundary	Scenery high regional Recreation high regional Wildlife high regional Fish high regional Prehistory high regional History high regional	Recreational
South Fork Little Wind River	Headwaters to Forest Boundary	Scenery high regional	Wild
South Fork Shoshone River	Headwaters to Wilderness Boundary	Scenery high regional Fish high regional Wildlife high regional	Wild
Sunlight Creek	Wilderness Boundary to Confluence with Clarks Fork of Yellowstone River	Geology high regional History high regional	Recreational
Torrey Creek and Tributaries	Headwaters of East and West Torresy Creeks to Forest Boundary	Scenery high regional Wildlife high regional	Wild
West Fork DuNoir Creek	Headwaters to ~1.5 Miles from Forest Boundary	History high regional	Wild
Wiggins Fork	Trailhead to Forest Boundary	Recreation high regional Fish high regional Prehistory high regional	Wild/Recreational
Wind River	Headwaters to Forest Boundary	Fish high regional Hisotry	Recreational
Wood River	Kirwin to Forest Boundary	Geology high regional History high regional	Recreational

Forest Service regulations guide what activities are appropriate with respect to the Values of eligible rivers. Generally speaking, site-specific projects and activities are allowed, though interim protection measures and some limitation apply based on the category of activity and river values. The projects and activities can be broken into the following categories: transportation system activities, recreational development, and motorized travel (Table 71).

Table 71: Activities Approved Based on Eligible River Values

Transportation System	
Wild	Roads and railroads are generally not compatible with a wild river classification. Prevent actions related to the road system that would preclude protection of the river as wild. Do not plan roads outside of the corridor that would adversely affect the wild classification. New trail construction should generally be designed for non-motorized uses. However, limited motorized uses that are compatible with identified values and unobtrusive trail bridges may be allowed
Scenic	New roads and railroads are permitted to parallel the river for short segments or bridge the river if such construction fully protects river values (including the river's free-flowing character). Bridge crossings and river access are allowed. New trail construction or airfields must be compatible with and fully protect identified values.
Recreation	New roads and railroads are permitted to parallel the river if such construction fully protects river values (including the river's free-flowing character). Bridge crossings and river access are allowed. New trail construction or airfields must be compatible with and fully protect identified values.
Motorized Travel	
Wild	Motorized travel on land or water may be permitted, but is generally not compatible with this classification. Where motorized travel options are deemed to be necessary, such uses should be carefully defined and impacts mitigated.
Scenic and Recreational	Motorized travel on land or water may be permitted, prohibited, or restricted to protect the river values.

Consistent with the Forest Plan, these rivers are managed to protect eligibility for future designation. Projects and activities with a likelihood of affecting the free-flowing character and respective values of the river are, therefore, evaluated.

3.6.1.3 Issues Addressed

This section includes issues pertaining to the Clarks Fork Wild and Scenic River (WSR) and the eligible WSRs that have been identified for detailed analysis. "An issue is a statement of cause and effect linking environmental effects to actions" (FSH 1909.15).

Issue 1: Whether wheeled vehicle use proposed under Alternatives 1, 2, and 3, affects the free-flow and value of the Clarks Fork of the Yellowstone River as a designated wild river under the National Wild and Scenic River System.

Issue 2: Whether OSV use proposed under Alternatives 1, 2, and 3, affects the free-flow and value of the Clarks Fork of the Yellowstone River as a designated wild river under the National Wild and Scenic River System.

Issue 3: Whether wheeled vehicle use proposed under Alternatives 1, 2, and 3, affects the free-flow and value of rivers identified as eligible for inclusion under the National Wild and Scenic River System.

Issue 4: Whether OSV use proposed under Alternatives 1, 2, and 3, affects the free-flow and value of rivers identified as eligible for inclusion under the National Wild and Scenic River System.

3.6.2 Methodology

This section includes a description of the methods and data used in this analysis. Similar analyses were used to evaluate the impacts to both designated and eligible rivers under the National Wild and Scenic Rivers System. Potential areas of impact were identified through Geospatial Information System analysis

by finding intersection of NFSRs and NFSTs with river corridors. The river corridors include the bed, bank, and 0.25 miles on either side of the ordinary high-water mark. Where intersections of NFSRs and/or NFSTs occur, the use and activity associated with the intersection is evaluated in light of the specific river value(s).

3.6.2.1 Resource Indicators and Measures

Table 72: Resource condition indicators and measures for assessing effects

Issue	Indicator or Measure	Source
Clarks Fork WSR		
Proposed Roads	New roads, campgrounds, picnic areas, and trailheads are not allowed.	Forest Plan Standard MA1.5A-STAND-11
Motorized Use Extent	Wheeled motorized vehicles are restricted to Forest Roads 110, 119, 164, 174, 178.1A, and 178.1B. In the lower corridor, motorized traffic is not permitted off designated routes for the purpose of dispersed camping or any other generally permitted activity. This excludes snowmobiles traveling over snow.	Forest Plan Standard MA1.5A-STAND-14
Motorized Use Character	The designated motorized routes within the river corridor should be maintained as primitive routes for off-highway vehicles or high clearance vehicles.	Forest Plan Guideline MA1.5A-Guide-19
Eligible WSR Segments		
Transportation system	<p>a. Wild Rivers. Do not plan roads outside of the corridor that would adversely affect the wild classification. Limited motorized uses that are compatible with identified values and unobtrusive trail bridges may be allowed.</p> <p>b. Scenic Rivers. New roads and railroads are permitted to parallel the river for short segments or bridge the river if such construction fully protects river values (including the river's free-flowing character). Bridge crossings and river access are allowed. New trail construction or airfields must be compatible with and fully protect identified values.</p> <p>c. Recreational Rivers. New roads and railroads are permitted to parallel the river if such construction fully protects river values (including the river's free-flowing character). Bridge crossings and river access are allowed. New trail construction or airfields must be compatible with and fully protect identified values.</p>	Forest Handbook 1909.12_80
Motorized Travel	a. Wild Rivers. Where motorized travel options are deemed to be necessary, such uses should be carefully defined and impacts mitigated.	Forest Handbook 1909.12_80

	b. Scenic and Recreational Rivers. Motorized travel on land or water may be permitted, prohibited, or restricted to protect the river values.	
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3.6.3 Environmental Consequences

This discussion considers impacts to two categories of rivers. First, this analysis examines effects to the Clarks Fork of the Yellowstone River (Clarks Fork), a river classified as wild under the National Wild and Scenic Rivers System. Second, this analysis examines effects to rivers identified as eligible for classification under the National Wild and Scenic Rivers System.

3.6.3.1 Environmental Consequences of Common to All Alternatives

This section evaluates management and effects common to all alternatives. Subsequent analysis specific to Alternatives 1, 2, or 3 indicates proposed changes that differ from other alternatives and, therefore, may result in other or additional effects to the resource.

3.6.3.1.1 Summary of System Unchanged Across the Alternatives

3.6.3.1.1.1 Clarks Fork Wild and Scenic River

Currently, approximately 5.4 miles of motorized NFS routes are located within the ½ mile corridor of the Clarks Fork WSR. Just under five miles of this length are open to public motorized use and are characterized as ML 2 NFSRs. Three NFS routes make up this 4.9 mile stretch: Forest Service Roads (FR) 119, 165, and 178.1B. FR 119 is located in the lower stretches of the Clarks Fork as the river winds along a canyon from County Road 8VH and connects with the Morrison Jeep Trail (FR 120). This intersection is located outside of the WSR corridor. FR 165 is located 0.3 miles within the river corridor off a spur from the Chief Joseph Scenic Highway that runs to the Clarks Fork. FR 178.1B parallels FR 165 located on the north side of Chief Joseph Scenic Highway across from the Crandall Ranger Station and offers additional river access. Administrative NFS routes closed to the public comprise the remaining 0.5 miles within the corridor. The following table lists the NFS routes within the WSR corridor. Proposed travel management actions for FR 119, 165, and 174 are the same across all alternatives.

Table 73: Existing NFS Routes for Wheeled Vehicle Use within the Clarks Fork WSR Corridor

					Miles affected per Alternative				
Forest Road	Status	Maintenance Level	Material	Purpose	Alt 1	Alt 2		Alt 3	
						Similar to Alt 1	Proposed Change	Similar to Alt 1	Proposed Change
119	Existing - Open	II – High Clearance Vehicles	Native Material	Access through 4 miles of canyon and intersects with Morrison Jeep Trail	4.15	4.15	0	4.15	0
165	Existing - Open	II – High Clearance Vehicles	Native Material	Access to Clarks Fork	0.32	0.32	0	0.32	0

178.1B	Existing - Open	II – High Clearance Vehicles	Native Material	Access to Clarks Fork	0.40	0	0.40	0	0.40
174	Existing – Administrative	II – High Clearance Vehicles	Native Material	Access to private inholding	0.5	0.5	0	0.5	0
Total					5.37	4.97	0.40	4.97	0.40

Approximately 40% (2,802 acres) of the 6,924 acres Clarks Fork WSR corridor is open to OSV use. This management action is consistent across all alternatives. There are no groomed or ungroomed OSV trails located within the corridor, and proposed management actions in Alternatives 2 and 3 do not propose new trails.

3.6.3.1.1.2 Eligible Wild and Scenic Rivers

Currently, 60.8 miles of motorized NFS routes available for public wheeled vehicle use are located within 10 of the eligible WSR corridors. The majority of the public motorized NFS routes are NFSRs classified as ML 2 and ML 3. An additional 21.58 miles of motorized NFS routes within this corridor are available for administrative use. All NFS routes are existing NFSRs and NFSTs, with surfaces that range from native materials to paved.

Proposed travel management actions for the routes within the Bear Creek, Clarks Fork River, Torrey Creek and Tributaries, Wiggins Fork, and Wood River corridors are the same across all alternatives. The following table summarizes the current inventory of routes with the 10 eligible corridors, and the miles of routes impacted per alternative.

Table 74: Mileage of Potential Effects to Eligible Wild and Scenic Rivers under the Alternatives

Eligible River corridor	Classification	Miles affected per Alternative				
		Alt 1	Alt 2		Alt 3	
			Similar to Alt 1	Proposed Change	Similar to Alt 1	Proposed Change
Bear Creek	Scenic	0.32	0.32	0	0.32	0
Clarks Fork River	Recreational	2.30	2.30	0	2.30	0
Crandall Creek	Recreational	4.45	3.03	1.42	3.03	1.42
Middle Fork Popo Agie River	Recreational	2.91	1.68	1.23	1.68	1.23
North Fork Shoshone River	Recreational	17.67	17.32	0.35	17.67	0
Sunlight Creek	Recreational	20.91	20.79	0.12	20.79	0.12
Torrey Creek and Tributaries	Wild	0.27	0.27	0	0.27	0
Wiggins Fork	Recreational	2.92	2.92	0	2.92	0
Wind River	Recreational	7.20	6.33	0.87	7.20	0
Wood River	Recreational	1.85	1.85	0	1.85	0
Total Wild		0.27	0.27	0	0.27	0

Total Scenic	0.32	0.32	0	0.32	0
Total Recreational	60.21	56.22	3.99	57.44	2.77
Total	60.8	56.81	3.99	58.03	2.77

There is approximately 81,287 acres of FS lands within the eligible Wild and Scenic corridors. 15,492 acres are available for OSV use, and the remaining 65,795 acres are not available for OSV use. Nearly all corridors where OSV use is allowed are tentatively classified as Recreational (14,710 acres), with 178 acres in corridors tentatively classified as Wild, and 569 acres tentatively classified as Scenic. There are approximately 16 miles of groomed and ungroomed OSV trails located within the corridors under Alternatives 1 and 3, and 17 miles under Alternative 2 (all of which are tentatively classified as Recreational). The majority (10 miles) of these OSV trails are located in the Wind River Ranger District. Proposed management of OSV are the same under all alternatives for all eligible river corridors except the Wind River. Proposed groomed/ungroomed management actions are consistent throughout all alternatives for the Middle Popo Fork Agie River and Wiggins Fork corridors. Refer to the following tables for proposed OSV management actions within the corridors per alternative.

Table 75: Eligible Wild and Scenic River corridors allowing Over-Snow Motorized Use per Alternative

River Name	Classification	Alt 1 Acres	Alt 2 Acres	Difference	Alt 3 Acres	Alt 1 Difference	Alt 2 Difference
Bear Creek	Scenic	569	569	-	569	-	-
	*No Values identified within Wilderness	*35.98	*35.98	-	*35.98	-	-
	<i>Total</i>	<i>604.18</i>	<i>604.18</i>	-	<i>604.18</i>		
Clarks Fork River	Recreational	3,778.13	3,778.13	-	3,778.13	-	-
Crandall Creek	Recreational	1,003.73	1,003.73	-	1,003.73	-	-
Middle Fork Popo Agie River	Recreational	368.05	368.05	-	368.05	-	-
	Wild	137.97	137.97	-	137.97	-	-
	<i>Total</i>	<i>506.02</i>	<i>506.02</i>	-	<i>506.02</i>	-	-
West Dunoir Creek	Wild	33.50	33.50	-	33.50	-	-
Wiggins Fork	Recreational	3,686.72	3,686.72	-	3,686.72	-	-
	Wild	6.96	6.96	-	6.96	-	-
	<i>Total</i>	<i>3,693.68</i>	<i>3,693.68</i>	-	<i>3,693.68</i>	-	-
Wind River	Recreational	4,537.55	4,308.96	-228.60	4,308.96	-228.60	-
Wood River	Recreational	1,335.48	1,335.48	-	1,335.48	-	-
	Recreational	14,709.66	14,481.07	-228.60	14,481.07	-228.60	-
	Scenic	569	569	-	569	-	-

	Wild	*178.43	*178.43	-	*178.43	-	-
Total		*15,492.28	*15,263.68	-228.60	*15,263.68	-228.60	-
35.98 acres of the Bear Creek corridor within the Washakie Wilderness was not given a Classification.							

Table 76: Groomed/ungroomed Trails within Eligible Wild and Scenic River corridors

River Name	Classification	OSV Trails	Alt 1 Miles	Alt 2 Miles	Difference	Alt 3 Miles	Alt 1 Difference	Alt 2 Difference
Clarks Fork River	Recreational	Groomed	4.70	4.70	-	4.70	-	-
		New Ungroomed	0.00	0.79	0.79	0.00	-	0.79
Middle Fork Popo Agie River	Recreational	Groomed	0.69	0.69	-	0.69	-	-
North Fork Shoshone River	Recreational	Groomed	0.07	0.07	-	0.07	-	-
Wiggins Fork	Recreational	Ungroomed	0.42	0.42	-	0.42	-	-
Wind River	Recreational	Groomed	10.17	10.17	-	10.17	-	-
		New Ungroomed		0.27	0.27	0.00	-	0.27
Total			16.05	17.11	+1.06	16.05	-	+1.06

3.6.3.1.2 Direct and Indirect Effects Common to All Alternatives

Issue 1: Whether wheeled vehicle use proposed under Alternatives 1, 2, and 3, affects the free-flow and value of the Clarks Fork of the Yellowstone River as a designated wild river under the National Wild and Scenic River System.

Forest Service Roads 119, 165, and 174 do not have any management changes proposed, and effects are consistent across the alternatives (Table 77).

Table 77: Forest Service Roads Without Changes Across the Alternatives

Routes within Clarks Fork WSR corridor	Miles per Alternative		
	Alt A	Alt B	Alt C
119	4.15	4.15	4.15
165	0.32	0.32	0.32
174 (administrative Road)	0.50	0.50	0.50
Total	4.97	4.97	4.97

These NFSRs, which were all existing and in use at the time the Clarks Fork was designated as a wild river, are not expected to alter the qualities of this river. The surface type for these routes is packed native material. These materials can be susceptible to erosion and cause sediment loading. (Effects associated

with soil and hydrological issues related to motorized use on these routes are addressed in the respective effects analysis for those resources.) Wheeled vehicle use is confined to NFS routes specifically identified in the Forest Plan, which the Plan addresses and condones. This limited use is also consistent with Forest Service guidance. Limiting motorized use to these NFS routes minimizes traffic within the Clarks Fork corridor, mitigates potential effects to associated Forest resources, and maintains the integrity of the River's "wild" designation.

The Forest Plan specifically calls for monitoring of Forest Road 119. This monitoring will continue into the future to ensure that motorized uses occur consistent with the values of the river corridor. A half mile of this road is also subject to a seasonal restriction. The restriction occurs up the canyon wall and protects watershed impacts and wildlife from disturbance. (An ancillary benefit of the seasonal restriction is decrease of potential effects to soil and hydrology resources during a period when these effects can be particularly impactful.)

Additionally, under all alternatives no new motorized NFS routes or related infrastructure are planned to be constructed within the Clarks Fork WSR corridor.

Issue 2: Whether OSV use proposed under Alternatives 1, 2, and 3, affects the free-flow and value of the Clarks Fork of the Yellowstone River as a designated wild river under the National Wild and Scenic River System.

The Forest Plan allows for OSV use within the corridor, of which approximately 2,802 acres within the corridor is available for OSV use under all alternatives. These areas are located within the Canyon paralleling Highway 296. These OSV recreation opportunities allow visitors to enjoy the highly desirable settings the WSR corridor offers. Impacts to the river from OSV use are low: primary OSV use occurs outside of the corridor. No OSV trails (groomed or ungroomed) exist or are proposed within the corridor under the alternatives. OSV use under the alternatives is not expected to impact the Clarks Fork or alter recreational opportunities within the WSR corridor.

Issue 3: Whether wheeled vehicle use proposed under Alternatives 1, 2, and 3, affects the free-flow and value of rivers identified as eligible for inclusion under the National Wild and Scenic River System.

Effects will be the same across the alternatives for the following rivers: Bear Creek, Clarks Fork River, Torrey Creek and tributaries, Wiggins Fork, and Wood River. Effects to the North Fork of the Shoshone River and the Wind River will also be similar between Alternatives 1 and 3.

Of the 158.5 miles of eligible river segments throughout the Shoshone classified as Wild, 0.27 miles overlap with existing NFS routes. This overlap occurs within or within proximity to the wild sections of Torrey Creek and its tributaries, which serve as access routes within the Trail Lake Trailhead. These existing NFS routes are consistent with management of eligible Wild and Scenic Rivers. (FSH 1909.12, Chapter 80) Effects from maintaining these NFS routes will not compromise the integrity of the Wild Classification and are unlikely to interfere with the free-flowing nature of the rivers. In addition, these NFS routes are critical staging areas for visitors to access the corridors. The intent and purpose of these routes is to eliminate resource impacts, such as soil compaction caused by driving and parking a vehicle off-road. By eliminating soil compaction, other associated resource impacts such as soil erosion and sediment loading into the Wild sections are reduced, if not eliminated. This management design directly benefits and is consistent with interim management guidelines for eligible wild and scenic rivers. Impacts to the Wild segments from current management is negligible.

There are currently 0.32 mile of motorized NFS routes located within the Scenic corridor of Bear Creek, and 56.22 miles located in Recreational corridors of other eligible rivers. Management for eligible scenic and recreational river segments allow for motorized NFS routes to be located within the corridors. For the Scenic corridors, management allows for a limited amount of routes, whereas recreational corridors do not establish a threshold. All alternatives are consistent with the transportation management guidelines within the Scenic corridor: only 0.32 mile of motorized routes are located within this corridor. Effects from maintaining and designating these routes as open to wheeled vehicle use will not compromise the integrity of the Scenic and Recreational Classifications and will not threaten the free-flowing nature of the rivers.

Issue 4: Whether OSV use proposed under Alternatives 1, 2, and 3, affects the free-flow and value of rivers identified as eligible for inclusion under the National Wild and Scenic River System.

Proposed OSV use within 10,955 acres under all alternatives will allow users to enjoy the settings provided by the Values identified within the corridors: 10,172 acres are located within corridors tentatively classified as Recreational, 569 acres classified as Scenic, and 178 acres classified as Wild. The Values within the corridors are defined as:

- Recreational: Recreation, scenery, history, prehistory, geology, and fish
- Wild: Recreation, history, prehistory, geology, and fish
- Scenic: Prehistory

OSV use on groomed and ungroomed trails within these corridors allow for users to experience these Values, all of which are unaffected by motorized use. Many of these corridors are not geologically distinct, such as the Clarks Fork Canyon, but rather a component of the landscape. Social conflicts may occur between motorized and non-motorized encounters. The presence of OSVs may interfere with non-motorized users' desired settings and experiences, which may displace users to alternative areas. These conflicts may occur but have not been documented. OSV use is expected to continue consistent with current management and will have negligible effects to Values.

3.6.3.2 Environmental Consequences of Alternative 1

This section discloses the environmental impacts of Alternative 1, the no action alternative, for the Clarks Fork WSR and the 16 Eligible Wild and Scenic Rivers. 5.4 miles of motorized routes are located within the Clarks Fork WSR corridor, of which 4.9 miles are open to public use. 60.8 miles of motorized routes available for public use are located within 10 of the eligible WSR corridors.

3.6.3.2.1 Direct and Indirect Effects of Alternative 1

The direct and indirect impacts of Alternative 1 are set forth below with respect to each issue.

Issue 1: Whether wheeled vehicle use proposed under Alternative 1 affects the free-flow and value of the Clarks Fork of the Yellowstone River as a designated wild river under the National Wild and Scenic River System.

Under Alternative 1, management of 4.4 miles of roads, Forest Roads 119, 165, 178.1B, would allow continued access year-round. The majority of those miles are located on FR 119, which is located in the Canyon. FR 119 provides motorized access into the Canyon and a highly reputable ML 2 NFSR with

outstanding vistas, opportunities to view wildlife, challenging riding surface, and access to the renowned Morrison Jeep Trail. Most of the motorized users consist of ATV/UTVs and high clearance vehicles. The settings within and surrounding the WSR create a highly exceptional motorized recreational experience. The same NFSR is also used extensively by non-motorized recreationists for hiking, horseback riding, and mountain biking. The NFSR allows for ample access to the Clarks Fork River, as well as other destinations such as Bridal Vail Falls. Non-motorized users enjoy the Canyon for its semi-primitive settings, outstanding vistas, wildlife viewing, fishing and hunting opportunities, and highly technical white-water rafting opportunities on the Class IV, V, and VI rapids. The remainder of the NFS routes within the corridor are small segments providing access to the Clarks Fork River from the Chief Joseph Scenic Highway. Alternative 1 would continue current management along this route. Social conflicts between motorized and non-motorized users may occur, as well as impacts to soils and hydrology of the area. However, user conflict and resource impacts have not been observed. Impacts to the free-flowing nature of the river and to the identified Values are not expected.

Issue 2: Whether OSV use proposed under Alternative 1 affects the free-flow and value of the Clarks Fork of the Yellowstone River as a designated wild river under the National Wild and Scenic River System.

Impacts to the Clarks Fork WSR are addressed above in section 3.6.3.1.2.

Issue 3: Whether wheeled vehicle use proposed under Alternative 1 affects the free-flow and value of rivers identified as eligible for inclusion under the National Wild and Scenic River System.

Impacts from wheeled vehicle use for the Bear Creek, Clarks Fork River, Torrey Creek and Tributaries, Wiggins Fork, and Wood River are the same as described in section 3.6.3.1.2 above. The remaining 53 miles of NFSRs and NFSTs (0.1 mile is motorized trail located in the Wind River corridor) are located in the Crandall Creek, Middle Fork Popo Agie River, North Fork Shoshone River, Sunlight Creek, and Wind River corridors. Sunlight Creek and North Fork of the Shoshone contains the largest amount of miles within the river corridors, 20.91 miles and 17.67 respectively. (Table 78) The Values within these corridors have been identified as Recreational. As discussed above, Recreational corridors do not have a specific management prescription addressing motorized use. 15.5 miles of roads within the corridors are currently managed under seasonal restrictions.

Table 78: Miles Affected of Eligible River Corridors under the Alternatives

Eligible River corridor	Classification	Miles affected per Alternative				
		Alt 1	Alt 2		Alt 3	
			Similar to Alt 1	Proposed Change	Similar to Alt 1	Proposed Change
Crandall Creek	Recreational	4.45	3.03	1.42	3.03	1.42
Middle Fork Popo Agie River	Recreational	2.91	1.68	1.23	1.68	1.23
North Fork Shoshone River	Recreational	17.67	17.32	0.35	17.67	0
Sunlight Creek	Recreational	20.91	20.79	0.12	20.79	0.12
Wind River	Recreational	7.20	6.33	0.87	7.20	0
Total		53.14	49.15	3.99	50.37	2.77

Issue 4: Whether OSV use proposed under Alternative 1 affects the free-flow and value of rivers identified as eligible for inclusion under the National Wild and Scenic River System.

15,492 acres within the Eligible Wild and Scenic River corridors are open to OSV use, which under Alternative 1 includes 4,538 acres found in the Wind River corridor. The Values identified within the corridor are fish and history and it is classified as Recreational. Impacts to the Wind River corridor will be the same as those addressed in section 3.6.3.1.2 above.

3.6.3.3 Environmental Consequences of Alternative 2

This section discloses the environmental impacts of Alternative 2.

Alternative 2 proposes to add a seasonal restriction to 0.4 mile on FR 178.1B, which serves as an access route leading to the Clarks Fork WSR from Chief Joseph Scenic Highway. There are no other routes within the Clarks Fork WSR corridor affected by proposed travel management actions in Alternative 2. The table below identifies the routes within the corridor and compares the Alternatives.

Table 79: Existing Routes within the Clarks Fork WSR corridor

Forest Road	Status	Maintenance Level	Material	Purpose	Miles affected per Alternative				
					Alt 1	Alt 2		Alt 3	
						Similar to Alt 1	Proposed Change	Similar to Alt 1	Proposed Change
119	Existing - Open	ML 2	Native Material	Access through 4 miles of canyon and intersects with Morrison Jeep Trail	4.15	4.15	0	4.15	0
165	Existing - Open	ML 2	Native Material	Access to Clarks Fork	0.32	0.32	0	0.32	0
178.1B	Existing - Open	ML 2	Native Material	Access to Clarks Fork	0.40	0	0.40	0	0.40
174	Existing – Administrative	ML 2	Native Material	Access to private inholding	0.5	0.5	0	0.5	0
Total					5.37	4.97	0.40	4.97	0.40

56.22 miles of routes within the Eligible Wild and Scenic corridors remain the same as Alternative 1. Approximately 3.99 miles of routes within the Crandall Creek, Middle Fork Popo Agie River, North Fork Shoshone River, Sunlight Creek, and Wind River corridors have some change to NFS routes under Alternative 2. These river corridors are classified as Recreational, and Values include history, prehistory, geology, recreation, scenery, and wildlife. Proposed actions in Alternative 2 include: adding 0.21 miles of new NFSRs within the Crandall Creek and Sunlight Creek corridors; applying 2.06 miles of new seasonal restrictions in Crandall Creek and Middle Fork Popo Agie River corridors; converting 0.49 miles of NFSRs to NFSTs open to all wheeled vehicles in the Middle Fork Popo Agie River corridor; converting 0.35 miles of NFSRs to NFSRs open to wheeled vehicles 64 inches wide or less in the North Fork Shoshone River corridor; decommissioning 0.77 mile of NFS routes and widening 0.10 mile of NFST currently open to

wheeled vehicles 50 inches wide or less to wheeled vehicles 64 inches wide or less within the Wind River corridor.

Alternative 2 would close OSV use in 229 acres within the Wind River corridor and add 1.06 miles of new ungroomed trails in the Clarks Fork River and Wind River corridors. The remaining winter management actions within the corridors are the same. (See Table 80)

Table 80: Groomed/ungroomed OSV trails within Eligible Wild and Scenic River corridors proposed in Alternative 2

River Name	Classification	OSV Trails	Alt 1 Miles	Alt 2 Miles	Difference	Alt 3 Miles	Alt 1 Difference	Alt 2 Difference
Clarks Fork River	Recreational	Groomed	4.70	4.70	-	4.70	-	-
		New Ungroomed	0.00	0.79	0.79	0.00	-	0.79
Wind River	Recreational	Groomed	10.17	10.17	-	10.17	-	-
		New Ungroomed	0.00	0.27	0.27	0.00	-	0.27
Grand Total			14.87	15.93	1.06	14.87	0.00	1.06

3.6.3.3.1 Direct and Indirect Effects of Alternative 2

The direct and indirect impacts of Alternative 2 are set forth below with respect to each issue.

Issue 1: Whether wheeled vehicle use proposed under Alternative 2 affects the free-flow and value of the Clarks Fork of the Yellowstone River as a designated wild river under the National Wild and Scenic River System.

Under Alternative 2, management of Forest Road 178.1B would be subject to a seasonal restriction that would run from June 1 to December 31. This seasonal restriction would prohibit wheeled vehicle use on 0.4 miles of the road. The seasonal restriction will interfere with the desired experiences and beneficial outcomes for those who wish to access the Clarks Fork River via 178.1B during this period. However, Forest Road 165, which parallels 178.1B less than 0.5 mile to the north provides year-round access to the Clarks Fork River. Those who wish to access the Clarks Fork River during the seasonal restriction period on FR 178.1B can continue to use 165, and goal interferences or displacement would be negligible. However, social conflicts may occur Forest Road 165 due to congestion: the expected impact is minimal, because recreational use of this area during the winter is low. Seasonal restrictions on FR 178.1B will minimize the surficial impacts caused by wheeled vehicle use on saturated soils, which would potentially otherwise compromise the Values within the corridor.

Issue 2: Whether OSV use proposed under Alternative 2 affects the free-flow and value of the Clarks Fork of the Yellowstone River as a designated wild river under the National Wild and Scenic River System.

Alternative 2 proposes 62 miles of groomed and ungroomed trails and 170,784 acres (2,802 acres within the corridor) open to OSV use in the Clarks Fork Ranger District, which serves as a destination for OSV users. This use is consistent with use under Alternative 1. Impacts to the corridor under Alternative 2 are anticipated to be minor.

Issue 3: Whether wheeled vehicle use proposed under Alternative 2 affects the free-flow and value of rivers identified as eligible for inclusion under the National Wild and Scenic River System.

Alternative 2 affects nearly 4 miles of NFS routes located within the eligible Wild and Scenic River corridors, of which 0.77 mile is proposed for decommissioning within the Wind River corridor. The remaining NFS routes will either be converted to NFSTs or managed under a new seasonal restriction. These proposed actions will aid in maintaining the identified Values within these corridors by limiting the chances of negligent wheeled vehicle use, such as off-road use and driving on saturated soils. Decommissioning seasonal restrictions is expected to enhance the non-motorized recreational experiences reflected in the river Values. The remainder of the proposed travel management actions will maintain recreation access.

Issue 4: Whether OSV use proposed under Alternative 2 affects the free-flow and value of rivers identified as eligible for inclusion under the National Wild and Scenic River System.

Alternative 2 would close 228.6 acres to OSV, limit OSV opportunities but enhancing non-motorized uses (e.g., cross-country ski opportunities). Displacement due to closing the 228.6 acres is anticipated to be minimal due in part of the opportunities located within the general area, including Togwotee Pass. Adding 1.06 miles of ungroomed OSV trails in the Clarks Fork River and Wind River corridors will allow additional access to winter recreational opportunities and allow visitors to enjoy the identified Values, such as scenery and recreation. OSV use on groomed and ungroomed OSV trails within these corridors allows for users to experience the Values. Some use within the corridors may be coincidental as users travel across the width of the corridor, rather than purposefully within the corridor. Social conflicts may occur between motorized and non-motorized encounters. These conflicts are anticipated to be minimal if non-existent, especially in the Wind River corridor. OSV use is expected to continue consistent with current management and will have negligible effects to Values.

3.6.3.4 Environmental Consequences of Alternative 3

This section discloses the environmental impacts of alternative 3.

3.6.3.4.1 Direct and Indirect Effects of Alternative 3

Issue 1: Whether wheeled vehicle use proposed under Alternative 3 affects the free-flow and value of the Clarks Fork of the Yellowstone River as a designated wild river under the National Wild and Scenic River System.

Effects are the same as analyzed under Alternative 2.

Issue 2: Whether OSV use proposed under Alternative 3 affects the free-flow and value of the Clarks Fork of the Yellowstone River as a designated wild river under the National Wild and Scenic River System.

Effects are the same as analyzed under Alternative 2.

Issue 3: Whether wheeled vehicle use proposed under Alternative 3 affects the free-flow and value of rivers identified as eligible for inclusion under the National Wild and Scenic River System.

Under Alternative 3, 50.37 miles of NFSRs within the corridors would continue as proposed under Alternative 1, and 26.42 miles of NFS routes would see the same management as proposed under

Alternative 2. The direct and indirect impacts of Alternative 3 are the same as described above for Alternatives 1 and 2

Issue 4: Whether OSV use proposed under Alternative 3 affects the free-flow and value of rivers identified as eligible for inclusion under the National Wild and Scenic River System.

Alternative 3 proposes the same changes as Alternative 2, which is to carry forward the management action to close 228.6 acres to OSV use. The direct and indirect impacts of Alternative 3 winter management actions are the same as described above for Alternative 2. There are no new groomed or ungroomed OSV trails proposed under Alternative 3. Direct and indirect impacts will be the same as those discussed in section 3.6.3.1.2.

3.6.3.5 Cumulative Effects of Alternatives 2 and 3

Overall, the effects of the cumulative actions on the Clarks Fork WSR and corridor, and the Eligible Wild and Scenic Rivers and their corridors, are minor at the forest-wide scale. The primary land use practices and actions that affect the Values and free-flowing nature of the WSR and Eligible WSRs on the Forest include transportation projects and vegetation management. These categories of activity directly affect transportation and motorized NFS routes across the Forest, through the rehabilitation and maintenance of existing routes or the construction of new routes (e.g., for timber harvest or fire suppression activities). These projects tend to be temporal, with effects to users typically lasting from several hours to several weeks or months, before those effects subside. These short-term impacts (often associated with heavy machinery, motor vehicles, and power equipment) are limited in duration and dispersed. Combined effects under both Alternative 2 and 3 are, therefore, not very likely.

Timber projects can have additional impacts, such as effects to the identified Values during harvest activities, fire suppression, and while related projects are occurring. Temporary to short-term road and trail restrictions may occur, but the effects to the 65.7 miles within the WSR and Eligible WSR corridors at the Forest-scale will be minimal. Other effects of grazing, special uses, and other stakeholder activities (private landowners, other federal agencies, and state entities) are not anticipated to affect cumulatively the WSR and Eligible WSRs and associated Values within the corridors when considered with Alternative 2 and 3.

3.6.4 Consistency with Relevant Laws, Regulations, and Policy

3.6.4.1 Land and Resource Management Plan

The Shoshone NF operates under the direction of its Land and Resource Management Plan (Forest Plan, 2015). The Shoshone National Forest’s recreation Standards and Guidelines, and roads and trails Goals and Objectives, are established to sustain the Clarks Fork WSR and Eligible WSRs while meeting desired conditions for other resources. The following table further details these Standards and Guidelines.

Table 81: Clarks Fork WSR Standards and Guidelines

Standard	New roads, campgrounds, picnic areas, and trailheads are not allowed. (MA1.5A-STAND-11) Wheeled motorized vehicles are restricted to Forest Roads 110, 119, 165, 174, 178. 1A, and 178.1B. In the lower corridor, motorized traffic is not permitted off designated routes for the purpose of dispersed camping or any other generally permitted activity. This excludes snowmobiles traveling over snow. (MA1.5A-STAND-14)
Guidelines	Manage for a scenic integrity objective of very high. (MA1.5A-GUIDE-18)

The designated motorized routes within the river corridor should be maintained as primitive routes for off-highway vehicles or high clearance vehicles. (MA1.5A-GUIDE-19)

The Forest Plan references to FSH 1909.12 chapter 80 – Wild and Scenic Rivers for management guidelines for Eligible or Suitable Rivers. Specifically, 1909.12, 84.3 – Interim Protection Measures for Eligible or Suitable Rivers, directs the Forest in interim management for Eligible WSRs. The proposed alternatives under this Travel Management Planning Project are consistent with the following management guidelines as prescribed in 1909.12, 84.3:

3.6.4.1.1 Transportation System.

- a) Wild Rivers. Roads and railroads are generally not compatible with a wild river classification. Prevent actions related to the road system that would preclude protection of the river as wild. Do not plan roads outside of the corridor that would adversely affect the wild classification. New trail construction should generally be designed for non-motorized uses. However, limited motorized uses that are compatible with identified values and unobtrusive trail bridges may be allowed. New airfields may not be developed.
- b) Scenic Rivers. New roads and railroads are permitted to parallel the river for short segments or bridge the river if such construction fully protects river values (including the river’s free-flowing character). Bridge crossings and river access are allowed. New trail construction or airfields must be compatible with and fully protect identified values.
- c) Recreational Rivers. New roads and railroads are permitted to parallel the river if such construction fully protects river values (including the river’s free-flowing character). Bridge crossings and river access are allowed. New trail construction or airfields must be compatible with and fully protect identified values.

3.6.4.1.2 Motorized Travel

- a) Wild Rivers. Motorized travel on land or water may be permitted, but is generally not compatible with this classification. Where motorized travel options are deemed to be necessary, such uses should be carefully defined and impacts mitigated.
- b) Scenic and Recreational Rivers. Motorized travel on land or water may be permitted, prohibited, or restricted to protect the river values.

3.6.4.2 Other Relevant Law, Regulation, or Policy

3.6.4.2.1 Federal Law

3.6.4.2.1.1 Wild and Scenic Rivers Act of October 2, 1968, as amended (16 U.S.C. §§ 1271-1287)

The Act designates and sets forth management authority to manage the selected river corridors so as to protect their Outstandingly Remarkable Values and free-flowing character. Relevant Forest Service

guidance can be found at FSH 1909.12, 82.51 - Management Guidelines for Eligible or Suitable Rivers and FSH 1909.12, 84.3 – Interim Protection Measures for Eligible or Suitable Rivers

3.6.5 Conclusion

Proposed travel management actions under the alternatives will minimally impact the Clarks Fork WSR and corridor, and the Eligible WSR river segments and their corridors. Approximately 65 miles of existing NFS routes are located within the corridors, of which under 4.5 miles will receive specific travel management actions under Alternatives 2 and 3. Only 0.4 mile of the 4.9 miles of public accessible NFS routes within the Clarks Fork WSR corridor will be affected through the alternatives, and up to 4 miles of the existing 60.8 miles of NFS routes will be affected in the Eligible WSR corridors. Alternative 2 proposes to add the most seasonal restrictions and NFSR decommissioning within the corridors compared with the other alternatives, implicating 3.23 miles of routes. Alternative 2 also proposes to add, convert to NFST, or widen, nearly a mile of the existing NFS routes (a larger amount of miles affected than Alternatives 1 and 3). These management actions are in concert with the Classifications and consistent with maintaining and sustaining the identified Values.

Proposed OSV use will affect 2,802 acres within the Clarks Fork WSR, and 15,500 acres within the Eligible WSR corridors. Alternatives 2 and 3 propose to close the most acres to OSV use, totaling 228.6 acres within the Eligible WSR corridors. Alternative 2 proposes the most miles of groomed and ungroomed OSV trails within the corridors, which are all located within the Eligible WSR corridors classified as Recreational. Existing OSV use within the corridors have not impacted or compromised the identified Values within the corridors. It is anticipated that effects from the proposed alternatives with respect to OSV use will be negligible.

3.7 Wilderness Study Area: The High Lakes Wilderness Study Area

3.7.1 Introduction

The High Lakes Wilderness Study Area (HLWSA) is situated along the northern border of the Forest, abutting the Montana border and the Custer-Gallatin National Forest to the North and the Absaroka-Beartooth Wilderness of the Shoshone National Forest to the West. This area is managed as Management Area 1.6A under the Forest Plan. It offers non-motorized summer recreation opportunities and OSV use opportunities, consistent with the establishing legislation for the area. The establishing legislation, the Wyoming Wilderness Act of 1984, provided that within the HLWSA “snowmobiling shall continue to be allowed in the same manner and degree as was occurring prior to the date of the enactment of this Act.” (Pub. L. 98-550 § 301(c)(4))

OSV use includes ungroomed OSV Class 1 trails and cross-country travel areas—no groomed OSV trails are within the HLWSA. The OSV use opportunities under the Alternatives are displayed in Table 82.

Table 82: Comparison of Over-Snow Motorized Use Opportunities Across the Alternaitves

Over-Snow Motorized Use Opportunities	Alternative 1	Alternative 2	Alternative 3
Groomed Trails (miles)	0.00	0.00	0.00
Ungroomed Trails (miles)	20.75	20.75	20.75
Total Trails (miles)	20.75	20.75	20.75

Area Open to Cross-Country Over-Snow Travel (acres)	14,818.89	14,818.89	5,644.12*
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*Reflects proposed closure of 9,174.77 acres

Notably, Alternative 3 incorporates a proposed closure of 9,174.77 acres in the northern and eastern portions of this area. (Figure 2) Seasonal differences between the alternatives would also occur. Alternative 1 would continue the current management of not designating a season open or closure date for OSV use. Alternative 2 would implement a season opening date for OSV use of November 1, with the season closing on May 31. Alternative 3 would not apply any seasonal opening or closure dates. (Note that SNOTEL data for the Beartooth Lake reflects adequate snow depths from November through June.)

3.7.1.1 Issues Addressed

This section includes issues pertaining to the High Lakes Wilderness Study Area that have been identified for detailed analysis. “An issue is a statement of cause and effect linking environmental effects to actions” (FSH 1909.15).

Issue 1: Whether and to what extent OSV use proposed under Alternatives 1, 2, and 3 affects the wilderness character of the High Lakes Wilderness Study Area consistent with its character and use as it existed in 1984.

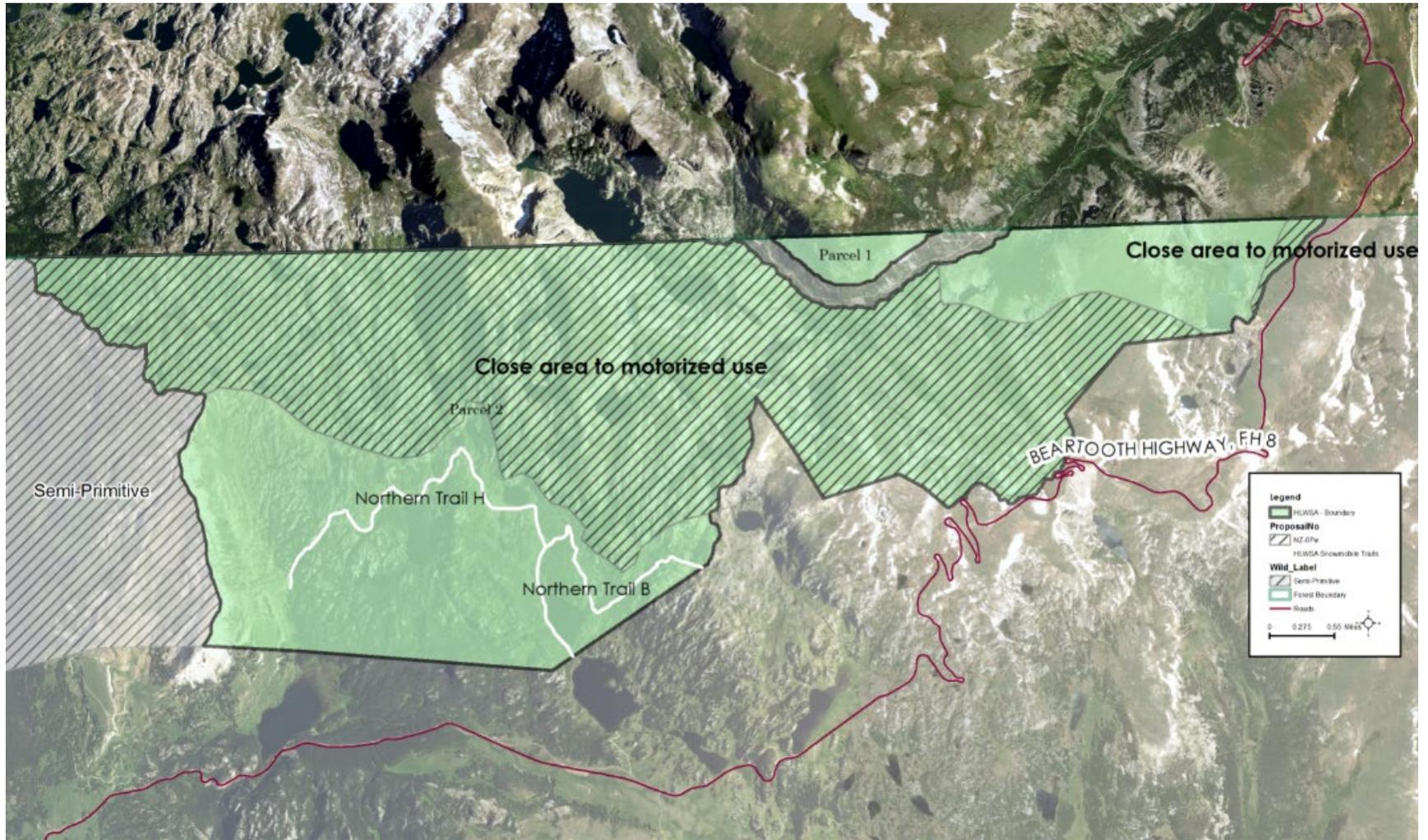


Figure 2: Proposed Closure of High Lakes Wilderness Study Area under Alternative 3

3.7.1.2 Methodology

This section includes a description of the methods and data used in this analysis. The alternatives were evaluated using GIS technology and spatial data to determine location of boundaries, mileage and acreage differences between 1984, existing condition, and travel management options for routes within these areas. Travel management decisions do not alter the HLWSA's boundaries, or the spatial extent of these areas. No alternative will affect the boundaries and boundary management relationship of future designations as Wilderness.

The effects analysis is both quantitative and qualitative. That is, the reduction or increase in OSV trail miles and acreage by alternative provides a quantitative look at project effects. The extent of effects on travel routes and other recreation opportunities is necessarily a qualitative assessment based on: visitor use patterns, historic documents, and professional judgment.

The WSA wilderness character, as it existed in 1984, was determined from a variety of sources including but not limited to Forest Service records, State of Wyoming records, and past documentation. The trend in wilderness character was derived by combining the trends from all of the WSA qualities, following the 2015 Keeping It Wild 2 interagency strategy to monitor trends in wilderness character (Vol 4-1).

Generally applicable wilderness qualities include:

Natural Integrity – This indicates the extent to which long-term ecological processes are intact and functioning. Impacts to natural integrity are measured by the presence and magnitude of human-induced change to an area. Such impacts include physical developments (for example, roads, trails, utility rights-of-way, fences, lookouts, cabins, recreation developments, livestock grazing, mineral developments, wildlife/fisheries management activities, vegetative manipulation, and fire-suppression activities).

Apparent Naturalness - The environment looks natural to most people using the area. It is a measure of importance of visitors' perceptions of human impacts to the area. Even though some long-term ecological processes of an area may have been interrupted, generally the area landscape appears to be affected by forces of nature. If the landscape has been modified by human activity, the evidence is not obvious to the casual observer, or it is disappearing due to natural processes.

Solitude – This indicated isolation from sights, sounds, presence of others and developments of man, focusing on features of the area that offer users outstanding opportunities for solitude; size of the area, presence of vegetation and topographic screening.

Opportunities for Primitive Recreation Experience – The area provides opportunities for isolation from evidence of man, a vastness of scale, feeling a part of the natural environment, having a high degree of challenge and risk, and using outdoor skills characterized by meeting nature on its own terms without comfort or convenience of facilities.

The primary focus of this analysis is the opportunities for primitive recreation experience qualities with respect to OSV use. The other qualities of this area will remain unaffected by OSV use, given

the lack of effect to these qualities. For instance, significant snow depth in the area that extends from the start of November through to June (*see* SNOTEL data from the Beartooth Lake) ensures the natural integrity and apparent naturalness of the HLWSA remain substantially unaltered. Furthermore, the analytical metrics used to assess solitude values will not change between the alternatives, with the environment under these alternatives offering ample opportunities for solitude. The analysis here necessarily focuses on the final quality: opportunities for primitive recreation experience. (Other resources, such as wildlife species or hydrology, that occur within the HLWSA are addressed in those respective sections of this analysis.)

3.7.1.3 Resource Indicators and Measures

Table 83: Resource condition indicators and measures for assessing effects.

Issue	Indicator or Measure	Source
OSV Use	Continue to provide motorized winter recreation opportunities.	Forest Plan MA1.6A-GOAL-01
Wilderness Characteristics	Until released from wilderness study area status, this area will be managed to prevent long-term impairment of wilderness characteristics.	Forest Plan MA1.6A-GOAL-02
General Recreational Use	Manage for an adopted recreation opportunity spectrum class of semi-primitive non-motorized in the summer and semi-primitive motorized in the winter.	Forest Plan MA1.6A-STAND-03

3.7.2 Environmental Consequences

The Wyoming Wilderness Act of 1984 (WWA) (PL 98-550) required the study of certain lands to determine their suitability for preservation as Wilderness, consistent with the Wilderness Act of 1964. These lands are referred to as wilderness study areas. One of the three areas identified in the WWA was the 14,700 acre High Lakes Wilderness Study Area located on the Shoshone National Forest. The WWA requires that the Forest Service administer the area to “maintain [its] presently existing wilderness character and potential for inclusion in the National Wilderness Preservation System[.]” (Pub. L. 98-550 § 301(c)) it further provides that “snowmobiling shall continue to be allowed in the same manner and degree as was occurring prior to the date of the enactment of this Act.” (Pub. L. 98-550 § 301(c)(4))

The area remains a Wilderness Study Area. Originally identified as a 14,700-acre area in the enabling legislation, surveys of the HLWSA after the Forest Plan revision defined the boundaries and led to its current acreage of 14,818.89. Consistent with the legislation, the Forest Plan authorizes OSV use, but that use must be “in the same manner and degree as was occurring prior to the Wyoming Wilderness Act of 1984.” (Forest Plan 121-22) The goals for the area include providing OSV recreation opportunities while managing the area “to prevent long-term impairment of wilderness characteristics.” (Forest Plan MA1.6A-GOAL-01, MA1.6A-GOAL-02)

Determining the “manner and degree” of OSV use that was occurring in the HLWSA at the time it was established is difficult. Little documentation of use exists prior to the designation of the area. Agency and publics on all sides of the issue (wilderness and motorized use advocates) have their own opinions and recollections of the conditions in the area in 1984. Numerous records were researched to help establish some understanding and comparison of conditions in 1984. These included the 1986 Forest Plan, the FEIS

in support of the plan, other agency documents, and maps published over the years. Pertinent information used in this analysis follows, beginning with Forest Service actions and followed by Congressional responses and legislation.

An EA from the early 1980s examining management options for snowmobile use between Cooke City, Montana, and the Beartooth Plateau in Wyoming included a discussion of snowmobile use in the area. Data on use in this EA was developed by the Wyoming Recreation Commission.¹⁴ That commission had conducted annual use studies to “obtain an indication of actual snowmobile use in the area.” The Commission obtained these data during grooming operations between the Wyoming/Montana state line and Island Lake along U.S. Highway 212. The data cited in the EA showed the following use patterns:

Table 84: Data from Clarks Fork Snowmobile Trail Environmental Assessment (Forest Service, 1982)

Annual Season	Days of Grooming	Counted OSVs	Period	Counted Skiers
1978 – 1979	41	1315	01/08/1979 – 04/08/1979	34
1979 – 1980	55	1702	12/08/1979 – 04/15/1980	11

¹⁴ The Upper Yellowstone Snowmobile Club obtained additional recreational use data, which was included in the EA. That Club collected the data on the east edge of Cooke City, using a traffic counter on Highway U.S. 212. That information and the methodology is included below:

1980	
February 29 – March 31 ¹	3035
April 1 – April 21 ¹	987
December 15 – December 31 ²	4461
1981	
January 2 – January 31 ²	6424
February 1 – February 28 ²	6270
March 1 – March 31 ²	6183
April 1 – April 13 ²	1691

¹ Only one side of highway counted

² Counts both side of highway

This EA was entitled “The Clarks Fork Snowmobile Trail” and a decision notice and finding of no significant impact was signed on March 30, 1982. The underlying EA noted that “[t]he traffic counter counted the passage of each machine, some of which made more than one trip in and out of town during the day and night.” The EA calculated the average daily machines by dividing the total machines counted (33,073 machines) by total days for which machines were counted (171 days). This produced a rough daily usage rate of 193.4 machines. The Forest Service acknowledged that this 193.4 usage rate “is merely an indicator of daily use.” Some of the limitations of the data included: “(1) not all of the machines entering and leaving the Cooke City limits passed through the counter; (2) each machine that leaves and re-enters town via this route is two counts; (3) many of the machines leave and re-enter more than once, and (4) most of the snowmobilers stay for more than one day per visit.”

1980 – 1981*	Not Available	2472	N/A	Not Available
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*The EA attributes the large increase in the 1980-1981 season to low snow fall across the region, with snowmobilers traveling to the higher elevation area of the High Lakes to recreate.

These data provide rough estimates for usage rates during the 1980s along U.S. Highway 212, a primary route from which snowmobilers often access the HLWSA (including via the Northern Trail, which branches from U.S. Highway 212).

Intermittent data are available that illustrate more recent OSV usage in the area. In the build-up to the Forest Plan revision, the Forest Service monitored OSV use in the High Lakes Wilderness Study area, with 1,013 visits counted in 2013/14 and 374 visits in 2014/15. Data from the 2018 season indicated up to 1,650 visits to the area. (Table 85)

Table 85: OSV Visit Counters at Beartooth Lake and Island Lake for 2018-2019 Winter

Date	Beartooth Lake	Island Lake
1/2/2018	Installed	Not recorded
2/3/2018	Not recorded	Installed
2/8/2018	Not recorded	168
2/16/2018	800	71
2/23/2018	437	197
3/10/2018	Not recorded	157
3/12/2018	235	31
3/23/2018	73	14
4/11/2018		189
5/2/2018	105	Not recorded
Total	1650	827

The 1,650 counted OSVs for the 2018-2019 winter season compares favorably with the data from the 1978/79 and 1979/80 winters. Available data do suggest outlier years (such as the low during the 2014/15 winter and the high during the 1980/81 winter), but the recent data combined with data from the 1970s and 1980s provide us with general idea of OSV usage along and off of U.S. Highway 212. Additionally, normalizing counted vehicles by the number of days during which visits were tracked illustrates that usage rates have stayed roughly the same since the 1970s. (Table 86)

Table 86: Snowmobile Counts, Including Counts by Days, by Year

Year	Snowmobiles	Days Counted	Counts/Day
1979	1315	91	14.45
1980	1702	130	13.09
1981	2472	Not recorded	Not Available
2014	1013	Not recorded	Not Available
2015	374	Not recorded	Not Available
2019	1650	121	13.63

These data indicate that use patterns have not deviated significantly since the 1970s. These data have their limitations: sampling methodology differed year-to-year, and data were not collected for many of them. Additionally, no consistent tracking of data has occurred since the 1970s. These usage statistics can inform decision-making, but should not drive decision-making.

Other studies have broadly examined patterns of use and economic effects associated with the HLWSA. (Jorgensen et al. 2013; Nagler et al. 2012) These studies reflect the broad usage rates for the area, demonstrating that the area features as a destination for OSV use both for in-state and out-of-state users. However, documented frequency, intensity, and duration of OSV use within the HLWSA is largely unavailable. Places traveled to, routes taken, and other information is not available. The available information—both the data counting use and survey results—provide a general picture of use within the area.

3.7.2.1 Assessment of Wilderness Characteristics

The Forest Service has long recognized the unique qualities of the High Lakes region. An early proposal from 1974 to designate the Beartooth Wilderness (in the adjacent Custer-Gallatin National Forest) included discussion of the High Lakes region. (USDA: U.S. Forest Service, A Proposal: Beartooth Wilderness Proposal (July, 1974)) The Forest Service recommended at that time that the High Lakes area (which encapsulated the entire area North of the Beartooth Highway) was best managed as a roadless area. (*Id.* at 25) The recommended management regime would prohibit motorized travel where it has a potential for resource damage. But the proposal would continue to administer the area under roadless management and allow for OSV use.

When crafting the Wyoming Wilderness Act, Congress also spoke to these issues. Congressional members indicated an intent to balance the area's unique wilderness character with the opportunities provided for OSV recreation. Both members of the House and Senate reiterated that snowmobiling would continue in the area and, in the words of Senator Simpson, "[t]he High Lakes Wilderness Study Area was created specifically in order to allow the continued snowmobile and recreational use that is presently so popular in the vicinity." (98 Cong. Rec. S29260 (daily ed. Oct. 3, 1984) (statement of Sen. Simpson)) Congress did not expressly prohibit or limit OSV use within the area.

3.7.2.2 Environmental Consequences Across All Alternatives

This section discloses the environmental impacts consistent across all alternatives. The wheeled vehicle use does not change across the alternatives, and the effects associated with this use are described below.

3.7.2.2.1 *Direct and Indirect Effects*

Wheeled vehicle travel will have the same effects across Alternatives 1, 2, and 3 for the High Lakes Wilderness Study Area. NFSRs and NFSTs are absent with the exception of the Beartooth Highway (U.S. Route 212), which bounds the southern extent of the HLWSA, and Route 2421, which bisects the HLWSA in the Northeast. Route 2421 (identified elsewhere as Forest Service Road 160, and which includes spur roads off FSR 160) totals 2.95 miles. These routes allow for the operation of highway legal vehicles. No NFS routes occur in or adjacent to the HLWSA.

This limited motorized use outside but adjacent to the High Lakes Wilderness Study Area is consistent with the Forest Plan, and ongoing management of wheeled vehicle use meets the goals, objectives, and standards set for the Area.

3.7.2.3 Environmental Consequences of Alternative 1

This section discloses the environmental impacts of Alternative 1. This no-action alternative would continue the current management of the area into the future.

3.7.2.3.1 Direct and Indirect Effects of Alternative 1

Issue 1: Whether and to what extent OSV use proposed under Alternative 1 affects the wilderness character of the High Lakes Wilderness Study Area consistent with its character and use as it existed in 1984.

The entirety of the HLWSA would remain open to OSV use. No limit, including seasonal restrictions, would be implemented. Impacts to natural integrity and apparent naturalness will be minimal. OSV use may affect opportunities for solitude, primarily through noise disturbance, but these impacts are anticipated to be minimal, especially when considering the tracking counts/day data described above, indicating that use levels have remained relatively consistent over the past four decades. Similarly, OSV use will not have measurable effects to primitive recreation experiences within the HLWSA. Infrequent use spread over the area, and particularly access to cross-country OSV travel, disperses any potential negative impacts of OSV use. OSV use has little lasting impact on the natural features or landscape. Wilderness attributes would only be impacted during a portion of the year, and some for only a short-term basis. As a transitory winter use, over-snow vehicles leave few visible signs of use.

The Forest Service recognizes that user conflicts and safety issues between motorized and nonmotorized over-snow users could occur in the area. (Jorgensen, et al. 2013) However, these conflicts are rare and appear limited to periods when non-motorized recreationalists can access the area off of the Beartooth Highway (after the highway is plowed). While such occurrences may happen, they are not expected to detract from the character of the HLWSA or the recreation opportunities. The continued use of OSVs in the area would also remain consistent with the establishing legislation and intent of Congress in designating the area as a Wilderness Study Area.

3.7.2.4 Environmental Consequences of Alternative 2

This section discloses the environmental impacts of Alternative 2. Alternative 2 proposes implementing open and close dates in the entire North Zone, which would include the HLWSA. The OSV season would run from November 1 to May 31. This May closure date substantially aligns with the dates when the Beartooth Highway becomes accessible to wheeled vehicles (because of road plowing) and provides access to the area to nonmotorized recreationalists who park along the highway and recreate in the HLWSA.

3.7.2.4.1 Direct and Indirect Effects of Alternative 2

Issue 1: Whether and to what extent OSV use proposed under Alternative 2 affects the wilderness character of the High Lakes Wilderness Study Area consistent with its character and use as it existed in 1984.

Alternative 2 proposes to implement open and close dates for the OSV season. The Alternative otherwise resembles the current management scenario, with no geographic closure. These seasonal open and close dates may decrease the potential for conflict between user groups. Non-motorized recreationalists would have an opportunity to utilize the area without OSV use effects between June 1 and October 31, while the core OSV season would remain open to vehicles. The OSV season from November 1 to May 31 would

provide ample opportunities for motorized recreation during high-snow months, while allowing undisturbed non-motorized recreation after May 31. This management scenario would serve both user community, be consistent with the Forest Plan and enabling legislation, and decrease potential user conflict. All other effects would be the same as Alternative 1.

3.7.2.5 Environmental Consequences of Alternative 3

Alternative 3 would implement a closure of two areas: a large portion of the HLWSA that stretches from the border with Montana southwards and then a small portion on the eastern side of the HLWSA. (Figure 2) This proposal primarily would address concerns raised from the non-motorized recreation community. Alternative 3 would not implement any open and close season dates for OSV use.

3.7.2.5.1 Direct and Indirect Effects of Alternative 3

Issue 1: Whether and to what extent OSV use proposed under Alternative 3 affects the wilderness character of the High Lakes Wilderness Study Area consistent with its character and use as it existed in 1984.

The proposed closure to OSV use would prohibit OSV use in approximately 62% of the HLWSA. This change is expected to increase opportunities for primitive recreation and solitude among the non-motorized recreation community, but substantially decrease those same opportunities for the OSV recreation community. Furthermore, the change in management would arguably contradict the statutory language and congressional intent of the HLWSA.

3.7.2.6 Cumulative Effects of the Proposed Action

No past, present, or reasonably foreseeable projects are anticipated to affect wilderness characteristics of the HLWSA. Vegetation projects, special uses, and range projects have the potential to have minor cumulative effects, both positive and negative, to wilderness characteristics. None of these categories of actions would significantly reduce wilderness character or irreversibly compromise the potential to designate the HLWSA as wilderness in the future. These activities are also not considered likely to impact the recreational opportunities for non-motorized and motorized use in the area.

3.7.3 Consistency with Relevant Laws, Regulations, and Policy

3.7.3.1 Land and Resource Management Plan

The Shoshone National Forest Land and Resource Management Plan (forest plan) provides relevant goals and standards for Management Area 1.6A, the High Lakes Wilderness Study Area.

MA1.6A-GOAL-01 - Continue to provide motorized winter recreation opportunities.

MA1.6A-STAND-03 - Manage for an adopted recreation opportunity spectrum class of semi-primitive non-motorized in the summer and semi-primitive motorized in the winter.

The alternatives described above would be consistent with these relevant goals and standards for the HLWSA.

3.7.3.2 Other Relevant Law, Regulation, or Policy

Wyoming Wilderness Act of 1984, Pub. L. 98-550 – Established the HLWSA and allowed for the use of snowmobiling within the boundary of the area.

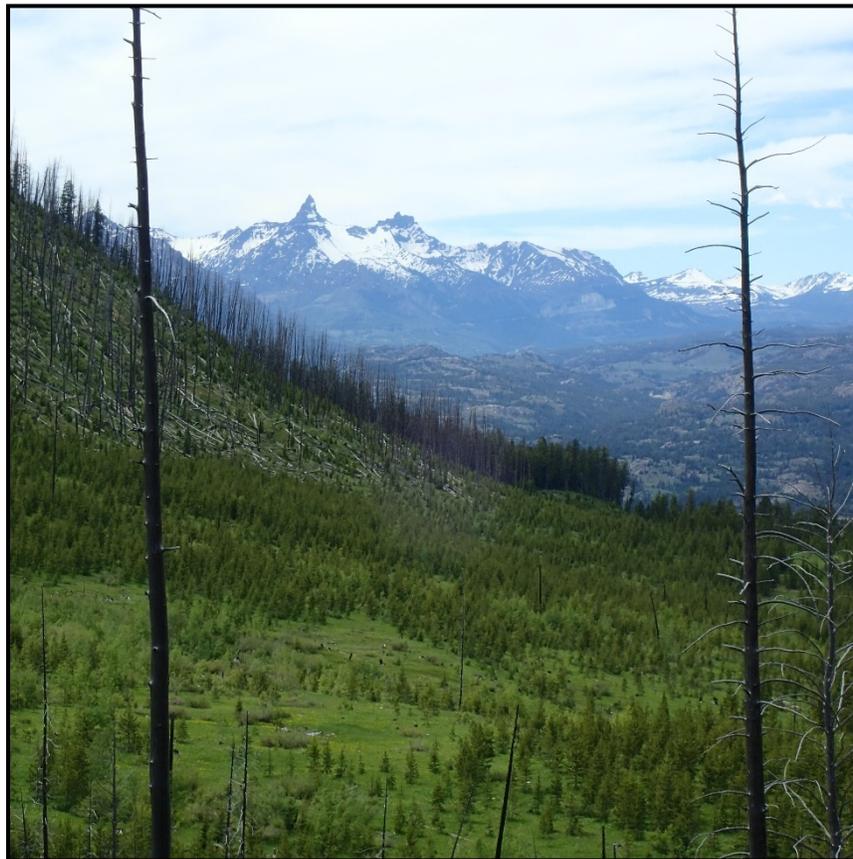
3.7.4 Conclusion

A decision regarding travel management with respect to the HLWSA and any cumulative impacts will result in negligible impacts to the HLWSA. Impacts to the wilderness qualities of the area are expected to be minimal under all the alternatives. Alternative 3, with the proposed closure, presents a potential to displace OSV users, though any displacement would be difficult to measure.

3.8 Soils

3.8.1 Introduction

The purpose of this report is to analyze and disclose potential soils impacts from the existing and proposed Forest Service routes open to wheeled vehicle use, as well as designated and cross-country OSV use. The Pike-San Isabel, Black Hills, and Bitterroot National Forest Travel Management Plans and Soil Reports are the base documents for this analysis, which were completed in 2018, 2009, and 2009, respectively. Relevant laws, general soil effects, methodology, issues, resource indicators and measures, assumptions, and screening criteria. are all very similar and well suited to use in this analysis.



3.8.1.1 Issues Addressed

This section includes issues pertaining to soil resources that have been identified for detailed analysis. “An issue is a statement of cause and effect linking environmental effects to actions” (FSH 1909.15).

Issue 1: Whether and to what extent wheeled vehicle use along existing designated NFS routes under the alternatives will affect soil resources.

Issue 2: Whether and to what extent decommissioning of NFS routes will affect soil resources under the alternatives.

Issue 3: Whether and to what extent new NFS wheeled vehicle routes proposed under the alternatives will affect soil resources.

Issue 4: Whether and to what extent seasonal restrictions applied to NFS routes under the alternatives will affect soil resources.

Issue 5: Whether and to what new administrative closures to NFS routes under the alternatives will affect soil resources.

Issue 6: Whether and to what extent cross-country OSV use will affect soil resources under the alternatives.

3.8.2 Methodology

This section includes a description of the methods and data used in this analysis. Initially, the analysis considered issues raised during external scoping between 2015 and 2018. Resource concerns related to soils focused on sediment generation and delivery to streams and aquatic habitat. These issues are addressed in the analysis of effects to hydrologic resources and aquatic organisms. The analysis here focuses instead on effects to soil rather than from soil. The analysis employs the measures and indicators listed below to determine effects.

Analysis indicators of impacts to soils are as follows:

- Inherent susceptibility of soil to erosion along existing motorized routes (NFSRs and NFSTs) and OSV use trails and areas.
- Total miles of proposed changes in management with erosion susceptibility applied on Forest Service routes per watershed.

3.8.2.1 Soils Resource Assumptions

- All roads/trails considered part of the Minimum Road System (MRS) in Alternative 1 are within the Forest boundary and have an existing road prism. For this analysis, a prism is the footprint of the travel way that includes cut and fill slopes, the road bed, drainage features, and some degree of vegetation clearing appropriate to the type of travel route (USFS, 2012a).
- Similar vehicle classes and route designations would have similar impacts on soils and, therefore, are analyzed jointly.
- When road/trail access is designated as “administrative,” it would generally be expected to have decreased use and thereby retain vegetative cover to a degree that would enhance soil stability

and slow water runoff velocity as compared to a designated “open” route that experiences multiple passes in a day. Administrative access such as use during a timber sale or during fire suppression require additional NEPA analysis and or specific rehabilitation actions.

- Specific travel proposals will require standard and or specific project design features (PDFs) to reduce impacts on soil resources. The basis for these PDFs will come from the Watershed Conservation Practices Handbook (FSM 2509.09, USFS 2006) and the National Best Management Practices for Water Quality Management on National Forest System Lands (USFS, 2012). These PDFs will be detailed during project design. Implementing PDFs will be the responsibility of the District where the project is located with the support of the Forest Watershed Program staff. A standardized list of PDFs is available in Appendix D.
- Soils on Forest Service administered lands would continue to be managed to minimize erosion and maintain inherent productivity.
- Soils with high erodibility have a lower probability of success for restoration than soils with less erosion potential.
- As slope increases, the potential for erosion increases and the risk of soil instability following disturbance increases, particularly if cover, structure, and permeability have been altered.
- Sensitive soils have characteristics that make them highly susceptible to impacts and difficult to restore or reclaim.
- Volcanic breccia soils have a high susceptibility to erosion, especially on steep slopes. Loamy and well-developed soils have lower susceptibility to erosion (NRCS, 2020).
- Decommissioning techniques vary in both cost and their effectiveness in restoring soil functions. At a minimum, decommissioning would entail a simple road closure which reduces erosion but does not eliminate it. At a maximum, decommissioning would entail re-contouring, ripping, mulching, and revegetating, which in general, reduces erosion and sedimentation, decreases compaction, and increases productivity of the decommissioned route and surrounding lands. Additional options including rock or soil barriers, gates, or any combination thereof. Decisions on the level of decommissioning would be made on a site-by-site basis reflecting the highest risk to resources, available funding, and goals of stabilization. For purposes of this analysis, decommissioning is presumed to occur at the minimum level of road closure.

3.8.3 Environmental Consequences

The area of analysis for soils is all lands within the Forest boundary, which includes 2,468,048 acres. This soils analysis focuses in on the 108 out of 147 watersheds (HUC 12 level) on the Forest that contain segments of NFS routes within the Forest boundary. These lands include 1103 miles of routes (both open and not open to the public) according to the road infrastructure database for the Forest. There are 65.37 miles of NFS roads and trails under Shoshone National Forest jurisdiction that were not analyzed, because these roads fall outside the boundary of the Forest. Additionally, these roads do not fall on lands with comparable soils data (despite the routes being managed by the Forest Service and/or another cooperating agency). These are typically roads that allow for Forest access or are roads that have portions which cross back and forth across the Forest boundary. Effects were only analyzed on routes and portions of routes that have a nexus to Forest Service lands outside the road prism.

The Watershed Conservation Practices Handbook (Forest Service Handbook 2509.25, Ch. 10 Management Measures and Design Criteria, USFS, 2006) and Forest Service Manual (FSM 2500, Ch. 2550) outline policy direction for protecting soil qualities under certain types of management.

Management Measure 13 of the WCPH (*Manage land treatments to limit the sum or severely burned soil and detrimentally compacted, eroded, and displaced soil to no more than 15% of any activity area*) states the following:

[t]he 15% limit applies to all natural and human disturbances that may impact soil structure, organic matter, and nutrients in areas allocated for vegetation production (R2 FSH2509.18). Where excessive soil impacts already exist from prior activity, the emphasis should be on preventing any additional detrimental impacts and on reclamation where practicable. As defined in the National Soil Handbook (FSH 2509.18) soil quality standards are intended for areas where management prescriptions are being applied such as timber harvest areas and range allotments. They are not intended to apply to administrative sites or other areas with dedicated uses such as the permanent transportation system, well pads, or ski areas, for example.

With that guidance in mind, analysis of effects to soil from the NFS route system focus on general erosion risk ratings to the areas surrounding travel corridors and to proposed areas designated for cross-country OSV use. General erosion risk ratings provide a suitable analysis metric because data are immediately available across the majority of the analysis area and can address soil effects in a broad sense.

Soils across the Forest vary widely in association with their parent material. A large percentage of the soils are from volcanic parent materials, with some sedimentary and glacial derived soils occurring as well. Table 87 describes parent material types across the Forest. Many areas of the Shoshone NF are prone to landslides and movement from natural erosion processes. Fertility of these soils ranges from good to poor. Some areas are more susceptible to mass movement than others, especially those with steep slopes and certain types of soils.

Table 87: Parent material quantities across the Shoshone NF*

Parent Material Type	Acres of Parent Material Type	Percent of Total Forest Area
Volcanic Breccia	1,018,337	41.26
Sedimentary	317,359	12.86
Glacial Till and Deposits	253,859	10.29
Miscellaneous	104,725	4.24
Basalts, Andesites, Gneiss	97,411	3.95
Granite and Grandiorite	67,953	2.75
Unassigned/Unmapped	608,435	24.65

*Derived from NRCS Parent Material Soil Thematic Map Tool from the Web Soil Survey (NRCS, 2020).

Soil erosion can be quantified by a numerical erodibility factor ("K") that represents the susceptibility of soil particle detachment and the rate of runoff. Soils high in clay have low K values because they are

resistant to detachment. Coarse textured soils, such as sandy soils, have low K values, because they yield low runoff even though they are easily detached. Medium textured soils, such as the silt loam soils, have moderate K values because they are moderately susceptible to detachment and they produce moderate levels of run-off. Soils having a high silt content are the most erodible of all soils (Institute of Water Research, 2020). They are easily detached and tend to crust and produce high rates of runoff. "K" can also vary seasonally, being highest in early spring and lowest in mid-fall or when the soil is frozen (Jain and Singh, 2003).

The Natural Resource Conservation Service (NRCS) Web Soil Survey includes several tools that can be used to aid in decision making and effects analysis. The NRCS has assigned a risk rating interpretation based on a variety of soil survey data and the erosion factor "K." Below are the descriptions from NRCS that describe erosion risk ratings both in off trail/road lands and on-trail/road lands. These tools are meant to be applied at a coarse scale, which is how they are applied in this analysis.

Erosion Hazard (Off road, off trail)

"The ratings in this interpretation indicate the hazard of soil loss from off-road and off-trail areas after disturbance activities that expose the soil surface. The ratings are based on slope and soil erosion factor K. The soil loss is caused by sheet or rill erosion in off-road or off-trail areas where 50 to 75 percent of the surface has been exposed by logging, grazing, mining, or other kinds of disturbance.

The ratings are both [qualitative] and [quantitative]. The hazard is described as 'slight,' 'moderate,' 'severe,' or 'very severe.' A rating of 'slight' indicates that erosion is unlikely under ordinary climatic conditions; 'moderate' indicates that some erosion is likely and that erosion-control measures may be needed; 'severe' indicates that erosion is very likely and that erosion-control measures, including revegetation of bare areas, are advised; and 'very severe' indicates that significant erosion is expected, loss of soil productivity and off-site damage are likely, and erosion-control measures are costly and generally impractical.

Numerical ratings indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the specified aspect of forestland management (1.00) and the point at which the soil feature is not a limitation (0.00)."

(NRCS, 2020) Numerical ratings can be found within the Web Soil Survey tools on the NRCS website for any area of the Forest.

Table 88: Soil Erosion Risk Rating for All Areas

Soil Erosion Risk Rating	Acres in Decision Area
Severe	1,500,869
Moderate	298,329.60
Slight	67,529.33
Not Rated (Insufficient Data)	601,319.70
Total:	2,468,048

Erosion Hazard (On Road or Trail)

“The ratings in this interpretation indicate the hazard of soil loss from unsurfaced roads and trails. The ratings are based on soil erosion factor K, slope, and content of rock fragments.

The ratings are both [qualitative] and [quantitative]. The hazard is described as ‘slight,’ ‘moderate,’ or ‘severe.’ A rating of ‘slight’ indicates that little or no erosion is likely; ‘moderate’ indicates that some erosion is likely, that the roads or trails may require occasional maintenance, and that simple erosion-control measures are needed; and ‘severe’ indicates that significant erosion is expected, that the roads or trails require frequent maintenance, and that costly erosion-control measures are needed.

Numerical ratings indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the specified aspect of forestland management (1.00) and the point at which the soil feature is not a limitation (0.00).”

(NRCS, 2020) Again, these numerical ratings can be found within the Web Soil Survey tools on the NRCS website for any area of the Forest.

Table 89: Soils Erosion Risk Rating for Existing Roads and Trails

Soil Erosion Risk Rating	Total Miles of Roads and Trails
	Alternative 1 - Existing Road System
Severe	576.9
Moderate	421.6
Slight	71.8
Not Rated (Insufficient Data)	32.8
Not Analyzed (Outside forest boundary)	65.4
Totals:	1168.5

3.8.3.1 Environmental Consequences Common to All Alternatives

This section discloses the environmental impacts common to all Alternatives.

3.8.3.1.1 Direct and Indirect Effects of No Action

The direct (same time and place) and indirect (occurs later in time or further in space) impacts common to all alternatives are described below.

Issue 1: Whether and to what extent wheeled vehicle use along existing designated NFS routes under the alternatives will affect soil resources.

Existing routes (NFSRs and NFSTs) are linear, unvegetated, compacted features that cross the landscape for different modes of travel. Slight changes are proposed under the alternatives, and a base motorized use system (reflecting NFSRs and NFSTs) exists across the alternatives.

In general, motorized routes and motorized use on NFS lands can contribute to site disturbances that could affect Forest soil resources when Watershed Conservation Handbook standards and Best Management Practices (*see* Appendix D) are not implemented by the Forest Service or when regulations are not followed by the public. Improperly constructed roads and poor road maintenance can increase the risk of erosion, landslides, and slope failure, endangering the health of watersheds. Soils outside the road/trail prism may be affected by erosion, landslides, and slope failure, leading to decreases in soil productivity for areas designated for other uses beyond transportation infrastructure, such as timber management. Unauthorized use or expanding route prisms by the public can lead to these issues. As a road or trail surface degrades due to rutting, users often widen the trail, which can affect soil stability and productivity beyond the road/trail prism (Meyer, 2002; USFS, 2018).

Although routes serve as pathways of erosion and soil compaction, they generally keep users on designated routes, rather than causing additional widespread resource damage through unplanned, user-created routes. Localized damage can occur when drivers of any type of vehicle move outside maintained routes. This happens particularly in places where water is present on the roadway, areas with active rockfall, slumps, and slides, where downed trees have not yet been cleared, and places where the flow of travel has been obstructed (USFS, 2009). Appropriate design criteria and engineering principles may help mitigate the effects of this type of use on soil health. However, in places that do not receive regular maintenance, these effects will continue to occur.

Alternative 1 would likely continue to contribute these types of localized effects to soils where damage outside travel routes currently exists and will occur in the future. Routes with severe soil erosion risks may be prone to more maintenance issues that could contribute to soil effects outside the road prism. Alternatives 2 and 3 are also expected to have these effects, with differences in magnitude and duration compared with Alternative 1 (*see below*).

Table 90: Soil Erosion Risk Rating Across All Alternatives for Roads and Trails

Soil Erosion Risk Rating	Total Miles of Roads and Trails				
	Alternative 1	Alternative 2	Percent Change from Alternative 1	Alternative 3	Percent Change from Alternative 1
Severe	576.9	628.46	9%	585.18	1%
Moderate	421.6	465.02	10%	424.4	1%
Slight	71.8	75.83	6%	72.73	1%
Not Rated (Insufficient Data)	32.8	33.22	1%	32.96	0%
Not Analyzed (Outside forest boundary)	65.4	65.4	0%	65.4	0%
Totals:	1168.5	1267.93	9%	1180.67	1%

Very little difference exists between Alternatives 1 (no action) and 3 when looking solely at overall risk rating per miles of road. Alternative 2 has the most difference with over 50 miles of route additions to the system in severe rated areas and another 40 odd miles rated moderate. Most of these routes already exist on the ground with a road prism and would primarily be rebuilt in portions or brought up to maintenance standards. Because most of these routes already exist on the ground, new impacts to soils are likely to be minimal. Therefore, despite the increase (and percentage change) under Alternative 2, impacts to soil resources across the alternatives are expected to be similar.

Issue 6: Whether and to what extent cross-country OSV use will affect soil resources under the alternatives.

When done over adequate snow cover, there are little to no effects to soils from cross-country or trail focused OSV use. Adequate snow depth provides a buffer to machine use that prevents compaction and direct soil disturbance. When cover is not adequate, soils can be compacted, rutted, and vegetation disturbed. Indirectly, vegetation, particularly sensitive plants in alpine habitats can be impacted permanently due to the slow nature of alpine soil development and extreme environmental conditions. Despite these effects, which could happen in small and localized instances, widespread soil impacts are not likely to occur over large areas of the Forest. There would be no differences between any of the alternatives for cross-country OSV use and OSV use on groomed and ungroomed trails, and further analysis is not necessary.

3.8.3.2 Environmental Consequences Common to Alternatives 2 and 3

This section discloses the environmental impacts of the proposed actions under Alternatives 2 and 3, respectively. Management actions common to both Alternatives 2 and 3 include decommissioning routes, building new NFS routes, adding new seasonal restrictions, designating cross-country OSV use areas, and adding "administrative use only" designations. Actions that changed NFSRs to NFSTs or NFSTs to NFSRs, such as changing a designation from "NFSR open to all wheeled vehicles" to "NFST open to wheeled vehicles 64 inches wide or less" were not analyzed separate from current conditions. The effect to soils would likely be very similar to current conditions under these new use types, as neither the length of season nor the footprint of the route would change.

3.8.3.2.1 Direct and Indirect Effects Common to Alternatives 2 and 3

The following analysis considers the effects of direct and indirect impacts of Alternatives 2 and 3 with respect to route decommissioning, new construction, seasonal restrictions, and change in use of NFS routes for wheeled vehicles. Each issue is addressed in turn. The effects of these actions as proposed under each alternative are expected to be roughly the same, though the amount of mileage designated for each action under the Alternatives may differ slightly.

Issue 2: Whether and to what extent decommissioning of NFS routes will affect soil resources under the Alternatives 2 and 3.

This section addresses the impacts to soil associated with decommissioned motorized routes under Alternatives 2 and 3. The analysis measures soil erosion risk rating for miles of decommissioned routes. Table 91, below, sets forth the results of this analysis.

Table 91: Soil Erosion Risk Rating of Roads and Trails to be Decommissioned

Soil Erosion Risk Rating	Total Miles of Roads and Trails Decommissioned		
	Alternative 1	Alternative 2	Alternative 3
Severe	0	8.09	2.03
Moderate	0	5.51	2.4
Slight	0	1.52	0.86
Not Rated (Insufficient Data)	0	0.322	0.46
Totals:	0	15.442	5.75

Decommissioning NFS routes under both alternatives can reduce erosion risk to the entire route area. Soils in and around routes can slowly re-vegetate, decreasing the ability of water to detach soil particles and destabilize slopes and move sediment.

These ratings reflect proposals to decommission NFSRs and NFSTs. Alternative 2 proposes the greatest number of routes and miles for decommissioning, with 31 NFSRs and two NFSTs proposed for decommissioning. This proposal would decommission over 15 miles spread over 24 watersheds (HUC12 Level). These miles include the following areas:

- Middle Popo Agie River - 2.3 miles
- Line Creek - 1.9 miles
- Lower Wind River - 1.9 miles
- Jakey's Fork - 1.9 miles
- Long Creek - 1.3 miles
- Sweetwater Creek - 0.83 miles

Eight of the 15 miles are found within severe rated areas concentrated in Jakey's Fork (all), Middle Popo Agie River (all), and Long Creek (0.94 miles).

Under Alternative 3, 5.75 miles are slated for decommissioning spread over 10 watersheds. The Alternative would decommission eleven routes, with highest mileages found in Bear Creek (2.8 miles) and Sweetwater Creek (0.83 miles). Alternative 3 proposes several of the same routes proposed for decommissioning as Alternative 2. Additionally, Alternative 3 proposes decommissioning NFSRs in Upper Warm Springs Creek (0.23 miles) and a longer tract of NFSR along Bear Creek (2.8 miles under Alternative 3 versus 0.12 miles under Alternative 2).

At a coarse scale, differences in effects from decommissioning between all the alternatives are negligible, though Alternatives 2 and 3 are expected to have beneficial effects at the local (and potentially watershed) scale. Alternative 2 proposes the highest number of miles overall, and the highest percentage of routes currently in a severe risk category. Alternative 2 would likely have the most beneficial effects to increasing soil stability when compared with Alternatives 1 and 3 though the extent of such effects is currently not possible to model.

Issue 3: Whether and to what extent new NFS wheeled vehicle routes proposed under Alternatives 2 and 3 will affect soil resources.

This section addresses the impacts to soil associated with new NFS routes under Alternatives 2 and 3. The analysis measures soil erosion risk rating for miles of new NFS routes. These ratings include any proposals with the following labels:

- New NFST open to wheeled vehicles 64 inches wide or less,
- New NFST open to wheeled vehicles 50 inches wide or less,
- New NFSR,
- New Administrative Only NFSR,

- Reconstruct NFSR,
- Reconstruct New Administrative NFSR, and

Newly constructed routes permanently move productive lands into bare and compacted surfaces subject to greater erosive forces. Erosion and destabilization of slopes can occur, especially in high risk soils, on steep slopes, and in areas influenced by water features. Table 92, below, sets forth the results of analyzing new construction in different soil settings.

Table 92: Soil Erosion Risk Rating of Roads and Trails with New Construction

Soil Erosion Risk Rating	Total Miles of Roads and Trails with New Construction		
	Alternative 1	Alternative 2	Alternative 3
Severe	0	54.76	13.26
Moderate	0	45.17	2.75
Slight	0	4.6	1.4
Not Rated (Insufficient Data)	0	0.4	0.14
Totals:	0	104.93	17.55

As previously mentioned, Alternative 2 proposes adding over 50 miles of NFS routes to the system in severe rated areas and 45 miles in moderately rated areas. Most of these routes already exist on the ground with an old road prism and would primarily be rebuilt in portions or brought up to maintenance standards. Adding these NFS routes to the system in Alternative 2 may benefit soil resources due to the level of maintenance they would expect to receive when compared with the maintenance provided under Alternatives 1 and 3 (where they would remain on the landscape in their current condition with no maintenance).

The additional miles of NFSRs and NFSTs in Alternative 2 are distributed across 42 watersheds. The largest additions are in Long Creek (12.4 miles), Lower Warm Springs Creek (10.5 miles), Lower Wind River (10.9 miles), Middle Wiggins Fork (6.7 miles), South Fork Warm Springs Creek (10.9 miles), and Upper Warm Springs Creek (11.2 miles), all of which are found on the South Zone of the Forest. In the severe risk rating category, the largest mileage additions will occur in Long Creek (8 miles), Lower Warm Springs Creek (5.3 miles), Middle Popo Agie River (5.2 miles), Middle Wiggins Fork (6.3 miles), and the Upper East Fork of Wind River (4.8 miles), again all located on the South Zone of the Forest.

Alternative 3 has very modest additions of new route miles. The 17.55 miles are distributed across 20 watersheds. The largest additions will be in the Middle Popo Agie River (3 miles), Long Creek (2 miles), Lower Pat O'Hara Creek (2.2 miles), and Aldrich Creek (1.9 miles). In the severe risk rating category, the largest mileage additions will occur in Long Creek (1.3 miles), Lower Pat O'Hara Creek (2.1 miles), Middle Popo Agie River (3 miles), and Upper Gooseberry Creek (1.3 miles). Unlike Alternative 2, these watersheds are distributed across both the North and South Zones of the Forest.

Issue 4: Whether and to what extent seasonal restrictions applied to NFS routes under the Alternatives 2 and 3 will affect soil resources.

This section addresses the impacts to soil associated with new seasonal restrictions applied to motorized routes under Alternatives 2 and 3. The analysis measures soil erosion risk rating for miles of routes subject

to a seasonal restriction. Adding seasonal restrictions during wet conditions to routes can reduce erosion off the route surface and surrounding lands. As mentioned above, the “K” erosion factor is influenced by seasonality. Limiting route access to times when “K” is least detrimental can reduce erosion risk. Table 93, below, sets forth the results of this analysis.

Table 93: Soil Erosion Risk Rating of Roads and Trails with New Seasonal Restrictions

Soil Erosion Risk Rating	Total Miles of Roads and Trails with New Seasonal Restrictions		
	Alternative 1	Alternative 2	Alternative 3
Severe	0	92.99	99.72
Moderate	0	68.6	70.11
Slight	0	2.77	3.56
Not Rated (Insufficient Data)	0	9.95	9.99
Totals:	0	174.31	183.38

These ratings cover proposals for seasonal restrictions applied both to NFSRs and NFSTs. Alternatives 2 and 3 do not differ in measurable ways with respect to new seasonal restrictions. Both alternatives would implement seasonal restrictions along relatively the same number of miles in each risk category. Effects from Alternatives 2 and 3 would likely be indistinguishable from each other. Effects from Alternative 1 would continue as they currently exist, as described previously.

The new seasonal restrictions on routes in Alternative 2 are spread over 30 watersheds, and 31 watersheds in Alternative 3. At a coarse scale, only small differences exist between Alternatives 2 and 3. The four most significant differences are 8.9 miles of new restrictions under Alternative 2 in Middle Horse Creek (not included in Alternative 3); 25.6 miles of new restrictions in Alternative 3 in Long Creek (only 13.7 miles in Alternative 2); 0.98 miles of new restrictions in Warehouse Creek and 1.5 miles in Whit Creek in Alternative 3 (not included in Alternative 2). In the severe erosion risk rating category, the most notable differences again are in Long Creek (Alternative 2: 7 miles, Alternative 3: 16.29 miles), and Middle Horse Creek (Alternative 2: 7.9 mile, Alternative 3: not included).

Similar to the effects expected from route decommissioning, additional seasonal restrictions would likely benefit soil resources at a local or watershed level, and soil stability is expected to improve on vulnerable route segments under a seasonal restriction.

Issue 5: Whether and to what new administrative closures to NFS routes under the Alternatives 2 and 3 will affect soil resources.

This section addresses the impacts to soil associated with new administrative closures to NFS routes under Alternatives 2 and 3. The analysis measures soil erosion risk rating for miles of routes subject to an administrative closure (conversion of road or trail open to the public to a road or trail for administrative use only).

Motorized use along NFSRs changed to administrative use only will decrease effects to soils, namely erosion potential. NFSRs designated to change from open to administrative would receive less traffic, promoting re-vegetation that would stabilize the surface to a degree. Current temporary or unauthorized routes that are proposed to be added to the system as administrative use would likely see no change in

effects to soil resources until maintenance was performed on each route. Maintenance would reduce erosion in the long term as routes were repaired and brought up to the appropriate design and maintenance level (Edwards, et al, 2016). Table 94, below, sets forth the results of this analysis.

Table 94: Soil Erosion Risk Rating for Roads and Trails with New Administrative Closures

Soil Erosion Risk Rating	Total Miles of Roads and Trails with New Administrative Closure		
	Alternative 1	Alternative 2	Alternative 3
Severe	0	3.22	5.24
Moderate	0	0.52	0.52
Slight	0	0.08	1.99
Not Rated (Insufficient Data)	0	2.27	2.31
Totals:	0	6.09	10.06

This rating describes the proposals to designate NFSRs for administrative use, effectively closing public access. In Alternative 2, six miles of new administrative closures are spread over six watersheds. The highest mileages occur in Upper Sunlight Creek (2 miles), Upper North Fork of the Shoshone River (1.54 miles), and Sunshine Creek (1.53 miles). In the severe erosion risk rating category, the highest mileages occur in Long Creek (0.7 miles), Sunshine Creek (1.37 miles), and Upper Sunlight Creek (0.9 miles).

Alternative 3 has 10 miles of new administrative closures spread over 8 watersheds. It includes all of the proposals from Alternative 2 in addition to Sweetwater Creek (2.3 miles, 1.72 miles in severe), Lower Elk Fork (2.3 miles, 0.96 severe), and Grizzly Creek (0.16 miles, .07 severe).

At a coarse scale, Alternatives 2 and 3 do not differ measurably with respect to administrative closures. Both add approximately the same number of miles in each risk category. Beneficial effects from administrative closures may occur on a localized or watershed scale that may add to soil stability from lower use and more established vegetation on and around routes.

Issue 6: Whether and to what extent cross-country OSV use will affect soil resources under the Alternatives 2 and 3.

Cross-country and trail OSV use can disturb soils and cause compaction when adequate snow cover is lacking. So long as use continues with adequate snow depth, these impacts are expected to be minimal.

3.8.3.3 Cumulative Impacts of Alternatives 2 and 3

This analysis summarizes effects to soils, but a list of specific projects from past, present, and future management are set forth at section 3.1.3. Direct and indirect impacts as discussed above were focused primarily on soil erosion. Soil resource cumulative impacts incorporates erosion into overall soil productivity over the analysis area. The cumulative analysis was broadened to capture other activities that are subject to soil standards under Forest Service Manual guidance.

Soil productivity is a site-specific analysis that depends on climatic characteristics and soil forming factors that occur at very small scales. Soil productivity can vary from one square foot to the next with each area functioning independently. The highly variable and independent nature of soil productivity requires site specific analyses to maintain the proper context. Assessment of cumulative impacts on soil productivity at

large scales (such as the watershed scale or forest boundary) can misrepresent the effects of management activities by diluting the site-specific effects across a larger area. As a result, soil productivity is typically evaluated in a specific treatment area. The treatment areas are typically small enough that soil monitoring can be completed that provides a true representation of soil conditions. For this project, the Forest boundary serves as the Project Area. Soil monitoring representative of true soil conditions is not feasible at this scale. Though cumulative impacts are described generally below, each individual project under these categories will have localized cumulative impacts that will attempt to be minimized through standard best management practices (USFS, 2009).

Some activities have little effect on soils. Their potential for compaction, displacement, and erosion is minimal due to natural recovery times since project completion, effective mitigations, small and isolated disturbance producing negligible effects, and activities isolated from analysis areas or streams. Examples include personal firewood cutting, timber harvest or wildfire occurring more than 50 years ago, outfitter and guide activity, dispersed recreation (non-ATV), hunting and fishing (USFS, 2009).

NFSR and NFST Management

The localized direct and indirect effects to soils from NFSRs and NFSTs are expected to continue, as previously described. Most primary NFSRs have been engineered and designed to limit erosion and sedimentation. However, lack of maintenance leads to rutting and loss of surfacing, as well as increased erosion and sedimentation. Erosion of NFSRs and NFSTs will continue, especially at the current level of maintenance, which is not adequate to fully address erosion concerns on all designated travel routes on the Forest. This level of maintenance is not expected to change in the foreseeable future. Primitive two track NFSRs have little engineering and are prone to rutting and erosion if not maintained regularly. NFSTs may have differing levels of use, but the travel way is usually bare and compacted with the risk of accelerated erosion and sedimentation as well. Design features and watershed conservation practices are put in place when route maintenance can occur to minimize detrimental effects (USFS, 2009).

Vegetation Management

Timber harvest across the Forest has been active throughout the Forest's existence and will continue into the foreseeable future. Soil impacts occur primarily by surface disturbance, compaction, rutting, and heating. These impacts occur through normal timber harvest activities such as building and using temporary roads, slash disposal, skidding, and yarding logs. All timber management projects on the Forest use project design features to minimize each of the impacts listed above.

Prescribed fire has and will occur in many places in the analysis area. Prescribed fire can be detrimental to soils when burn severity is high. These fires can cause the formation of water repellent layers that reduce water infiltration and can cause large debris flows and other erosive events. High burn severity fires can cause chemical changes in the soil as well as changes to the biotic community living within the soil (USFS, 2009). Project design features are also used in prescribed burning activities to minimize burn severity effects to soil.

Wildfire suppression activities typically cause soil impacts through compaction and displacement. These occur mostly through fire line construction, whether by heavy equipment or by hand. While fire lines are typically rehabilitated for erosion control and sometimes reseeded, compacted soils can persist for decades. For instance, cuts on steep and dry slopes where vegetation is much slower to establish may be exposed to lasting erosion issues. Suppression activities will occur across the forest in unpredictable

locations. The Forest will continue to adhere to rehabilitation standards as much as possible to minimize detrimental soil effects.

Grazing Management

Grazing allotments exist across the entire analysis area. Effects to soils from grazing action typically are concentrated in small areas such as bedding locations, shaded areas in otherwise exposed pastures, water developments, salting locations, along fence lines and driveways. These locations are typically compacted, have little vegetation cover, and have increased erosion with decreased infiltration. While these impacts are expected to continue, they are typically small and localized.

Cumulative impacts may occur to soils from a variety of sources from past, present, and future management actions for all alternatives, but would be minimal from the road system outside the route path designated for travel use or from OSV use. The effects would likely be localized, small in magnitude, but may persist over time.

3.8.4 Consistency with Relevant Laws, Regulations, and Policy

3.8.4.1 Land and Resource Management Plan

The Shoshone National Forest Land and Resource Management Plan (Forest Plan) provides standards, guidelines, and goals for soil resources. All new management activities tier to the direction outlined in that document for the life of the plan. Goals, standards, and guidelines from the plan as they pertain to soil resources are found below and are identified by their original unique identifiers. These standards and guidelines dictate management direction for specific projects and are also addressed by incorporation into project design features that aim to minimize resource impacts, while goals provide broad statements that describe conditions contributing to the attainment of desired conditions. Consistency with relevant standards, guidelines, and goals was confirmed for this resource (see Table 95). Additional relevant analysis is set forth above.

Table 95: Forest Plan Consistency Review

Forest Plan Standards, Guidelines, and Goals*	Alternative 1	Alternative 2	Alternative 3
S&W-GOAL-01	Yes	Yes	Yes
S&W-GOAL-04	Yes	Yes	Yes
S&W-STAND-01	Yes	Yes	Yes
S&W-GUIDE-01	Yes	Yes	Yes
*Refer to the Forest Plan for information on compliance with these standards, guidelines, and goals.			

3.8.4.2 Other Relevant Law, Regulation, or Policy

3.8.4.2.1 Federal Law and Forest Service Direction

3.8.4.2.1.1 National Best Management Practices for Water Quality Management on National Forest System Lands. Volume 1: National Core BMP Technical Guide.

This technical guide serves as instruction to improve agency performance and accountability in managing water quality consistent with the Federal Clean Water Act and State water quality programs. The guide

also addresses soil stability and practices to reduce nonpoint source pollution. It provides the standards for resource protection, in coordination with the Watershed Conservation Practices Handbook, implemented during management activities.

Region 2 Watershed Conservation Practices (“WCP”) Handbook Direction

Guidance from the WCP reads as “Manage land treatments to limit the sum or severely burned soil and detrimentally compacted, eroded, and displaced soil to no more than 15 percent of an activity area (commonly a timber sale cutting unit, prescribed fire burn unit or an allotment pasture).”

3.8.4.2.1.2 Forest Service Manual Direction (FSM2500 Chapter 2550 Soil Management)

Guidance from FSM2500 reads as “Generally, soil management standards and guidelines are not applied to administrative sites or dedicated uses areas (such as roads, recreation sites). Standards and guidelines may apply to off-site impacts related to these sites and areas.”

3.8.5 Conclusion

Both action alternatives (*i.e.*, Alternative 2 and Alternative 3) increase the total mileage of motorized routes overall and increase mileage in areas with severe erosion risk ratings. New NFS routes create the most opportunity for negative impacts to soil resources through new ground disturbance. While Alternative 2 adds approximately 100 miles of new NFS routes (many of them ML 1 NFSRs), which may require some new ground disturbance, many of these routes utilize existing road prisms—meaning that the highest risk of erosion and disturbance has already occurred. The remaining erosion risk would come from maintenance activities and user impacts. Alternative 2 further proposes decommissioning 15 miles of routes, benefiting soil resources. Alternative 3 adds about 17 miles of routes, most of which are already existing prisms of older roads or proposals to relocate portions of existing road—however, the majority (13 miles) are in the severe erosion risk category. Alternatives 2 and 3 differ only slightly in mileages of new administrative roads and new seasonal restrictions.

Alternative 2 and 3 have similar OSV use proposals, with a slightly higher acreage of cross-country travel allowable in Alternative 2. Effects to soil from OSV use will likely be negligible on both designated routes and cross-country travel under all alternatives, with primarily small localized effects when snow cover is variable in some locations.

Soil effects to areas outside the main travel pathway, subject to soil management standards, may occur, but would likely be localized and minor, but potentially long lasting.

3.9 Watershed

3.9.1 Introduction

Water resources on the Shoshone National Forest have varied water quality and habitat potential, and the systems that exist today are a function of parent geology, natural processes, and human influences. Watersheds that function properly are defined as those that “have terrestrial, riparian, and aquatic ecosystems that capture, store, and release water, sediment, wood, and nutrients within their range of natural variability for these processes.” In short, they have high biotic integrity, are able to recover from natural disturbances, exhibit a high degree of both vertical and lateral connectivity, provide ecosystem services (*i.e.*, water quality), and maintain long-term soil productivity (USDA Forest Service, 2011).

The watersheds on this Forest are headwaters to the Upper Missouri River basin watershed as subdivided by the Upper Yellowstone, Big Horn, and North Platte river basins. The condition of these watersheds was assessed using the Watershed Condition Framework which defines aquatic physical and biological processes and terrestrial physical and biological processes (USDA Forest Service, 2011). Although, individual indicators represent unique functional levels of condition, the composite scores rate the majority of the 147 Shoshone National Forest watersheds as functioning properly and in good condition (USDA Forest Service, 2020).

Water resources on the Shoshone provide ecosystem services that support agriculture, recreation, drinking water supplies, and other consumptive and non-consumptive uses. Three municipalities rely on water originating from the Forest for municipal supply. The State of Wyoming's Department of Environmental Quality reports on the status of water quality. The vast majority of water resources on the Forest are unimpaired and include outstanding waters in wilderness areas and the Class 1 Clarks Fork of the Yellowstone where water quality degradation is prohibited. Water resources are also classified for impairment. One watershed included in this analysis, Upper Wind River, has a waterbody that is not meeting designated uses and has been placed on the 303(d) list. (WY DEQ, 2019)

3.9.1.1 Issues Addressed

This section includes issues pertaining to water resources that have been identified for detailed analysis. "An issue is a statement of cause and effect linking environmental effects to actions" (FSH 1909.15). The issues were identified from statements of concern from public scoping. The issues formed the basis of alternatives to the proposed action and are used to evaluate and compare the effects.

Issue 1: Whether and to what extent the condition and location of the transportation network including OSV areas could result in impacts that degrade watershed condition, water quality, floodplain function, cause a loss of critical water resources (i.e., wetlands), or degrade a designated water resources (i.e., State designated class 1 streams, impaired waterbodies, or municipal water supply watersheds).

Issue 2: Whether the presence of OSV use may cause impacts to water resources through effects to water quality, inadequate winter snowpack conditions, and routes through critical water resources.

3.9.2 Methodology

Healthy watersheds are critical for protecting water quality, sustaining dependent ecosystems, providing a reliable public water supply, and preventing or reducing erosion or flooding from high-runoff events. In a natural state, watersheds are in a dynamic equilibrium determined by geologic and climatic variables. The natural functions of a watershed, however, can be disrupted by human caused activities where the ground or vegetation are disturbed. The degree of disturbance and the effectiveness of any mitigation efforts govern the magnitude of long-term damage and recovery.

The analysis area for effects includes all 6th-level watersheds within the bounds of the Forest that have motorized travel routes (NFSRs and NFSTs, OSV trails), motorized areas (OSV areas), or proposed routes or areas within their boundaries. The term watershed is used when referring to these hydrologic units throughout this report. The issues were addressed through the analysis considering effects for wheeled vehicle and OSV routes and areas. Due to seasonally differing hydrologic conditions between summer and winter, they were analyzed using separate methodologies.

This section defines the methodologies used. The analysis relied on modeling, professional judgement, monitoring and inventory data, and scientific literature for qualitative comparative analysis. The methods utilized for analyzing effects to the water resource indicators are described below and include the assumptions and limitations of each methodology. The relationship for how these methodologies link to the indicators and address the issues is further defined in the Resource Indicators & Measures section.

3.9.2.1 Wheeled Vehicle Use

The methods for wheeled vehicle use effects analysis included applying the Forest Service Watershed Condition Framework (WCF) to assess overall watershed condition and attribute condition change. The analysis was further refined by modeling road-based sediment delivery to streams using the Geomorphic Roads Analysis Inventory Process (GRAIP_Lite), applying location analysis relative to wetland and lake intersections not included within the WCF, applying location analysis relative to FEMA designated floodplains, and then grouping effects by those that occurred within designated water resources such as municipal watersheds and those with State listed water quality protections or impairments.

3.9.2.1.1 Watershed Condition Framework

The WCF utilizes 12 indicators to assess condition. This analysis included one of the 12 indicators: Roads & Trails. (USDA Forest Service, 2011). Of the four Roads & Trails attributes that are applicable to this indicator, two were used to define the degree of hydrologic connectivity: Open Road Density and Proximity to Water (Table 96).

The spatial context for open road density includes the change in miles of road per square mile of watershed for each alternative. Proximity to water is similar and considers road lengths that either intersect or are within 300 feet of a perennial or intermittent stream as a percentage of the total road or trail length by watershed.

Table 96: Watershed Condition Framework classification ratings (USDA Forest Service, 2011).

Attribute	Condition Rating		
	Good (1) Functioning Properly	Fair (2) Functioning at Risk	Poor (3) Impaired Function
Open Road Density	Less than 1 mi/mi ² , or a locally determined threshold for good conditions supported by forest plans or analysis and data.	From 1 to 2.4 mi/mi ² , or a locally determined threshold for fair conditions supported by forest plans or analysis and data.	More than 2.4 mi/mi ² , or a locally determined threshold for poor conditions supported by forest plans or analysis and data.
Proximity to Water	No more than 10 percent of road/trail length is located within 300 feet of streams and water bodies or hydrologically connected to them.	Between 10 and 25 percent of road/trail length is located within 300 feet of streams and water bodies or hydrologically connected to them.	More than 25 percent of road/trail length is located within 300 feet of streams and water bodies or hydrologically connected to them.

Data Gaps & Assumptions: Within the WCF protocols and existing publicly available condition sets, this indicator applies to open roads and non-motorized trails. This analysis modified the methodology to include all motorized routes (i.e., NFSRs with maintenance levels 1-5 and NFSTs) and did not include non-motorized trails. There is an assumption that the WCF methodology and condition class thresholds are

based on science that remains applicable for this variation. Streams included for Proximity to Water include both perennial and intermittent flowlines.

Condition ratings and associated changes were recognized as shifts in categories. Change within categories was not recognized. The Poor rating does not have an upper threshold, so observations of change that deemed additional attention relied on professional judgement. Water Quality Condition is also an indicator in WCF through two attributes: Impaired Waters (303(d) listed) and Water Quality Problems (not listed). However, the WCF was not used as the basis for assessing it. Water quality condition, specifically related to sediment, is inferred using the GRAIP_Lite model described below.

Considered but not Described in Detail: The overall Watershed Condition Class rating was reviewed as part of this analysis. Where shifts in attribute condition class were identified, none of these changes were weighted enough within the rating system to cause a change in overall watershed condition. Further discussion of overall watershed condition, per the Framework, was not included.

Interpretation: The condition class and condition class change conclusions are applicable only to this analysis. This data should not be used for comparisons to the ratings in the USDA Forest Service Watershed Condition Class & Prioritization Information (USDA Forest Service, 2020).

Outputs Utilized for Effects: Watershed Condition (hydrologic connectivity): Open Road Density and Proximity to Water (streams).

3.9.2.1.2 GRAIP_Lite

This tool was used to model road-related sediment impacts to stream habitats. This methodology creates a quantifiable comparison of hydrologic connectivity between roads and streams. Model inputs include digital elevation models, default base rate erosion calculations, and treatment scenarios for initial, disturbed, and recovered conditions all in relation to the elevational gradient of a flowline to a point of interception. Various treatment options are available for modeling alternative actions. The model generates outputs for the initial condition (i.e., existing condition), disturbed condition (i.e., 3-5 years following the action (e.g., decommissioning)), and recovered condition (i.e., bare surfaces from the action have been revegetated). Model outputs are road sediment production that result in stream sediment delivery. This is displayed by road segment, point, catchment, and sediment accumulation. The model quantifies sediment delivery to streams; however, these metrics should only be used for relative comparison as an indicator of risk. (USDA Forest Service, 2019).

Motorized System Model Inputs: NFSTs were included in this modeling effort and were modeled using the same parameters as a maintenance level two, native surface NFSR (ML 2).

Data Gaps & Assumptions: The model is not based on actual ground conditions: the model assumes that all road maintenance conditions mirror Forest Service maintenance level standards. The model does not apply or assume best management practices such as rolling dips or the presence of drainage structures and therefore assumes some level of hydrologic connectivity. Unique calibration zones are not available for the Shoshone National Forest, so the default calibration zone was used. Although, erosion rates differ across the Forest, the model inputs assume that they are equal.

The analysis assumes seasonal restrictions that are in place during a time of year when the ground isn't frozen or dry have the potential to decrease sediment delivery to water resources. Effects to the integrity

of the road prism and drainage structures will be minimized, also minimizing road-stream connectivity and subsequent sediment delivery to streams. Further discussion of seasonal restrictions is not included.

Interpretation: The model outputs represent an analysis of risk and potential sediment delivery to streams. Data should be viewed for relative comparisons of sediment delivery between alternatives. The model is used to identify areas of concern for potential sediment delivery to streams (i.e., risk).

Outputs Utilized for Effects: Change in water quality as defined by accumulated sediment delivery in tons per year by NFSR and NFST segment (in the recovered condition) for each watershed.

3.9.2.1.3 Critical Water Resources (Wetlands & Lakes)

This method was adopted from the Watershed Condition Framework Proximity to Water attribute measures as described in Table 96. Lakes datum is from the National Hydrography Database that is part of the Forest Service GIS dataset, and wetland information is from both Forest inventories and the Fish and Wildlife Service's National Wetland Inventory (U.S. Fish & Wildlife Service, 2020). This was a geospatial exercise that provided a comparison of miles of NFSR or NFST that intersected or came within 300 feet of a wetland or lake as a percentage of the total NFSR or NFST length by watershed.

Data Gaps & Assumptions: The NHD data is the best available data for wetlands on the Shoshone National Forest. However, field-based wetland validation has verified that this information should be used with caution and may underestimate the number, size, and location of wetlands on the Forest.

Outputs Utilized for Effects: Percent of the total NFSR and NFST mileage that intersects a 300-foot buffer zone around and through perennial and intermittent streams.

3.9.2.1.4 Floodplains

Proposals that intersect floodplains were analyzed based on the miles of intersection with these areas. Floodplains were defined and categorized using the Federal Emergency Management Agency (FEMA) designations (U.S. Department of Homeland Security, 2020). This analysis considered only Flood Zone A which is equivalent to the mapped 100-year flood zone. This was used for a geospatial comparison of miles of NFSR by alternative per watershed that intersected this zone.

Data Gaps & Assumptions: Detailed FEMA flood zone information is not available Forest-wide, and much of the Wind River & Washakie Districts could not be assessed to the same detail as the Clarks Fork, Wapiti, or Greybull Districts. Only areas with a nexus to on-the-ground proposals were analyzed to determine the miles of motorized route increases or decreases in the floodplain. Baseline conditions for this metric did not have adequate data integrity to expand the scale of analysis Forest-wide.

Outputs Utilized for Effects: Miles of NFSR and NFST in the flood zone.

3.9.2.1.5 Designated Water Resources

This applies to municipal supply watersheds and water resources with designations for additional protection or impairment. These areas were used as a filter within the effects analysis. Effects that occurred in a municipal watershed, a Wyoming Department of Environmental Quality Class 1 water, or an impaired water (i.e., watersheds that are part of a municipal supply, wilderness waters or the Clarks Fork of the Yellowstone River, and Brooks Lake) were rated with a higher level of concern. The majority of watersheds are those that contribute to a municipal supply.

Outputs Utilized for Effects: The presence of an effect (from one of the wheeled vehicle indicators) that occurs within one of these watersheds indicates an effect to a Designated Water Resource.

3.9.2.1.6 Synthesis of Effects Rating Rule Set

The effects of wheeled vehicle use on NFS routes to water resources was analyzed as described in the stated methodologies. However, in order to synthesize these results relative to thresholds and effects, a numeric rating criteria was developed (Table 97 - Table 99). A rule set for the rating criteria was applied to each indicator as an existing condition and then as a function of change based on the alternatives.

Existing Condition: Thresholds were identified for each indicator. A numeric equivalent was assigned to these thresholds to derive a summed water resources risk rating for each watershed (Tables 3-5). The greatest risk is numerically defined as (-7) and the least risk is (0). A rating equal to or more negative than a (-3) was considered to have potentially severe risk to water resources. At this point, either the Sediment Delivery from Roads to Streams indicator is listed as excessive or there are at least two indicators in the potentially severe threshold range.

Alternatives: A numeric rating associated with a change in the potentially severe threshold was applied for each alternative by indicator per watershed. The values for each indicator were summed by watershed developing a composite score. Increasingly negative numbers indicate greater risk and increasingly positive numbers represent benefits to water resources. The numeric rating for alternatives ranks the greatest risk as (-11) and the greatest benefit as (+11). The composite scores defining potentially severe effects (as risk) were a rating of (-3) or more negative. This represented a condition where one or more indicators, as a result of the action alternative, were present at a potentially severe threshold and may cause effects to watershed condition, water quality, wetlands, or floodplain function. Similarly, the composite score that was used to show a potentially major improved condition was (+3) or greater. The analysis also identifies watersheds that have an existing condition noted as producing "potentially severe effects" and then where those same watersheds, through the action alternatives, increase in risk.

Additional detail is provided in the Indicator Thresholds & Synthesis of Effects as Risk section.

3.9.2.2 Winter motorized

Effects analysis relied on the relationship between areas of concentrated use, water quality, and sensitive water resources and was supported by published literature. The National Resources Conservation Service (NRCS) snow telemetry data (SNOTEL), scientific literature, and professional judgement were used to evaluate seasonal dates relative to snowpack and minimum snow depths for water resource protection.

3.9.2.2.1 Water Quality

Water quality impacts from OSV use relies solely on available published literature. Areas of concentrated use are described as established OSV trails and other areas of concentrated use such as parking areas.

Data Gaps & Assumptions: Field based snowpack chemistry is limited, and where data is available, correlations to water quality based on OSV use were not included as part of the study design.

Outputs Utilized for Effects: General conclusions relative to water quality effects.

3.9.2.2.2 Critical Water Resources

Winter OSV areas of concentrated use included analysis of geospatial data for NHD delineated wetlands and lakes and the miles of trail that either intersected or were within 300 feet of them (U.S. Fish & Wildlife Service, 2020). This provided a comparison of miles by alternative. The ability to protect sensitive areas was based on snow depths identified in the Forest Service Watershed Conservation Practices Handbook (USDA Forest Service, 2006).

Data Gaps & Assumptions: The NHD data is the best available data for wetlands on the Shoshone National Forest. However, field-based wetland validation has verified that this information should be used with caution and may underestimate the number, size, and location of wetlands on the Forest.

Outputs Utilized for Effects: The percent of the total trail mileage that intersects a 300-foot buffer zone around and including wetlands and lakes.

3.9.2.2.3 Impacts to Water Resources

The NRCS SNOTEL data was used to define mean daily snow depth at both the first of the month and mid-month. Key sites that best represented winter snowpack conditions in OSV use areas were considered. They included Beartooth Lake (Station 326), Togwotee Pass (Station 822), and Townsend Creek (Station 826) (USDA National Resources Conservation Service, 2020). The dates were bound by when 12 to 18 inches of unpacked snow were present at each site.

Data Gaps & Assumptions: The selected sites and associated data are an indicator of the conditions in a general area, and data represents unpacked snow depths. The North Zone was represented by data from Beartooth Lake, the Wind River District by Togwotee Pass, and the Washakie District by Townsend Creek. There is unrepresented variability in snow depth across the geographic area that is open to OSV use.

Interpretation: This data should be used as a general indicator, and field data will be needed to validate actual conditions on an annual basis.

Outputs Utilized for Effects: An assessment of when minimum snow depths are achieved relative to the proposed dates.

3.9.2.3 Cumulative Effects

Cumulative effects analysis included the future removal of unauthorized routes on the system for wheeled vehicle use, relevant climate data for understanding projections related to snowpack and the connection to OSV season of use, and water resource risk from wheeled vehicle routes.

3.9.2.4 Resource Indicators and Measures

A summary of the issues, indicators, measures, and direct and indirect effects are listed in Table 109 which defines the parameters used to analyze effects.

3.9.2.4.1 Wheeled Vehicle Use

Water resources originating from forests provide clean, cold water that supports aquatic life and often domestic water supplies. Water pollution that threatens this is often related to both acute (e.g., road related debris slides) and chronic sources (e.g., delivery from cut or fill slopes, ditches, or road surface runoff where sediment delivery is from the road draining system) of sediment from roads (Boston, 2016).

Roads and road construction contribute more sediment than any other land management activity. This sediment has the potential to alter hydrologic regimes through effects to streamflow patterns, sediment loading, transport and deposition, channel morphology, and water quality (USDA Forest Service, 2011). In general, the greater the road density and connectivity of the road system to a stream system or water body, the greater the risk for degradation to water resources. (Boston, 2016) As such, indicators that describe or define hydrologic connectivity, water quality, and impacts to floodplains, wetlands, municipal water supply watersheds, and designated water resources were adopted for this analysis.

3.9.2.4.2 OSV Use

In seasonally snow-covered environments, OSV use can influence snowpack properties such as snow density and consequent spring melt rates and changes to soil temperatures. Shallow snow depths have been shown to have impacts on underlying resources due to the higher potential for increasing snow density whereas deeper snowpacks are directly correlated to having fewer changes to snowpack properties. (Fassnacht, Heath, Venable, & Elder, 2018) Snow depths of 12 to 18 inches are generally adequate to protect watershed resources. (USDA Forest Service, 2006) Acknowledging that snow depth is one of the most critical factors for protecting resources, indicators related to snow depth and water resource condition were utilized.

Winter motorized use also contributes to overall air and water quality. The effects of this have been shown to create significant differences between snow chemistry on established trails or areas of concentrated use versus adjacent areas without packed trails. Snowpack chemistry changes have been recognized for sodium (Na⁺), calcium (Ca²⁺), magnesium (Mg²⁺), ammonium (NH₄⁺), fluoride (F⁻) and sulfate (SO₄²⁻). (Musselman & Korfmacher, Air quality at a snowmobile staging area and snow chemistry on and off trail in a Rocky Mountain subalpine forest, Snowy Range, Wyoming, 2007) (Switalski, 2016) The literature provides a foundation for understanding effects to water quality from the winter trail system.

Travel Management, Water Resource Effects Analysis

Table 97: Resource condition indicators and measures for assessing effects.

Issue	Indicators	Method	Source
Change in Watershed Condition (hydrologic connectivity)	<p><u>Wheeled Vehicle Use</u></p> <p>Proximity to Water (streams): Percent of the total NFSR and NFST mileage that intersects a 300 foot buffer zone around and including perennial and intermittent streams (<i>Quantitative</i>).</p> <p>Open Road Density: Miles of NFSR and NFST relative to watershed areas (<i>Quantitative</i>).</p> <p>Both are described using watershed condition category ratings for effects (<i>Qualitative</i>).</p>	Watershed Condition Framework	<p>Forest Plan: S&W-GOAL-01, S&W-GOAL-02, S&W-STAND-01</p> <p>Forest Service Watershed Condition Classification and Watershed Condition Classification Technical Guide (USDA Forest Service, 2011),</p> <p>(USDA Forest Service, 2011)</p> <p>Forest Service Watershed Conservation Practices Handbook (USDA Forest Service, 2006)</p>
	<p>Direct Effects: Miles or percent of motorized routes in stream areas and/or within the watershed.</p> <p>Indirect Effects: Likelihood of hydrologic connectivity.</p>		
Changes to Water Quality	<p><u>Wheeled Vehicle Use</u></p> <p>Sediment delivery from NFSR and NFST to streams (<i>Quantitative</i>) and category ratings for effects (<i>Qualitative</i>).</p> <p><u>OSV Use</u></p> <p>Potential for emissions related pollutants to create changes in water chemistry based on miles of trail. Relevant published literature (<i>Quantitative</i>) and a generalized effects summary (<i>Qualitative</i>).</p>	<p>Summer Motorized: GRAIP_Lite</p> <p>Winter Motorized: Water Quality</p>	<p>Forest Plan: S&W-GOAL-01, S&W-GOAL-02, S&W-STAND-01</p> <p>Forest Service Watershed Conservation Practices Handbook (USDA Forest Service, 2006)</p> <p>Geomorphic Roads Analysis Inventory (USDA Forest Service, 2019)</p> <p>Qualitative category ratings: Professional Judgement.</p>
	<p>Direct Effects: Sediment delivery to streams in tons/year/watershed.</p> <p>Miles of trail contributing to concentrated use.</p> <p>Indirect Effects: Change in water quality.</p> <p>Potential for change in water chemistry.</p>		

Issue	Indicators	Method	Source
Loss of Critical Water Resources (Wetlands & Lakes)	<u>Wheeled Vehicle Use</u> Proximity to Critical Water Resources: Percent of the total NFSR and NFST mileage that intersects a 300-foot buffer zone around and including wetlands and lakes (<i>Quantitative</i>) and category ratings for effects (<i>Qualitative</i>). <u>OSV Use</u> Percent of the total trail mileage that intersects a 300-foot buffer zone around and including wetlands and lakes (<i>Quantitative</i>), and probability of impact relative to snow depth (Quantitative & Qualitative).	Summer Motorized: Critical Water Resources (Wetlands & Lakes) Winter Motorized: Impacts to Water Resources	Forest Plan: S&W-GOAL-01, S&W-GOAL-02, S&W-STAND-01 Forest Service Watershed Conservation Practices Handbook (USDA Forest Service, 2006) Forest Service Watershed Condition Classification and Watershed Condition Classification Technical Guide (USDA Forest Service, 2011), (USDA Forest Service, 2011)
	Direct Effects: Percent of motorized routes in wetland and lake areas. Indirect Effects: Likelihood of disturbance and consequent loss of critical water resources.		
Loss of Floodplain Function	<u>Wheeled Vehicle Use</u> Miles of new proposed NFSRs and NFSTs for wheeled vehicle use that intersect the flood zone (<i>Quantitative</i>)	Floodplains	Forest Plan: S&W-GOAL-01, S&W-GOAL-02, S&W-STAND-01 Forest Service Watershed Conservation Practices Handbook (USDA Forest Service, 2006) FEMA Flood Zone (U.S. Department of Homeland Security, 2020)
	Direct Effects: Miles of route within a flood zone. Indirect Effects: Change in floodplain functional values.		
Impacts to a Designated Water Resources	<u>Wheeled Vehicle Use</u> The presence of an effect (based on the wheeled vehicle use indicators) in a watershed with a designated water resource implies an effect (<i>Qualitative</i>).	Designated Water Resources	Forest Plan: S&W-GOAL-01, S&W-GOAL-02, S&W-STAND-01 Forest Service Watershed Conservation Practices Handbook (USDA Forest Service, 2006)
	Direct Effects: An effect to watershed condition, water quality, critical water resources, or floodplain function equals an effect to a designated water resource. Indirect Effects: Risk or benefit to a designated water resource.		

Issue	Indicators	Method	Source
Impacts to Water Resources	<u>OSV Use</u> An assessment of when minimum snow depths are achieved relative to the proposed dates (<i>Quantitative</i>) with determinations (<i>Qualitative</i>).	Impacts to Water Resources	Forest Plan: S&W-GOAL-01, S&W-GOAL-02, S&W-STAND-01 Forest Service Watershed Conservation Practices Handbook (USDA Forest Service, 2006) Professional Judgement
	Direct Effects: Presence/Absence of minimum snow depth. Indirect Effects: Risk or benefit to water resources related to ground disturbance.		



3.9.2.4.3 Spatial & Temporal Context for Indicators

The spatial context for all indicators is the 6th-level hydrologic unit code (HUC) which, as stated above, is termed watershed for this report. Where watersheds extend beyond the Forest boundary, only that portion within the Forest’s land management jurisdiction were included.

3.9.2.4.3.1 Temporal Context

Water Quality: Sediment delivery relative to the initial condition (i.e., existing condition), disturbed condition (i.e., 3-5 years following the action (e.g., decommissioning)), and recovered condition (i.e., bare surfaces from the action have been revegetated) were modeled. The effects analysis focuses on the initial condition and the recovered condition for comparisons. The recovered condition is long-term risk for annual sediment deposition. This assumes all other model parameters and road conditions in the watershed are static.

Impacts to Water Resources: Snowpack condition and associated dates are certain for the historical data presented. However, the applicability for future snowpack conditions is assumed and should be considered valid for a five to ten-year period. Reanalysis may be needed in the future based on changing climactic conditions.

All Other Indicators: The temporal context assumes that the action has been completed (e.g., if a road is being added to the system, the effects analysis assumes that the action has been completed and the new road exists). This identifies conditions of long-term risk (i.e., as long as the road is in place and any existing conditions used for that calculation remain unchanged).

3.9.2.4.4 Indicator Thresholds & Synthesis of Effects as Risk

The analysis utilizes modeling, professional judgement, monitoring and inventory data, and scientific literature for qualitative and quantitative comparisons. The thresholds applied when determining effects are outlined below. While the effects of each parameter can be discussed in detail, they were synthesized for wheeled vehicle use to communicate concisely effects to water resources under the alternatives (Tables 3-5). Winter motorized (i.e., OSV use) thresholds are described following wheeled vehicle use. The effects are discussed for each alternative below.

Table 98: Wheeled Vehicle Use thresholds and numeric risk rating criteria for indicators of Watershed Condition (hydrologic connectivity).

Issue	Watershed Condition (hydrologic connectivity)	
Indicators	Proximity to Water (streams)	Open Road Density
Metric	Percent of total NFSR and NFST system per watershed	Miles/Sq. Mile
Measure	Good: < 10	Good: < 1
	Fair: > 10 but < 25	Fair: > 1 but < 2.4
	Poor: > 25	Poor: > 2.4
Existing Condition Potentially Severe Threshold	Measure = Fair or Poor	Measure = Fair or Poor

Issue	Watershed Condition (hydrologic connectivity)	
Existing Condition Numeric Equivalent - Risk	Categories: Good = 0 Fair = -0.5 Poor = -1	Categories: Good = 0 Fair = -0.5 Poor = -1
Alternatives Numeric Equivalent - Risk	Condition Class Change for Increased Impairment: Shift 1 Category = -0.5 Shift 2 Categories = -1	Condition Class Change for Increased Impairment: Shift 1 Category = -0.5 Shift 2 Categories = -1
Alternatives Numeric Equivalent - Benefit	Improved Condition Class Change: Shift 1 Category = +0.5 Shift 2 Categories = +1	Improved Condition Class Change: Shift 1 Category = +0.5 Shift 2 Categories = +1

Table 99: Wheeled Vehicle Use thresholds and numeric risk rating criteria for indicators of Water Quality and Floodplains.

Issue	Water Quality	Floodplains
Indicators	Sediment Delivery from Roads to Streams	Motorized Trail in Floodplains
Metric	Tons/year/watershed at the Recovered Condition	Miles
Measure	Low: < 10	< 0.5
	Moderate: > 10 but < 50	> 0.5
	High: > 50 but < 100	
	Excessive: > 100	
Existing Condition Potentially Severe Threshold	Measure = Moderate, High, or Excessive	Measure = Did not apply for Existing Condition given the limited data and inability to compare Forest-wide
Existing Condition Numeric Equivalent	Low = 0 Moderate = -1 High = -2 Excessive = -3	n/a
Alternatives Numeric Equivalent - Risk	Sediment Delivery Increase: > 5 but < 10 = -1 > 10 but < 50 = -2 > 50 but < 100 = -3 > 100 = -4	Increase of > 0.5 miles = -1
Alternatives Numeric Equivalent - Benefit	Sediment Delivery Decrease: > 5 but < 10 = +1 > 10 but < 50 = +2 > 50 but < 100 = +3 > 100 = +4	Decrease of > 0.5 miles = +1

Table 100: Wheeled Vehicle Use motorized thresholds and numeric risk rating criteria for indicators of Wetland Loss and Designated Watersheds.

Issue	Wetland Loss	Designated Watersheds
Indicators	Miles of NFSR that intersect or are within 300 ft	For any Designation, an effect in wheeled vehicle use indicators.
Metric	Percent of total NFSR and NFST system per watershed	Presence/Absence of Effect
Measure	Good: < 10%	Yes
	Fair: > 10 but < 25	No
	Poor: > 25	
Existing Condition Potentially Severe Threshold	Measure = Fair or Poor	Measure = Yes
Existing Condition Numeric Equivalent	Categories: Good = 0 Fair = -1 Poor = -2	No = (N) Yes = (Y)
Alternatives Numeric Equivalent - Risk	Condition Class Change for Increased Impairment: Shift 1 Category = -1 Shift 2 Categories = -2	No = (N) Yes = (Y)
Alternatives Numeric Equivalent - Benefit	Improved Condition Class Change: Shift 1 Category = +1 Shift 2 Categories = +2	No = (N) Yes = (Y)

The OSV issues and indicators address three primary concerns for water resources: water quality, critical water resources, and impacts to water resources related to ground disturbance (Table 109). The thresholds for each of these are described below.

- **Water Quality:** State and federal regulatory entities set water quality standards, but there is limited data available to reference for winter conditions across the Forest. As such there are no quantitative thresholds for this analysis but instead a recognition of the presence or absence of an effect based on findings from relevant literature.
- **Loss of Critical Water Resources:** The threshold is based on meeting or exceeding minimum snow depths of 12 to 18 inches of unpacked snow. If this threshold is met, there are no expected effects.
- **Impacts to Water Resources:** The threshold for protecting this resource is meeting or exceeding a minimum snow depth of 12 to 18 inches at the established seasonal date. Where a seasonal date was not identified for an alternative, observational data was paired with professional judgement as a mechanism for identifying resource degradation.

3.9.3 Environmental Consequences

The environmental consequences to water resources should be interpreted as a degree of risk. Although the indicators have a quantitative basis, they are not indicative of certain effects but represent the potential for effects. For example, although hydrologic connectivity indicators that are part of watershed condition may be rated as Fair, it doesn't indicate that the system is hydrologically connected. It provides

an indicator of risk and “flags” watershed areas that should be given additional review to better understand field conditions and determine if NFS route conditions are affecting water resources or to identify that minimization criteria or best management practices (BMPs) are in place and effective.

The effects to water resources on this Forest are most influenced by the magnitude, pattern, intensity, and location of land uses or management decisions. Watershed conservation practices and Forest Plan standards and guidelines prescribe extensive measures to protect soil, riparian, wetland, and aquatic resources. Preventing negative impacts is fundamental to protecting these resources, and the primary means for doing this is through the implementation of effective BMPs. Generally, adverse impacts on these resources can be minimized when all applicable measures are applied and effective. However, protective measures are not a failsafe, especially when one or more impacts exceed the capability of these efforts to be effective. The primary BMPs applied on this Forest are derived from the Watershed Conservation Practices Handbook (USDA Forest Service, 2006) and the National Core BMPs (USDA Forest Service, 2012). BMP implementation and effectiveness monitoring is a standard practice for validating that soil and water resources are protected and that the prescribed design features are adequate.

The effects discussion assumes that minimization criteria and or best management practices will be specific and applied to NFS routes, that they are developed by the core interdisciplinary team, and that they are maintained and effective. If conditions change such that water resources cannot be protected through the minimization criteria or BMPs, the change to the system will be delayed until acceptable alternatives for implementation can be developed. For the effects analysis, it is assumed that BMPs and minimization criteria are implemented fully and are effective for all scenarios within the action alternatives.

3.9.3.1 Environmental Consequences of No Action (Alternative 1)

The No Action is the existing condition. This is the current NFS route system, and as such the effects are a reflection of the existing situation and the baseline used for comparing effects from the action alternatives (Alternatives 2 and 3). The effects are only displayed for watersheds that are within a potentially severe threshold and are characterized by a numeric rating that defines potentially severe risk. The Action Alternatives are characterized by both risk and benefit (Tables 3-5).

3.9.3.1.1 *Direct and Indirect Effects of No Action (Alternative 1)*

3.9.3.1.1.1 Issue 1:

Watershed condition as defined by NFSR density shows 31 watersheds (27 Fair and 4 Poor) within a potentially severe threshold, and for proximity to water, there are 97 watersheds (27 Fair and 70 Poor). The remaining watersheds for each indicator are low risk.

Water quality indicators meet potentially severe thresholds in 82 watersheds. The distribution among categories is Extreme (21), High (22), and Moderate (39). Each of the 82 watersheds have the potential for between 10 to over 100 tons of sediment per year depositing into streams and degrading water quality. The remaining watersheds are categorized as having low risk and the potential for each contributing less than 10 tons per year.

Critical water resources within the potentially severe threshold category include 70 watersheds (38 Fair and 32 Poor). The remaining watersheds are considered low risk.

3.9.3.1.1.1.1 Context & Intensity

When considering the combined effect of all the indicators for water resources, the rule set for the numeric equivalent of risk (Table 97 to Table 99) was applied. Those watersheds that scored less than or equal to (-3) are considered to have the highest degree of risk or potential to cause water resource impairment. Seventy watersheds meet this composite score with 26 of them being a designated water resource. Where direct and indirect effects are realized as an actual condition, this would indicate persistent long-term chronic deterioration of water resources due to the NFS route system for wheeled vehicles.

3.9.3.1.1.1.2 Conclusion

Best management practices are one of the primary mechanisms for minimizing risk. The Forest has completed several formal Best Management Practice reviews following Forest Service Protocols (USDA Forest Service, 2020). Between 2014 and 2019, nine reviews using three protocols were used to evaluate BMP implementation and effectiveness. The protocols were: Completed Road or Waterbody Crossing Construction or Reconstruction, Road Operation and Maintenance, and Stored Roads. The overall ratings show an inconsistency in BMP implementation and a general lack of effectiveness. The most frequent deficiency for implementation cited is the lack of BMP prescriptions that are linked to NFS road management objectives. The effectiveness ratings were due to field based determinations of reduced capacity at road crossing structures for protecting water resources in conjunction with some evidence of sedimentation near or reaching waterbodies (USDA Forest Service, 2020).

Data indicate that most watersheds with NFS routes have met or exceeded the potentially severe threshold. However, available information is insufficient to determine actual on-the-ground effects. When properly applied, BMPs remain the most effective means of minimizing impacts. Currently, improvements are needed in the planning, implementation, and monitoring of BMPs to improve their effectiveness. In sum, although unquantified, effects to water resources are occurring as a result of the existing NFS route system.

3.9.3.1.1.2 Issue 2:

There are 289 miles of OSV trails that are either groomed or ungroomed on the Forest, and open areas for OSV use are slightly over one-half million acres. Twenty-six percent of the total trail system intersects with a water resource of concern, and the season of use is listed as open year-round.

3.9.3.1.1.2.1 Context & Intensity

Based on current literature, it is likely that there are chemical deposition contributions from OSVs along the 289 miles of OSV trails, and detectable increases in snowpack chemistry will occur during part or all of the winter season. No evidence presently exists to indicate these concentrations will shift water chemistry (water quality) outside of established regulatory standards. (Switalski, 2016) (Musselman & Korfmacher, Air quality at a snowmobile staging area and snow chemistry on and off trail in a Rocky Mountain subalpine forest, Snowy Range, Wyoming, 2007)

One quarter of the OSV trail system intersects with a critical water resource, and there are countless intersections with water resources across the open OSV use area. Minimum snow depths required for protecting these areas range from 12 to 18 inches of snow, and there are no established season of use dates. Therefore, given that snowmobiling is occurring, the established measures for this indicator assume some level of effect to water resources occur. However, qualitative field observations suggest that this use is not degrading water resource conditions. A reasonable conclusion is that OSV users do not operate frequently enough during times when snowpacks are less than adequate to affect these resources.

3.9.3.1.1.2.2 Conclusion

Effects from OSV use are negligible for water quality and, based on field observations, assumed to be negligible for critical water resources and all other water resources. Application of practices that ensure minimum snowpack and locate trails, to the best of our ability, away from water resources is necessary for water resource protection. It should also be noted that the science linking water chemistry and OSV use is growing, and additional BMPs may need to be incorporated in the future.

3.9.3.2 Environmental Consequences of Alternative 2

3.9.3.2.1 Direct and Indirect Effects of the Proposed Action

3.9.3.2.1.1 Issue 1:

Watershed condition as defined by road density indicates three watersheds have an increase in density and one a decrease, effectively removing it from the potentially high severity threshold. For proximity to water, one watershed shifted from a good to poor condition now being categorized within a potentially high severity threshold.

Water quality risk is determined by increases or decreases in sediment delivery. Four watersheds increased by more than 5 but less than 10 tons/year, 11 by more than 10 but less than 50 tons, two by more than 50 but less than 100 tons/ year, and one by more than 100 tons/year. The proposed changes also benefit some watersheds: one decreasing by more than 5 but less than 10 tons/year, five by more than 10 but less than 50 tons, and one by more than 50 but less than 100 tons/ year. Those watersheds where the effects of the action result in increased sediment delivery of over 50 or 100 tons/year are within watersheds with baseline conditions categorized as High or Extreme: Middle Wiggins Fork C, Upper East Fork Wind River, and Long Creek.

Critical water resources were both converted to and from a category listed as a potentially severe threshold. Those that moved to a potentially severe risk threshold include: Long Creek, Upper Wiggins Fork, Lower Warm Springs Creek, Cherry Creek, and Line Creek. One watershed benefited enough that it is no longer within a potentially severe threshold. There were five watersheds that moved from a Fair to Poor category, and two that improved from a poor to fair category.

Flood zone improvements within critical thresholds occurred in one watershed (i.e., Sweetwater Creek) on the North Zone.

3.9.3.2.1.1.1 Context & Intensity

When considering the combined effect of all the indicators for water resources, the rule set for the numeric equivalent for potentially severe effects as risk was applied (Table 97 to Table 99). Those watersheds that scored less than or equal to (-3) are considered to have the highest degree of risk or potential to cause water resource impairment while those greater than or equal to (+3) have the greatest potential for water resource improvement.

- Greatest Potential for Risk: Long Ck, Middle Wiggins Fork C, South Fork Warm Springs Ck, Upper Wiggins Fork, Lower Warm Springs Ck C, and DuNoir Ck C.
- Greatest Potential for Benefit: Upper Sunlight Creek.
- None of the watersheds are a designated water resource.

Five of the 70 watersheds with a composite baseline condition of “potentially severe risk” are within the potentially severe composite score for effects. There is cumulative increased risk to: Long Creek, Middle Wiggins Fork C, South Fork Warm Springs Ck, and Lower Warm Springs Ck C. The magnitude of these changes is generally represented by sediment increases that range from doubling to increasing by seven times the baseline condition, and higher percentages of NFS routes within proximity of critical water resources.

Direct and indirect effects realized as an actual condition would indicate persistent long-term chronic deterioration of water resources due to the NFS route system.

3.9.3.2.1.1.2 Conclusion

Assuming that BMPs are appropriately applied across the NFS route system, the effects to water resources will be negligible.

3.9.3.2.1.2 Issue 2:

Alternative 2 proposes 299 miles of OSV trail that are either groomed or ungroomed on the Forest, and open areas for OSV use totaling slightly over one-half million acres. Twenty-six percent of the total OSV trail system intersects with a water resource of concern, and the season of use is listed as November 1 to May 31 for the Clarks Fork District on the North Zone, November 1 to June 15 for the Wind River District on the South Zone, and December 1 to May 31 for the Washakie District on the South Zone.

Over one quarter of the trail system intersects with a critical water resource, and there are countless intersections with all water resources over the area open to use. Minimum snow depths required for protecting these areas range from 12 to 18 inches of snow. SNOTEL data for the period of record was used to identify when these conditions were present (Table 101).

Table 101: Dates minimum snow depths are achieved at SNOTEL sites based on the historical record.

District	Beginning of the Season		End of the Season	
	12 Inches	18 Inches	12 Inches	18 Inches
Clarks Fork, North Zone Proposed Dates: November 1 to May 1	November 1 (most years)	December 1 (all years)	May 31 (all years)	May 31 (most years)
Wind River, South Zone Proposed Dates: November 1 to June 15	November 15 (most years)	December 1 (almost all years)	June 15 (all years)	June 15 (most years)
Washakie, South Zone Proposed Dates: December 1 to May 31	December 15 (most years)	January 1 (all years)	May 1 (most years), May 15 (some years), May 31 (very few years)	May 1 (some years), May 31 (no years)

3.9.3.2.1.2.1 Context & Intensity

Based on current literature, it is likely that there would be a chemical deposition contribution from OSVs along the 299 miles of established trail, and detectable increases in snowpack chemistry will occur during part or all of the winter season. No evidence presently exists to indicate that these concentrations will shift water chemistry (water quality) outside of established regulatory standards. (Switalski, 2016) (Musselman

& Korfmacher, Air quality at a snowmobile staging area and snow chemistry on and off trail in a Rocky Mountain subalpine forest, Snowy Range, Wyoming, 2007)

Snow depth necessary to protect both critical water resources and all water resources may not be achieved by the opening dates on the Wind River and Washakie Districts and may not be sustained to the end of season date on the Washakie District. Based on this data, a reasonable conclusion is that there may be effects to water resources. When these circumstances occur, Responsible Officials will retain authority to apply closures to protect resources. Observational data regarding resource conditions in OSV use areas within the existing condition suggests that dates alone do not influence OSV use periods and that associated effects during low snow periods may be negligible due to limited use.

3.9.3.2.1.2.2 Conclusion

SNOTEL site data indicate suitable date ranges based on past years snowfall. There is no guarantee, however, that snow depths will occur on the proposed dates in future years. However, when using these dates as a reference point, the open dates proposed for the North Zone are reasonable. The beginning of the season dates for the South Zone Wind River and Washakie Districts may need to be adjusted to the middle of the proposed months, as well as to an earlier end of season date on the Washakie District. Additionally, while minimization criteria are necessary for protecting water resources, the observational data from the existing condition implies that a recreational seasonal snow depth requirement doesn't drive OSV use periods but instead by snow depths sufficient for vehicle capabilities and their maintenance.

Effects from OSV use are negligible for water quality, and based on SNOTEL data for the established dates for critical water resources and all other water resources, effects are possible if use occurs. This effect isn't quantifiable by either degree or magnitude with the currently available information.

3.9.3.3 Environmental Consequences of Alternative 3

3.9.3.3.1 Direct and Indirect Effects of Alternative 3

3.9.3.3.1.1 Issue 1:

Watershed condition as defined by road density shows no severity changes in density, and there is an improvement in one watershed for proximity to water. This shift is from poor to fair and remains within a potentially severe threshold.

Water quality risk is determined by increases or decreases in sediment delivery. Three watersheds increased by more than 5 but less than 10 tons/year and two by more than 10 but less than 50 tons/year. The proposed changes also benefited some watersheds: four decreasing by more than 10 but less than 50 tons, and one by more than 50 but less than 100 tons/year.

Critical water resources were both converted to and from a category listed as a potentially severe threshold. Three watersheds that were listed as Fair shifted to Poor, increasing in risk and remaining in a potentially severe risk threshold. Eight watersheds showed a benefit with six shifting out of a potentially severe threshold.

Flood zone improvements within critical thresholds occurred in one watershed (i.e., Sweetwater Creek) on the North Zone.

3.9.3.3.1.1.1 Context & Intensity

When considering the combined effect of all the indicators for water resources, the rule set for the numeric equivalent of potentially severe effects as risk was applied (Tables 3-5). Those watersheds that scored less than or equal to -3 are considered to have the highest degree of risk or potential to cause water resource impairment while those greater than or equal to a (+3) have the greatest potential for water resource improvement.

- Greatest Potential for Risk: There are no watersheds that have a combined rating of (-3) or more.
- Greatest Potential for Benefit: Sweetwater Ck, Upper North Fork Shoshone Rvr, Bear Ck, and Upper Sunlight Ck.
- Designated Water Resource: Sweetwater Ck and Upper North Fork Shoshone Rvr.

Three of the 70 watersheds with a composite baseline condition indicating “potentially severe risk” are within the potentially severe composite score for effects from the alternative and cumulatively decrease risk to: Upper North Fork Shoshone Rvr, Bear Ck, and Upper Sunlight Ck.

Direct and indirect effects realized as an actual condition would indicate persistent long-term improvement of water resources within the identified watersheds due to the NFS route system.

3.9.3.3.1.1.2 Conclusion

Assuming that BMPs are appropriately applied across the NFS route system, the effects to water resources will be negligible and in many instances improve watershed condition.

3.9.3.3.1.2 Issue 2:

The proposal and associated effects are the same as the No Action Alternative.

3.9.3.4 Cumulative Effects Common to All Alternatives

Past, present, and reasonably foreseeable future actions or conditions that may have an effect on the issues and associated indicators for water resources include (1) decommissioning of unauthorized routes and (2) changing climactic conditions (Table 102).

Table 102: Direct and indirect cumulative effects to water resources.

	Direct	Indirect
Watershed Condition (hydrologic connectivity)	(1) Reduced percentage of routes in proximity to a stream and total road density per watershed. (2) Increase in runoff timing, peak, and duration that increases the flood zone.	(1) Reduced hydrologic connectivity. (2) Increased potential for hydrologic connectivity for routes in proximity to a stream.
Water Quality	(1) Miles of routes removed from a watershed (2) Increase in shoulder season precipitation.	(1) Reduction in total sediment delivery to streams per watershed. (2) Increase in probability for sediment delivery to streams.
Critical Water Resources	(1) Reduced percentage of routes in proximity to a critical water resource.	(1) Decreased risk for critical water resource loss.

	Direct	Indirect
Loss of Floodplain Function	(1) Miles of unauthorized routes removed from floodplains. (2) Increase in runoff timing, peak, and duration that increases the flood zone.	(1) Increased floodplain function. (2) Increase in hydrologic connectivity.
Impacts to Water Resources	(2) Change in snowpack conditions and persistence.	(2) Decreased ability to protect resources with the identified winter season of use.

Unauthorized routes constitute those not on the designated NFS system for wheeled vehicle use. These routes exist on the landscape but were not included as part of the effects to the existing condition or action alternatives. Their presence contributes to the overall risk to water resources. The future decommissioning of these routes allows the landscape to revegetate and return to pre-disturbance conditions. The effects of the recovered condition would result in decreased hydrologic connectivity and sediment delivery to streams, remove risk to critical water resources, and improve floodplain function.

Changing climactic conditions are expected in the future and have the potential to affect water resources in both summer and winter seasons. The current science shows that in the near-term, projections indicate that winter precipitation may increase snowpack, but under future climate scenarios, snowfall is shown to shift to rainfall at progressively higher elevations. (Rice, Tredennick, & and Joyce, 2012) When considering over-snow travel in nearby Yellowstone National Park, research suggests that the change in the amount of snow may not be as severe as the decline in the length of the snow season. (Tercek & Rodman, 2016) The shift in the number of days with adequate snow is most likely to be realized on the shoulder seasons when more rain and less snow is expected to occur. (Halofsky, et al., 2018)

One of the most critical factors for protecting water resources from OSV use is related to snow depth. Based on the science, it's likely that the season of use may need to shift in conjunction with snowpacks. Shifts away from minimum snow depths have the potential to result in a decreased ability to protect water resources.

Changes in climate that cause shifting precipitation, temperature, and snowpack timing have the potential to increase the vulnerability of roads and associated infrastructure to flooding resulting from higher peak flows and flood frequency. The ability to adapt to the effects of these climatic shifts is increased by maintaining floodplain function and associated riparian areas, increasing the size of infrastructure, improving road drainage, and relocating vulnerable road segments that are within proximity of water resources. (Halofsky, et al., 2018) If climactic shifts are realized, increases in hydrologic connectivity, sediment delivery, risk to critical water resources, and floodplain function are likely. Best management practices identified through the minimization criteria will need to be adaptable to the increased magnitude and frequency of effects in order to protect water resources.

3.9.4 Consistency with Relevant Laws, Regulations, and Policy

The Shoshone National Forest Plan (2015) provides direction to protect and manage resources. The selected alternative will be subject to those standards and guides as well as applicable state and federal regulations, orders, and laws. Consistency with the Forest Plan will require continued monitoring and responsive actions when necessary. Where necessary, regulatory permits will be acquired prior to the implementation of any proposed change to the motorized system. Provided that the assumptions for effects are correct and that within the Alternatives 2 and 3 that BMPs and minimization criteria are implemented fully and are effective, there is consistency with relevant laws, regulations, and policy.

3.9.4.1 Land and Resource Management Plan

The Shoshone National Forest Land and Resource Management Plan provides standards and guidelines for water resources.

3.9.4.1.1 *Pertinent Forest Plan Goals*

- Restore and maintain healthy watersheds, including wetlands, riparian areas, and floodplains. (S&W-GOAL-01)
- Disturbed areas resulting from management activities or infrastructure are disconnected from streams, lakes, and wetlands. (S&W-GOAL-02)

3.9.4.1.2 *Pertinent Forest Plan Standard or Guideline*

Implement appropriate watershed conservation practices to protect soil, aquatic, and riparian systems as contained in Forest Service Handbook 2509.25 Watershed Conservation Practices Handbook. (S&W-STAND-01)

3.9.4.1.3 *Special Area Designations*

Management Area 5.2 – Public water supply - water quality emphasis directs this area to be “managed for multiple uses with an emphasis on the protection or improvement of water quality” by doing the following:

- Manage for an adopted recreation opportunity spectrum class of semi-primitive motorized to roaded natural. (MA5.2-GUIDE-04)
- Promptly restore disturbed areas contributing to water quality degradation. (MA5.2-GUIDE-01)

The management approach for this area is to produce high quality water while supporting multiple uses provided that activities protect water quality.

3.9.4.2 Other Relevant Law, Regulation, or Policy

3.9.4.2.1 *Clean Water Act*

The Clean Water Act (CWA) is the primary federal law in the United States governing water pollution. The principal body of law currently in effect is based on the Federal Water Pollution Control Amendments of 1972, which significantly expanded and strengthened earlier legislation. Major amendments were enacted in the Clean Water Act of 1977 and the Water Quality Act of 1987. The CWA regulates discharges of pollutants from point sources through a permitting system. Nonpoint source pollution is controlled through the use of national best management practices (BMPs). (USDA Forest Service, 2006) Regulatory control of the CWA is at the Federal, State, and local levels

3.9.4.2.2 *Executive Orders (EO)*

3.9.4.2.2.1 Executive Order 11988, Floodplain Management

EO 11988 requires federal agencies to avoid to the extent possible long- and short-term adverse impacts from 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 flood plains in carrying out its responsibilities” for the following actions: (1) acquiring, managing, and disposing of federal lands and facilities; (2) providing federally undertaken, financed, or assisted construction and improvements; and (3) conducting federal activities and programs affecting land use, including water and related land resources planning, regulation, and licensing activities.

3.9.4.2.2 Executive Order 11990, Protection of Wetlands

The purpose of EO 11990 is to “minimize the destruction, loss or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands.” To meet these objectives, it requires federal agencies, when planning actions, to consider alternatives to wetland sites and to limit potential damage if an activity affecting a wetland cannot be avoided. The EO applies to acquisition, management, and disposition of federal lands and facilities construction and improvement projects that are undertaken, financed, or assisted by federal agencies. It also applies to federal activities and programs affecting land use, including water and related land resources planning, regulation, and licensing activities.

3.9.4.2.3 FSM 2500: Watershed and Air Management

Provides direction for air and watershed management on NFS lands. Specific chapters related to water resources are FSM 2520 (Watershed Protection and Management), and FSM 2530 (Water Resource Management).

3.9.4.2.4 FSH 2509.25: Watershed Conservation Practices Handbook, R2 Supplement (2509.25-2006-1)

Incorporates interim directive information, direction related to watersheds conservation practices, and other guidance related to watershed conservation practices.

3.9.5 Conclusion

In order to compare an overall assessment of risk for all alternatives, the effects by watershed were rated using the same mechanism as the No Action (existing condition). The effects were translated to an existing potentially severe threshold (Table 97 to Table 99) and the associated numeric rating was assigned. On a risk scale of (0) to (-7), the average scores show the most risk with Alternative 1 and the least risk with Alternative 2 (Table 103). However, the magnitude of these effects is not fully realized where indicator ratings were already in the highest risk category. Specific watersheds of concern are noted in the table. The proposed actions should be carefully considered for these specific watersheds, and localized opportunities should be prioritized in order to decrease the potential risk.

Table 103: Potentially high severity effects (as risk) for all watersheds across the Forest.

Rating	Alternative 1	Alternative 2	Alternative 3
Wheeled Vehicle Use Cumulative Rating	-3.1	-2.7	-2.9

Rating	Alternative 1	Alternative 2	Alternative 3
Wheeled Vehicle Use Magnitude of Effect and Watersheds of Concern – unrecognized based on changes to Water Quality within categories or exceeding the highest risk categories	n/a	Potential increase of 986 tons of sediment per year delivered to streams with the greatest concern for magnitude of change in: Long Creek, Middle Wiggins Fork C, South Fork Warm Springs Ck, and Lower Warm Springs Ck C	Potential decrease of 75 tons of sediment per year delivered to streams.
OSV Use	minor and localized	minor and localized	minor and localized

3.10 Invasive Plants and Noxious Weeds

3.10.1 Introduction

An invasive plant is a non-native plant whose introduction does or is likely to cause economic or environmental harm or harm to human health (Executive Order 13122). Invasive plants are distinguished from other non-native plants in their ability to spread (invade) into native ecosystems and displace native plants. Some species of invasive plants are listed by the Secretary of Agriculture or by responsible state officials as “noxious weeds.” This analysis includes all noxious weeds listed by the State of Wyoming plus other invasive species that are of concern because of their impacts to ecosystem health. The term “invasive plants” more broadly encompasses all invasive, aggressive, or harmful non-indigenous plant species, whether designated noxious or not.

3.10.1.1 Issues Addressed

Issue 1: Whether wheeled vehicle use under Alternatives 1, 2, and 3 will have resource impacts due to increased invasive plant spread on the Shoshone National Forest.

3.10.2 Methodology

This section includes a description of the methods and data used in this analysis. The primary means of assessing impacts to resources from invasive plants associated with wheeled vehicle use was to examine miles existing of NFSRs and NFSTs and compare the change in mileage between alternatives via Geographic Information Systems analysis. All wheeled vehicle use and ground disturbing activities have the potential to introduce invasive plant species.

OSV use is not expected to have direct impacts on resources with respect to invasive plant species introduction and spread.

The SNF does not have route-specific information on the level of use occurring on NFS routes. If this information was available, it could bolster the analysis of the potential for invasive plant species introduction. Without this information, analysis of intensity is limited to the quantity of NFSRs and NFSTs where wheeled vehicle use occurs. The SNF maintains GIS records of invasive plant treatment history, but records are far from an all-inclusive representation of invasive plant populations. This analysis incorporates applicable records, but, again, the records were of limited utility. Soil seed bank and plant propagule transport vectors are also critical components of invasive plant spread, but much more difficult to analyze, predict and quantify.

3.10.2.1 Resource Indicators and Measures

Table 104: Resource condition indicators and measures for assessing effects related to invasive plants and noxious weeds

Issue	Indicator or Measure	Source
Reduce resource impacts	Reduce adverse impacts from invasive plant and aquatic species.	Forest Plan INVS-GOAL-01
Reducing invasive plant species spread	The distribution of Dalmatian toadflax, leafy spurge, cheatgrass, and oxeye daisy is reduced or eradicated where possible.	Forest Plan INVS-GOAL-03
Measures to prevent establishment and minimize spread of invasive plant species	Contracted and other authorized management activities incorporate measures to prevent the establishment, and minimize the spread of invasive species.	Forest Plan INVS-STAND-04

3.10.3 Environmental Consequences

Research has shown that vehicular routes are primary pathways for plant invasions into arid and semi-arid ecosystems (reviewed in Brooks and Lair 2005), such as the Shoshone National Forest. Vehicles serve as dispersal vectors for alien plant propagules (Clifford 1959) and disturbances within vehicular route corridors facilitate establishment of invasive plants. (Greenberg et al. 1997) OHVs caked in mud acquired elsewhere potentially introduce or disperse seeds of non-native and invasive species; thus, OHV-route margins often become populated with non-native and invasive plants that eventually may spread and outcompete native plant species at the landscape level. (Ouren et al. 2007) One study found that vehicles driven several feet through a spotted knapweed infestation can accumulate more than 2,000 seeds, with ten percent of the seeds remaining on the vehicle ten miles from the infestation site. (Sheley and Petroff 1999) Lonsdale and Lane (1994) demonstrated that tourist vehicles are moving weed seeds around and into Kakadu National Park in Australia. And an early study by Clifford (1959) suggests that small-seeded species have a better chance of dispersal by incorporation in the mud beneath vehicles than large-seed species, and that season of year might determine the range and frequency of species.

Roads and trails create edge habitats, resulting in a variety of effects, including changes in vegetation and encroachment of non-native and invasive plant species. (Ouren et al. 2007) Parendes and Jones (2000) found non-native species were more frequent along high-use and low-use roads than on abandoned roads or along streams. Roads enhance non-native species invasion in the landscape by acting as corridors or vectors for dispersal, providing suitable habitats, and containing reservoirs or propagules for future episodes of invasion. Tyser and Worley (1992) described alien flora in nine fescue grassland study sites adjacent to three types of transportation corridors—primary roads, secondary roads, and backcountry trails—in Glacier National park, Montana. That study found that roadsides are especially vulnerable to colonization by alien flora and that they then function as sites of prolific seed production. (Tyser and Worley, 1992)

Gelbard and Belnap (2003) concluded that paved and improved surface roads have more invasive plants than gravel roads for four-wheel drive tracks in Utah’s Canyonlands National Park. As roads are improved, the verges adjacent to them tend to become wider and to contain an increasing cover of exotic plant species. The study determined that the process of constructing paved roads disturbed more land (23 feet on each side of the road) than the two-track road (3 feet on each side of the road). A similar study in Glacier National park found spotted knapweed and yellow toadflax along primary and secondary road but not along backcountry (non-motorized) trails. Also, weed abundance was higher within the first 25 meters than at 100 meters, suggesting that the roads were the primary source for weed dispersal.

Brooks and Lair (2005) provide examples of the typical pattern of plant invasions in the Mojave Desert. First, new invaders appear along roadsides near their adjacent regions of origin. In some cases, invaders may “island hop” into the region by establishing first in urbanized or agricultural regions, then moving outward along roadsides into less developed areas. Once within the region, invaders are pre-positioned to begin the second phase of invasion: the spread away from roadsides into wildland areas. The initial stages of spread away from vehicular routes occur within landscape features (e.g., washes or north facing hill slopes) or microsites (e.g., beneath perennial shrubs) where soil moisture levels are locally high. Disturbed areas adjacent to roadsides are also more readily invaded such as utility corridors, areas with high OHV use, or burned areas away from roads.

Soil compaction also increases the potential for invasive, non-native annuals and other early successional plants to establish rapidly in OHV routes, whereas native perennials may require at least five years to establish. (Ouren et al. 2007) Davidson and Fox (1974) found significant loss of herbaceous vegetation in areas disturbed by motorcycle activity, and that non-native, early-successional species, such as redstem stork’s bill (*Eroidium cicutarium*), were common at sites disturbed by off-road motorcycle activity.

3.10.3.1 Environmental Consequences of Common to All Alternatives

This section discloses the environmental impacts common to all alternatives. All alternatives have similar effects with respect to invasive plant populations. The ability to access the Forest on wheeled vehicles via NFSRs and NFSTs increases the potential of introducing and spreading invasive plant species.

As discussed earlier, vehicles serve as dispersal vectors for alien plant propagules (Clifford 1959) and disturbances within vehicular route corridors facilitate establishment of invasive plants (Greenberg et al. 1997). Within areas open for wheeled vehicle use for dispersed camping, it is reasonable to assume that existing invasive plant infestations will continue to expand into disturbed areas, and new populations are likely to become established from seeds and plant propagules carried into these areas by vehicles. OHVs have a higher potential for spreading seeds and propagules than passenger vehicles due to the low stature and multiple areas of the under carriage of these vehicles that can harbor invasive plant seed and propagules. Trails open to OHVs are considered higher risk vectors for invasive plant introduction and spread.

Table 105: Comparison of Mileage of Motorized Routes Across Alternatives

Motorized Route Mileage	Alternative 1	Alternative 2	Alternative 3
Miles of roads open to public use	883	732	718
Miles of motorized trails open to public use	36	198	195

(Note: Miles rounded to nearest 1 mile.)

A component of the NFSR is the administrative and closed road network. These components are not anticipated to contribute to the spread of invasive and noxious plants within the Forest. First, use of these NFSRs is intermittent and infrequent, and decrease in frequency of use correlates to a decrease in potential for spread. Second, use associated with management activities must comply with Forest Plan standard INVS-STAND-04, which states: “Contracted and other authorized management activities

incorporate measures to prevent the establishment, and minimize the spread, of invasive species.” These measures apply to use on administrative and open roads. And specific measures to achieve these goals include washing trail construction equipment prior to entering the Forest and prior to moving to a new location on the Forest (as well as ensuring that all gravel, straw and fill material are either certified weed-free or come from a weed-free inspected source). These measures would be adopted and applied across the alternatives, with the intent of addressing potential vectors and minimizing spread of invasive plant species. Analysis of impacts associated with the alternatives incorporates, therefore, these measures into the assessment. Because the administrative and closed network is subject to sporadic use that incorporates appropriate mitigation measures, impacts from use of this network with respect to noxious and invasive plants are not anticipated. The analysis of impacts focuses, therefore, on the open motorized route system.

OSV use will have minimal to no significant impacts with respect to invasive plant populations.

3.10.3.2 Environmental Consequences of Alternative 1

3.10.3.2.1 Direct and Indirect Effects of Alternative 1

The direct (same time and place) and indirect (occurs later in time or further in space) impacts of Alternative 1, the no-action alternative, involve potential increases to invasive plant populations from motorized use. Continued herbicide treatments are recommended under this alternative.

3.10.3.3 Environmental Consequences of Alternative 2

This section discloses the environmental impacts of Alternative 2. For the most part, impacts associated with Alternative 2 resemble those analyzed under Alternative 1. The analysis below addresses those impacts under Alternative 2 that differ from Alternative 1.

3.10.3.3.1 Direct and Indirect Effects of the Proposed Action

Alternative 2 would decrease NFSRs open to the public by 149 miles, which would decrease the likelihood of invasive plant introduction and spread. Alternative 2 simultaneously increases NFST miles by 167 miles, which is likely to increase the potential for invasive plant introduction and spread. The conversion of NFSRs to NFSTs provides more opportunities for OHV-use through the Forest, with attendant increase in potential for invasive plant migration. Educating user groups, regular inspections, and NFST monitoring are discrete activities that can mitigate the potential increase. Alternative 2 would likely create conditions that would result in a net increase of potential for invasive plant colonization and infestation, though the measures identified above could mitigate this increase.

3.10.3.3.2 Cumulative Effects of Alternative 2

Additional ground disturbing activities such as vegetation management (which involves the use of roads and temporary roads) may increase motorized use. Enforcement of strict requirements (Forest Plan INVS-STAND-04) for activities associated with ground disturbing activities will reduce the cumulative effects related to invasive plant introduction and spread. Generally, increased motorized routes associated with these activities create vectors of high spread through which invasive plants can be introduced from anywhere that a vehicle or OHV previously traveled and spread rapidly. Mitigation actions taken with respect to the NFS route system, as well as related activities, will likely minimize any effects related to invasive plant increase across the Forest.

3.10.3.4 Environmental Consequences of Alternative 3

This section discloses the environmental impacts of Alternative 3.

3.10.3.4.1 Direct and Indirect Effects of Alternative 3

Alternative 3 would slightly decrease NFSRs available to the public compared to Alternative 2 (decrease of 15 miles) and Alternative 1 (decrease of 164 miles). Alternative 3 increases NFST miles by 158 miles. Both Alternative 2 and 3 consist of measures that increase the potential for invasive plant introduction and spread. The conversion of NFSRs to NFSTs provide more opportunities for OHV use through the Forest, with attendant increase in potential invasive plant migration. Educating user groups, regular inspections, and motorized trail monitoring are discrete activities that can mitigate the potential increase.

3.10.3.4.2 Cumulative Effects of Alternative 3

The cumulative effects of Alternative 3 are expected to be the similar to those analyzed for Alternative 2.

3.10.4 Consistency with Relevant Laws, Regulations, and Policy

3.10.4.1 Land and Resource Management Plan

The Shoshone National Forest Land and Resource Management Plan (Forest Plan) provides goals, standards, and guidelines for invasive species, as well as broad management direction. Relevant to motorized travel on the Forest, the management direction to apply herbicide to OHVs is the primary consideration for consistency. A secondary consideration is outreach and education of users. The alternatives proposed are expected to be consistent with these management recommendations. Nothing shall constrain the Forest from revising discrete travel management proposals and activities to effectuate accomplishing this goal.

3.10.4.2 Other Relevant Law, Regulation, or Policy

Organic Administration Act of 1897 (16 U.S.C. § 475) – This law defines original National Forest purposes to improve and protect the forest, secure favorable conditions of water flows, and furnish a continuous supply of timber.

Sustained Yield Forest Management Act of 1944 (16 U.S.C. § 583) – This law ties the goal of sustained yield to maintaining water supply, regulating stream flow, preventing soil erosion, and preserving wildlife.

Granger-Thye Act of 1950 (16 U.S.C. § 5801) – This law authorizes issuance of grazing permits having terms that preserve land and resources from erosion and flood damage. The Forest Service may reduce livestock numbers and cancel grazing permits if land is overgrazed.

Watershed Protection and Flood Prevention Act of 1954 (16 U.S.C. § 1001) – This law authorizes watershed improvement works to prevent floods, conserve ground water recharge and water quality, and protect aquatic life.

Multiple Use-Sustained Yield Act of 1960 (16 U.S.C. § 528) – This law amplifies National Forest purposes to include watershed, wildlife and fish, outdoor recreation, range, and timber. Renewable surface resources are to be managed for multiple use and sustained yield of the several products and services they provide.

Federal Noxious Weed Act, Public Law 93-629 (7 U.S.C. 2801 et seq.) - 88 Stat. 2148), enacted January 3, 1975, established a Federal program to control the spread of noxious weeds. The Secretary of Agriculture was given the authority to designate plants as noxious weeds by regulation, and the movement of all such weeds in interstate or foreign commerce was prohibited except under permit. The Secretary was also given authority to inspect, seize and destroy products, and to quarantine areas, if necessary to prevent the spread of such weeds. He was also authorized to cooperate with other Federal, State and local agencies, farmers associations and private individuals in measures to control, eradicate, or prevent or retard the spread of such weeds.

Noxious Weed Control and Eradication Act, Public Law 108-412 (Oct 30, 2004); amends the Plant Protection Act- (a) In General.--The Secretary shall establish a program to provide financial and technical assistance to control or eradicate noxious weeds. (b) Grants.--Subject to the availability of appropriations under section 457(a), the Secretary shall make grants under section 454 to weed management entities for the control or eradication of noxious weeds. (c) Agreements.--Subject to the availability of appropriations under section 457(b), the Secretary shall enter into agreements under section 455 with weed management entities to provide financial and technical assistance for the control or eradication of noxious weeds.

Public Lands Corps Healthy Forests Restoration Act, Public Law 109-154 (Dec 30, 2005); amends the Public Lands Corps Act of 1993 - (C) To address the impact of insect or disease infestations or other damaging agents on forest and rangeland health.

Section 6006 of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users, Public Law 109-59 (Aug 10, 2005); implementing 23 U.S.C. § 329, a new provision of law added to Title 23 by §6006 of SAFETEA-LU - Includes a provision that makes activities for the control of noxious weeds and the establishment of native species eligible for Federal-aid funds under the National Highway System (NHS) and the Surface Transportation System (STP). The control of terrestrial noxious weeds and aquatic weeds is commonly done by maintenance districts or contracted crews of each State department of transportation. Historically, maintenance activities have been the responsibility of the State and therefore have not been eligible for Federal-aid dollars.

Plant Protection Act, Public Law 106-224(Jun 20, 2000); Replaces the Federal Noxious Weed Act and many other APHIS Plant Protection Authorities- Consolidates and modernizes all major statutes pertaining to plant protection and quarantine (Federal Noxious Weed Act, Plant Quarantine Act) Permit APHIS to address all types of weed issues. Increase maximum civil penalty for violation. Authorize APHIS to take both emergency and extraordinary emergency actions to address incursions of noxious weeds

Executive Order 13112 (Feb 1999) - Defines invasive species ("an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health"). Directs all federal agencies to:1. Address invasive species concerns 2. Refrain from actions likely to increase invasive species problems. Creates interagency Invasive Species Council. Calls for National Invasive Species Management Plan to better coordinate federal agency efforts

Alien Species Prevention and Enforcement Act (1992), Public Law 102-393 (Oct 6, 1992) - Plants and animals whose shipment is prohibited under 18 U.S.C. 42; 43, or the Lacey Act. Plants or plant matter whose shipment is prohibited under the Federal Plant Pest Act or Plant Quarantine Act. Makes illegal the shipment of certain categories of plants and animals through U.S. mail

Federal Insecticide, Fungicide, and Rodenticide Act (1947) (7 USC §136 et seq.) - Gives EPA authority to regulate importation and distribution of substances, including organisms, that are intended to function as pesticides

Federal Seed Act (1940; amended 1998), (7 USC §1551 et seq.) -Requires accurate labeling and purity standards for seeds in commerce and prohibits importation and movement of adulterated or misbranded seeds.

Carlson-Foley Act (1968), Title 43 USC §1241 (Public Law 90-583)- To provide for the control of noxious plants on land under the control or jurisdiction of the Federal Government.

Clean Water Act of 1977 (33 U.S.C. §§ 1251 et seq.) – This series of laws was written to restore and maintain the chemical, physical, and biological integrity of the Nation’s waters. States have authority over water rights. The Forest Service must comply with federal, state, and local water quality laws and rules, coordinate actions that affect water quality with States, and control nonpoint source pollution.

Public Rangelands Improvement Act of 1978 (43 U.S.C. § 1903) – This law directs that range condition and productivity be improved to protect watershed function, soil, water, and fish habitat.

3.10.5 Conclusion

All alternatives pose potential impacts to vegetation communities, range, livestock grazing, and forage production. Increased NFS routes create highly effective spread vectors through which invasive plants can be introduced from anywhere that a vehicle or OHV previously traveled. Enforcement of standards (e.g., Forest Plan INVS-STAND-04) for activities associated with ground disturbing activities will help reduce the effects related to invasive plant introduction and spread. Other impacts will likely be indirect to water and soil resources which are analyzed in other sections of this document. Continued integrated weed management actions, which include early detection/rapid response, inventory, herbicide treatments and efficacy monitoring, will be essential to curtail the spread of invasive plant populations. Active management of noxious weed and invasive plants at the forest-level, including by aerial herbicide application both inside and outside of wilderness areas, would further address the spread and ensure motorized use on the Forest is not a vector for such species.

3.11 Range

3.11.1 Introduction

The Shoshone National Forest (SNF) manages livestock grazing as one of many multiple-use activities occurring on the National Forest. Livestock grazing has been determined by the Forest Plan to be an appropriate use of the project area based in part on the Forest Plan suitability determination.

3.11.1.1 Issues Addressed

Issue 1: Whether wheeled vehicle use under Alternatives 1, 2, and 3 will have resource impacts to range resources on the Shoshone National Forest.

3.11.2 Methodology

This section includes a description of the methods and data used in this analysis. The primary means of assessing impacts to range resources from wheeled vehicle use was to examine miles of NFSRs and NFSTs within grazing allotment boundaries via Geographic Information System analysis. The data layer of range allotments serves as a proxy for range use. And though this data may be incomplete and not reflect current conditions on the ground, it offers the best available data by which to consider these impacts. (Additionally, soils and hydrology analyses offer information relevant to range resources and are analyzed separately. These other resources support the rangeland capacity of allotments within the SNF for livestock grazing.) It was determined that structural improvement proximity to NFSRs and NFSTs would not be analyzed because impacts to range resources have not been an issue in the past.

OSV use is not expected to have direct impacts on range resources. Insofar as this use has indirect effects upon range resources, those effects are analyzed directly with respect to soil and hydrology resources.

The SNF does not have route-specific information on the level of use occurring on NFS routes. If this information was available, it could help inform the analysis of intensity of impacts on livestock grazing. Without this information, analysis of intensity is limited to the quantity of motorized roads and trails themselves.

3.11.2.1 Resource Indicators and Measures

Table 106. Resource condition indicators and measures for assessing effects

Issue	Indicator or Measure	Source
Forage Production	Provide a sustainable supply of forage that helps achieve other resource desired conditions on NFS lands and supports ranching in local communities.	Forest Plan GRAZ-GOAL-01
Rangeland Conditions	Rangeland conditions are maintained or improved over time (qualitative)	Forest Plan GRAZ-GOAL-02
Maintaining Forage Production	Average annual permitted animal unit months will range between plus or minus 10 percent of 60,000 animal unit months	Forest Plan GRAZ-OBJ-01

3.11.3 Environmental Consequences

Permits to graze livestock on the Forest are issued for a ten-year period on specific portions of the project area, known as grazing allotments (see Table 107). There are 93 allotments totaling approximately 1.2 million acres. All allotments on the SNF are permitted for cattle and horse except three allotments: two on the southern tip of the forest, which are permitted for sheep, and one allotment in non-use, which is permitted for bison.

Table 107: Grazing Allotments on the Shoshone NF

Allotment Name	Area Acres
Clarks Fork Ranger District	
Bald Ridge	23,392

Basin	73,124
Bench	28,748
Reef Creek	11,450
Face of the Mountain	8,559
Ghost Creek	11,367
Lake Creek	19,816
Little Rock	4,901
Table Mountain	13,896
North Bennett Creek	6,310
Bennett Creek	6,684
Burnt Mountain	4,415
Deep Creek	3,791
Line Creek West	5,138
Little Rock Creek	3,495
Peat Beds	5,844
Stockade	4,910
Crandall II	18,641
Pat Ohara on/off	1,990
Greybull Ranger District	
Deer Creek	4,417
Dick Creek	10,961
Gooseberry Creek	9,919
Greybull	36,494
Guard Station	7,042
Carter Mountain	2,411
Kirwin	21,784
Pickett Creek	15,543
Rennerberg	1,348
Sage Creek on/off	919

Sugarloaf/Three Peaks	1,971
Timber Creek	10,009
Cottonwood	7,717
Sugarloaf	9,332
Francs Peak	19,163
Twin Peaks	4,820
Washakie Needles	7,773
Piney	14,292
Swing	6,186
Aspen Creek	2,092
Meeteetse	3,678
Washakie Ranger District	
Bayer Mountain	5,265
Dickinson Park	22,139
Ed Young Basin	11,327
Frye Lake	20,533
Hays Park	8,670
Maxon Basin	5,841
Meadow Creek	1,351
Middle Fork	27,408
Sawmill	9,379
South Pass	6,944
Squaw Creek	6,916
Pine/Willow	18,294
Slate Creek	7,544
Beaver Creek	1,333
Atlantic City	1,008
Wapiti Ranger District	
Belknap	11,307

Big Creek	18,993
Bobcat	6,577
Community	14,980
North Fork Winter Range	4,540
Rand Creek	1,588
Hardpan/Table Mountain	15,212
Hunter Creek	1,688
Ishawooa Hills	1,470
Logan Mountain	12,470
Pearson	12,279
Rattlesnake	4,451
Rock Creek	16,883
Trout Creek	21,050
Valley/Boulder	3,370
Carter Creek on/off	601
Bull Creek on/off	1,172
Wind River Ranger District	
Doby Cliff	803
Dunoir	53,335
Fish Lake	13,334
Horse Creek	28,253
Parque Creek	13,430
Ramshorn	16,213
Union Pass	48,028
Warm Springs	17,028
Whiskey Mountain	12,424
Wiggins Fork	59,957
Wind River	45,020
Bear Creek	19,500

Salt Creek	10,088
Special Use Allotment	
Brooks Lake	
Crow Creek	
Goff Creek	
Grinnell Creek	
K-Z	
Libby Creek	
Name It Creek	
Triangle C	

Each allotment is managed to achieve on-the-ground resource conditions called desired conditions. Structural range improvements distribute livestock between allotment pastures to facilitate the achievement of these desired conditions. Examples of structural range improvements include managing water sources and fencing areas.

3.11.3.1 Environmental Consequences of Common to All Alternatives

This section discloses the environmental impacts common to all alternatives. All alternatives will have very similar impacts to livestock grazing and forage production. The ability to access the Forest via NFSRs and NFSTs facilitates access for grazing permittees to manage livestock operations. Management activities may include conducting livestock gathers, maintaining structural range improvements, and salt/mineral placement. Grazing permittees are considered authorized users and will continue to have access to their allotments and structural range improvements which will not change through all alternative. No changes in stocking levels would occur under any alternatives.

Table 108: Assessment of NFS Routes Open to Use by Alternative¹

	Alternative 1	Alternative 2	Alternative 3
Miles ² of NFS routes	988	1005	992

¹ Includes Routes Open for Administrative Use; does not include ML 1 roads placed in storage.

² Miles rounded to nearest 1 mile.

Motorized users accessing grazing allotments could disturb livestock due to their presence or noise and could diminish resource conditions that support livestock grazing, such as the trampling of vegetation. OSV travel will have minimal to no impacts on rangelands or forage production.

3.11.3.2 Environmental Consequences of Alternative 1

3.11.3.2.1 Direct and Indirect Effects of Alternative 1

The direct (same time and place) and indirect (occurs later in time or further in space) impacts of Alternative 1, the no-action alternative, involve potentially minor negative impacts to range resources from wheeled vehicle use and access to range resources to support management activities.

Existing impacts on livestock grazing from NFS routes would continue under Alternative 1. These impacts include disruption of livestock behavior, tampering with structural range improvements, and impacts of resource conditions such as forage production that support livestock grazing on the SNF. Instances of all impacts are minimal.

Access to range resources would correspond to existing use under Alternative 1. Permittees would continue to have access to allotments along existing routes for management of their grazing operations and maintenance of structural range improvements.

3.11.3.3 Environmental Consequences of Alternative 2

This section discloses the environmental impacts of Alternative 2. For the most part, impacts associated with Alternative 2 resemble those analyzed under Alternative 1. The analysis below addresses those impacts under Alternative 2 that differ from Alternative 1.

3.11.3.3.1 Direct and Indirect Effects of the Proposed Action

Alternative 2 would increase NFS routes in allotments by 17 miles, which could increase the impact of wheeled vehicle use on livestock grazing management within the Forest. Resource conditions supporting livestock grazing may decrease with the increase in motorized routes, though any impact is expected to be minimal.

Proposal NZ-01 within Alternative 2 would add an additional motorized loop off of Line Creek in elk parturition grounds on the Forest and adjacent to private ranch lands. This proposal is in a brucellosis Designated Monitoring Area. Additional OHV traffic along this route could increase the likelihood of displacing elk onto private lands during the calving season. The displacement could facilitate interaction between elk and local cattle herds and, thereby, increase the potential for transmission of brucellosis. Alternative 2, and particularly this proposal within Alternative 2, has a higher potential than Alternative 1 to impact negatively local ranchers and Wyoming's Brucellosis Free Designation.

3.11.3.3.2 Cumulative Effects of Alternative 2

Alternative 2 is not expected to have any adverse effects to range resources within the Forest when considering cumulative effects from other actions. Additional ground disturbing activities such as vegetation management (which involves the use of roads and temporary roads) may increase motorized use. The impacts to range resources from this use is likely minimal. Similarly, invasive plant species spread, since other cumulative effects topical areas take steps to minimize and address this issue (e.g., timber management activities incorporating mitigation measures to decrease the spread of invasive plants). Increased human presence from motorized use may lead to more incidents of vandalism to range improvements and livestock harassment or displacement—though no incidents have yet been identified or reported. Any of these factors could result in resource issues with changes in cattle dispersal causing cattle concentrations and forage overutilization. These effects are likely to be minimal. Special use permits

or mineral development activities that result in permanent ground disturbances would reduce available forage for livestock.

3.11.3.4 Environmental Consequences of Alternative 3

This section discloses the environmental impacts of alternative 3.

3.11.3.4.1 *Direct and Indirect Effects of Alternative 3*

Alternative 3 would slightly increase NFS routes available to the public in allotments (increase of 4 miles) when compared with Alternative 1, the no action alternative. The increased motorized routes could result in a slight increase in the number of visitors to the SNF and attendant impacts on livestock grazing management. Resource conditions supporting livestock grazing could decrease slightly with the increase in motorized routes and impacts on livestock grazing management could increase with increased visitor use.

3.11.3.4.2 *Cumulative Effects of Alternative 3*

The cumulative effects of alternative 3 are expected to be the similar to those analyzed for alternative 2.

3.11.4 Consistency with Relevant Laws, Regulations, and Policy

3.11.4.1 Land and Resource Management Plan

The Shoshone National Forest Land and Resource Management Plan (forest plan) provides goals, standards, and guidelines for Range. The goal and objectives relevant to Range with respect to travel management is Forest Plan GRAZ-GOAL-01 & 02 and GRAZ-OBJ-01. The alternatives are expected to be consistent with these Goals. And nothing shall constrain the Forest from revising discrete travel management proposals and activities to effectuate accomplishing this goal.

3.11.4.2 Other Relevant Law, Regulation, or Policy

3.11.4.2.1 *Federal Law*

Granger-Thye Act of 1950 (16 U.S.C. § 5801) – This law authorizes issuance of grazing permits having terms that preserve land and resources from erosion and flood damage. The Forest Service may reduce livestock numbers and cancel grazing permits if land is overgrazed.

Public Rangelands Improvement Act of 1978 (43 U.S.C. § 1903) – This law directs that range condition and productivity be improved to protect watershed function, soil, water, and fish habitat.

3.11.4.2.2 *Other Authorities*

FSM 2200: Range Management – Provides guidance on the administration of range management on National Forest System lands.

FSM 2200: Range Management, R2 Supplement (2200-2005-1) Regional supplement, which adds responsibilities of the regional forester and forest supervisor with regard to rangeland analyses.

3.11.5 Conclusion

All alternatives have minimal impacts to range, livestock grazing, and forage production. The risk of brucellosis transmission to domestic cattle based on the proposal NZ-01 under Alternative 2 remains a concern. Other impacts will likely be indirect to water, soil resources and the introduction of invasive species, which are analyzed in other sections of this document.

3.12 Cultural Resources

3.12.1 Introduction

The Shoshone National Forest (SNF) Heritage Program manages the cultural resources of the Forest to prevent loss or damage before those resources can be evaluated for scientific study, interpretive efforts, or other appropriate uses. This management direction requires projects or management actions to be implemented in a manner that avoids adverse effects on historic properties. Where a proposed activity would result in impacts to historic properties, the proposal should anticipate that treatment of the property will conform to sound preservation practice and be consistent with all applicable preservation laws and standards. Project planning should ensure that the essential form and integrity of historic properties is not impaired.

The National Historic Preservation Act section 301 (16 U.S.C. § 470w) defines an “undertaking” as a

project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a Federal agency, including A) those carried out by or on behalf of the agency; B) those carried out with Federal financial assistance; C) those requiring a Federal permit, license or approval; and D) those subject to State or local regulation administered pursuant to a delegation or approval by a federal agency.

When an “undertaking” is proposed on the Forest, the Forest Archaeologist participates in its planning and in the analysis of potential effects. This participation consists of 1) review of historical materials, archival documents, and overviews relevant to the project area; 2) analysis of the nature of the project and its potential to affect cultural resources; 3) review of public concerns regarding the project and its potential effect; and 4) consultation with interested Tribes, Heritage interest groups, and the Wyoming State Historic Preservation Offices (WY SHPO). In the process, the Forest Archaeologist determines the undertaking’s “area of potential effect” (APE) based on the geographic area in which a project or management decision may alter the character or use of any existing historic properties.

The undertaking categories are as follows:

- construction of a new road (NFSR) or trail (NFST)
- authorization of wheeled motor vehicle use on an NFS route currently closed to vehicles
- formal recognition of an unauthorized route as a designated NFS route open to wheeled vehicles
- closures of an NFS route currently open to wheeled vehicle use (under the Travel Management Planning Project, no proposed road closures would be implemented on the ground). Any NFSR proposed for closure would not be designated as open to wheeled vehicle use on the MVUM. There would be no ground disturbance and therefore no potential to affect historic properties. If

and when physical closures (gates, berms, etc.) are proposed, Ranger Districts would determine the method of closure in site-specific NEPA projects and required NHPA consultation would be handled with a separate Section 106 report.

For cultural resource purposes, the analysis area for the Travel Management Planning Project comprises all SNF lands potentially affected by actions falling within the above categories. The APE for the road, trail, or area includes corridors or zones adjacent to the road, trail, or area that the Forest determines to be subject to indirect effects due to local environmental factors or the proximity of particularly sensitive resources. This area includes the road, trail or area surfaces; passing or parking areas; and campsites or other features established as part of the road or trail. The existing NFSRs and NFSTs open to wheeled vehicle travel, which include dispersed camping corridors up to 300 feet wide, generally do not need to be reevaluated for the purposes of this decision. Their designation on the MVUM is not generally considered an undertaking for the purposes of NHPA, and not subject to Section 106 review.

The SNF, along with all other Region 2 Wyoming National Forests, currently manages these resources under a programmatic agreement with the WY SHPO for NHPA compliance (*Programmatic Agreement Among the U.S.D.A. Forest Service, Wyoming Forests, Wyoming State Historic Preservation Office, and Advisory Council on Historic Preservation Regarding Compliance with the National Historic Preservation Act on the National Forest and Grasslands of Wyoming* (Region 2 Agreement # 09-MU-11020000-003). Travel Management Appendix J was compiled and ratified to the existing Programmatic Agreement in 2016. This appendix clearly defines protocol for survey, reporting and consultation of Travel Management activities in Wyoming Forests.

Under the direction of Forest Service Policy for NHPA Compliance in Travel Management, the SNF will adhere to the terms of this programmatic agreement when authorizing motor vehicle use on new roads, trails, and areas. If a proposed activity has a potential for adverse effects that cannot be avoided, appropriate design features are developed in accordance with 36 C.F.R. § 800.5. As examples, impacts of travel management may require closures to wheeled vehicle use on NFSR or NFST segments adjacent to culturally sensitive sites, or limitations on the width of dispersed camping access corridors to protect archaeological resources. Where a project has the potential to impact a property of Tribal concern, the Forest Service will consult with Tribal representatives to develop appropriate project design features.

3.12.1.1 Issues Addressed

This section includes issues pertaining to Cultural Resources that have been identified for analysis. "An issue is a statement of cause and effect linking environmental effects to actions" (FSH 1909.15).

Issue 1: Whether and to what extent wheeled vehicle use proposed under the alternatives will affect cultural resources and implicate management requirements under the National Historic Preservation Act.

3.12.2 Methodology

3.12.2.1 Wheeled Vehicle Use

This analysis utilizes a qualitative assessment to determine impacts from wheeled vehicle use upon cultural resources of the Forest. Under the guidance provided in Forest Service Policy for National Historic Preservation Act (NHPA) Compliance in Travel Management: Designated Routes for Motor Vehicle Use, prepared by the Forest Service in consultation with the Advisory Council on Historic Preservation, only certain elements of the 2005 Travel Management Rule are to be considered undertakings with potential to

affect historic properties. Therefore, it is only these undertakings which require evaluation under NHPA Section 106 and 36 C.F.R. part 800.

The analysis employs three guiding benchmarks to determine impacts. First are issue indicators. These criteria indicate impacts on cultural resources by considering the number of known resources within an Area of Potential Effects (APE) along the routes. Inputs of this analysis include:

- The extent of surface disturbance and the potential for affecting known or unknown cultural resources, or areas of importance to Native American or other communities
- Increased access to or activity in areas where resources are present or anticipated, potentially associated with overuse, vandalism, or unauthorized collecting
- The extent to which the route use affects the potential for erosion or other natural processes that could affect cultural resources
- The extent to which the route facilitates or reduces the availability of cultural resources for appropriate uses, including interpretation, and access to Native American spiritual sites or traditional resource gathering areas
- Closures or restrictions to protect other resources that could provide direct and indirect protection of cultural resources from disturbance and from incompatible and unauthorized activities
- Effects on the setting (such as visual and audible factors) where it is relevant to certain cultural resources

The second are general assumptions incorporated into the analysis. These assumptions guide the assessment with respect to resource specific impacts. And they include the following:

- The SNF would continue to comply with NHPA when addressing federal undertakings, including changes to travel management and route designations; therefore, adverse effects on historic properties would be resolved and impacts on cultural resources would be appropriately mitigated.
- Baseline information is limited to previously recorded resources and past inventories that were provided in GIS layers.
- No surveys were conducted as part of this analysis. Any proposed new NFS routes will require surveys at the implementation stage.
- No predictive modeling was conducted in this analysis.

The third and final benchmark involves subsequent field work to address data gaps and ensure accurate field information relevant to ground disturbance. Because this assessment is qualitative, no consultations or site significant evaluations have occurred. These future activities are especially vital given the importance of the associations that Native American and other communities have to SNF lands. For Native Americans, the Forest contains ancestral lands, significant ancestral sites, sacred areas, and resource collection areas associated with ongoing use or traditions. The SNF will address these concerns by:

- Conducting site-specific inventory, evaluation, and resolution of effects on cultural resources, as appropriate to meet the requirements of the NHPA.
- Consulting with Native American communities on a site-specific basis.

3.12.2.2 OSV Use

During winter months, many, if not all, cultural resources are snow-covered. Additionally, NFSRs and NFSTs which may be utilized to access cultural resources may also be snow-covered, limiting their use by the public. Therefore, there are likely to be negligible effects to cultural resources from OSV use, and associated impacts are not further analyzed.

3.12.2.3 Resource Indicators and Measures

Table 109: Resource condition indicators and measures for assessing effects

Issue	Indicator or Measure	Source
Avoiding adverse effects	Adverse effects to historic properties from trail or road maintenance or construction are avoided or mitigated.	Forest Plan Standard HERT-STAND-08

3.12.3 Environmental Consequences

This section briefly describes and summarizes the prehistoric and historic cultural context of the area. This area is transitional to several cultural historical chronologies. It is situated near the Wyoming Basin, Great Plains, and Rocky Mountain culture areas in the prehistoric cultural sub-area known as the Northwestern Plains. The Northwestern Plains stretch from central Alberta to southern Wyoming and from western North Dakota to western Montana.

Past use has resulted in extensive cultural resources on the Forest. Cultural resources refer to the material remains used and modified by prehistoric or historic-age peoples. The Forest’s archaeological record provides information on human occupation and use going back at least 11,000 years. Prehistoric archaeological sites within the Forest include wooden sheep traps, wooden conical lodges, tipi rings or stone circles, stone alignments, cairns, rock art, and artifact scatters with chipped stone and steatite (soapstone) artifacts, trade beads, metal artifacts, bone fragments and ceramics. Historic artifacts and historic structures range from ranching, logging, homesteading, and mining with all of the associated materials utilized for these activities and structure types. Beyond just the ravages of time, these cultural resources are non-renewable and are threatened by a variety of forces and circumstances.

The project area has not been surveyed in its entirety; the proposed undertaking would therefore require a phased process in the area of potential effect (APE) to conduct identification and evaluation efforts, pursuant to 36 C.F.R. § 800.4(b)(2) and phased application of criteria of adverse effect at 36 C.F.R. § 800.5(a)(3). Because the potential effects of these undertakings cannot be fully determined before the ROD is signed, the Forest is utilizing Appendix J – Travel Management Analysis of the Programmatic Agreement Among the U.S.D.A. Forest Service, Wyoming Forests, Wyoming State Historic Preservation Office, and Advisory Council on Historic Preservation Regarding Compliance with the National Historic Preservation Act on the National Forest and Grasslands of Wyoming (Region 2 Agreement # 09-MU-11020000-003) to identify the phased identification and effect evaluation for historic properties. Surveys, inventories, and consultation with the WY SHPO will be completed prior to developing any new NFS

routes for wheeled vehicle use or conducting route decommissioning activities that involve ground disturbance.

3.12.3.1 Environmental Consequences Common to All Alternatives

This section discloses the environmental impacts consistent across all alternatives. Particularized and discrete impacts traceable to a distinct alternative are addressed under that alternative.

3.12.3.1.1 *Direct and Indirect Effects Common to All Alternatives*

Travel and travel-related activities within NFS routes, corridors, and areas have the potential to affect cultural resource sites through direct surface disturbance, erosion, looting, vandalism, and changes in access and setting.

Vehicular travel has the potential to affect cultural resource sites both directly and indirectly. Vehicles such as automobiles, light trucks, motorcycles, and ATVs/UTVs are all of a sufficient weight to damage or displace artifacts on the surface of sites, and damage surficial architectural elements and other features. Vehicular travel can also remove vegetation from a site surface, accelerating sheet-wash erosion and initiating channel erosion. Vehicles can displace surface sediments and damage subsurface archaeological deposits when sediments are soft or wet (rutting), and in other instances contribute to surface compaction.

Existing NFS routes may have experienced significant surface disruption (either rutting or compaction, or both) due to vehicular traffic, and function as active water erosion channels. Surface damage to sites located on these NFSRs or NFSTs may have already occurred. Generally, there is limited potential that substantial further direct damage to cultural resource sites will occur from the continued existing use or designation of existing system routes.

There is more potential for impacts in areas where there would be new or anticipated intensive use, or near camping and parking locations if cultural resources are present. Dispersed camping can cause accidental and intentional surficial and subsurface damage to cultural resource sites. Vehicular and foot traffic associated with the use of camping areas can remove vegetation, accelerating erosion. Activities associated with camping that may affect cultural resources also can include surface and subsurface disturbance to prepare campsites and fire pits; removal of wood, stone, and other materials from cultural sites; off-road and off-trail vehicular use; unauthorized artifact collecting; and other forms of vandalism.

Changes in public access or activity in areas where cultural resources are present or anticipated can affect the potential for impacts from overuse, vandalism, or unauthorized collecting. Likewise, there may be impacts from increased traffic and noise in areas where Native American tribes require solitude or privacy during ceremonies or when visiting sacred sites. An increase in human presence can also intrude on settings that may be important to Native Americans. Generally, restrictions, seasonal restrictions, or subtractions of roads or trails from public use would reduce the potential for impacts on cultural resources, if access is maintained for Native American traditional uses.

3.12.3.2 Environmental Consequences of Alternative 1

This section discloses the environmental impacts of not taking action.

3.12.3.2.1 Direct and Indirect Effects of No Action

The existing effects of NFSRs and NFSTs on cultural resources are described in Section 3.11.3. Because there is no federal action, there is no undertaking, consistent with 36 C.F.R. § 800.16(y) and Section 106 of the National Historic Preservation Act. This alternative is also consistent with the Forest Plan, since no new construction is proposed.

3.12.3.3 Environmental Consequences Common to Alternatives 2 and 3

This section discloses the impacts to cultural resources under Alternatives 2 and 3.

3.12.3.3.1 Direct and Indirect Effects of Alternative 2 and 3

The potential for impact and the types of impacts on cultural resources that would be anticipated are similar to those described under Environmental Consequences Common to All Alternatives. Along existing NFS routes there would be limited potential for substantial further direct damage to cultural resource sites. Reductions in the miles of routes that are open would reduce the potential for impacts on known cultural resources within these routes from surface disturbance, erosion, looting, vandalism, and changes in access and setting. Substantial seasonal restrictions would further reduce the potential for impacts, if access is maintained for Native American traditional uses.

This alternative proposes new NFSRs, including a number of administrative and closed ML 1 NFSRs across the Forest. Prior to construction, new NFS routes require surveys, reporting, and consultation as outlined in Appendix J: Travel Management Activities in the Region 2 Programmatic Agreement (#09-MU-11020000-003) between the Wyoming R2 Forests and the Wyoming State Historic Preservation Office.

3.12.3.3.2 Cumulative Effects of Alternatives 2 and 3

Cultural resources are nonrenewable. Archaeological resources will continue to be lost through both natural and human causes. Although efforts have been made to locate cultural resources in the project area, it is possible that there are undiscovered cultural resources that may be affected by project activities.

The accumulated loss of individual cultural resources has the potential to limit the Forest's ability to understand broad patterns of human history and local historical events. Over time, fewer cultural resources would be available for study and interpretation. Although individual cultural resources in the form of isolated occurrences may be impacted by the proposed activities, these resources are not considered to be significant; this is because none are eligible for listing on the NRHP.

The potential for impact varies by alternative. Alternative 1 would maintain the current level of potential for impacts. Alternatives 2 and 3 would continue motorized use at a similar level as under Alternative 1, and the potential for impacts would not change substantially; therefore, contributions to cumulative impacts on cultural resources from the changes to the forest system route designations are not anticipated.

3.12.4 Consistency with Relevant Laws, Regulations, and Policy

3.12.4.1 Land and Resource Management Plan

The 2015 National Forest Land and Resource Management Plan (forest plan) provides standards and guidelines for cultural resources.

3.12.4.1.1 *Pertinent Forest Plan Standard or Guideline*

HERT-GOAL-01: A Forest-wide goal to “Protect heritage resources from human activities, wildfire and other natural disturbances.” The alternatives proposed would not hinder the Forest’s intent to work toward this goal.

HERT-STAND-08: A Forest-wide standard stating that “Adverse effects to historic properties from trail or road maintenance or construction are avoided or mitigated.” Protection of heritage resources will continue and future actions that may affect these resources are subject to mitigation activities that ensure compliance.

3.12.4.2 Other Relevant Law, Regulation, or Policy

The primary legislation governing modern cultural resource management is the National Historic Preservation Act of 1966 (amended in 1976, 1980, and 1992). All other cultural resource management laws and regulations support, clarify, or expand on the National Historic Preservation Act. Federal Regulations 36 C.F.R. § 800 (Protection of Historic Properties), 36 C.F.R. § 63 (Determination of Eligibility to the National Register of Historic Places), 36 C.F.R. § 296 (Protection of Archaeological Resources), and Forest Service Manual 2360 provide the basis of specific Forest Service cultural resource management practices. These laws and regulations guide the Forest Service in identifying, evaluating, and protecting cultural resources on National Forest System lands. The Forest Service is required to consider the effects of agency actions on cultural resources that are determined eligible for the National Register of Historic Places (NRHP) or on those resources not yet evaluated for eligibility. Guidelines and standards for the preservation of archaeological and historic properties are additional important elements of federal agencies’ stewardship of cultural resources on public lands.

Several other laws address various aspects of cultural resource management on the National Forests, including the National Environmental Policy Act of 1969, the National Forest Management Act of 1976, the Antiquities Act of 1906, the Historic Sites Act of 1935, and the Archaeological Resource Protection Act (ARPA) of 1979, as amended in 1988. ARPA and two other regulatory acts describe the role of Tribes in the federal decision-making process, including heritage management. ARPA requires Tribal notification and consultation regarding permitted removal of artifacts from federal lands. The Native American Graves Protection and Repatriation Act of 1990 (NAGPRA) recognizes Tribal control of human remains and certain cultural objects on public lands, and requires consultation prior to their removal. The American Indian Religious Freedom Act of 1978 (AIRFA) requires federal agencies to consider the impact of their actions on traditional Tribal cultural sites. The National Historic Preservation Act (NHPA) also specifically calls for Tribal participation in the NHPA Section 106 consultation process. Forest Service Manual 2360 provides direction regarding both SHPO and Tribal consultation.

3.12.4.3 Consultation Practices

3.12.4.3.1 *Advisory Council on Historic Preservation*

Pursuant to 36 C.F.R. § 800.14(b), a programmatic agreement is used for historic properties located in the State of Wyoming as an alternative means of compliance with the National Historic Preservation Act’s implementing regulations. That agreement outlines the Forest Service’s intent to complete NRHP evaluations prior to project implementation for all cultural sites located in the Wyoming area of potential effect whose NRHP significance remains undetermined (USDA Forest Service 2010a). This consultation will occur for triggering projects proposed under the selected alternative.

3.12.4.3.2 State Historic Preservation Office

The NRHP implementing regulations identify the SHPO as one of several primary consulting parties when federally authorized or federally funded undertakings have the potential to affect cultural resources (36 CFR §800.2(c)). Similarly, Section 2361.21 of the USDA Forest Service Manual (USDA Forest Service 2008e) states that the agency official shall consult with the SHPO when:

1. Seeking review and comments for forest and grassland projects and programs in accordance with NHPA Section 106.
2. Seeking a consensus determination of National Register eligibility for cultural resources in accordance with NHPA Section 106.

The cultural resources analysis for this project involves lands located in the state of Wyoming. The Forest consultation process with the Wyoming SHPO falls under a programmatic agreement, under which the Forest has agreed to complete NRHP evaluations prior to project implementation for all unevaluated cultural sites located in the area of potential effect.

3.12.4.3.3 Tribal Consultation

The NRHP implementing regulations identify American Indian tribes as a as one of several primary consulting parties when federally authorized or federally funded undertakings have the potential to affect cultural resources (36 C.F.R. § 800.2(c)). Similarly, section 2361.22 of the Forest Service Manual states that the agency official shall consult with Indian tribes in recognition of their government-to-government relationship.

Section 101(d)(2) of the NHPA establishes criteria for designating Tribal Historic Preservation Officers to assume the functions of a State Historic Preservation Officer on Tribal lands.

Executive Order 13007, *Indian Sacred Sites*, issued May 24, 1996, directs Federal land management agencies, to the extent permitted by law, and not clearly inconsistent with essential agency functions, to accommodate access to and use of Indian sacred sites, to avoid affecting the physical integrity of such sites wherever possible, and, where appropriate, to maintain the confidentiality of sacred sites. Federal agencies are required to establish a process to assure that affected Indian tribes are provided reasonable notice of proposed Federal actions or policies that may affect Indian sacred sites.

Executive Order 13175, *Consultation and Coordination with Indian Tribal Governments*, issued November 6, 2000, directs Federal agencies to establish regular and meaningful consultation and collaboration with tribal officials in the development of Federal policies that have tribal implications, to strengthen the United States government-to-government relationships with Indian tribes, and to reduce the imposition of unfunded mandates upon Indian tribes. Public Law (P.L.) 108-199 and 108-477 added language that directed the Office of Management and Budget and all Federal agencies to consult with Alaska Natives and Alaska Native Corporations on the same basis as Indian tribes under Executive Order 13175.

The Shoshone National Forest regularly consults with tribal governments regarding projects authorized under the NHPA and the NEPA. Eleven different tribes from seven states have expressed traditional cultural, spiritual, or geographical interests in the Shoshone National Forest in the past. Each tribe will be sent a copy of the Shoshone National Forest Travel Management Plan Preliminary Environmental Assessment contemporaneous with its publication, with an invitation to comment and a Forest Service contact.

3.12.5 Conclusion

Effects to cultural resources are expected to be consistent across the alternatives, and future ground disturbing activities will necessitate further consultation to ensure cultural resources are protected and potential impacts are minimized.

3.13 Air Quality

3.13.1 Introduction

Federal Land Managers are charged with protecting the natural and cultural resources in Class I wilderness areas from the adverse impacts of air pollution and have an affirmative responsibility to protect air quality related values (AQRVs), including visibility, from deterioration. (U.S. Forest Service, National Park Service, and U.S. Fish and Wildlife Service, 2010) Class I areas are defined as wilderness areas that were designated before August 7, 1977, and are larger than 5,000 acres. There are three on the Shoshone: The North Absaroka Wilderness, the Washakie Wilderness, and the Fitzpatrick Wilderness (map available at <http://www.fs.fed.us/air/wy.htm>). All other wilderness areas managed by Federal land managers are designated Class II: the Absaroka-Beartooth and Popo Agie Wildernesses.

Pollutants in the air can impact visibility, and the deposition of these pollutants onto landscapes can negatively affect ecosystem function over time. In Class I areas, the primary concerns for air pollution are visibility impairment, ozone effects on vegetation, and effects of pollutant deposition on soils and surface waters. AQRVs at risk from these threats include flora, fauna, odor, water, soils, geologic features and cultural resources. Often the AQRVs are difficult to measure, and surrogates such as species or processes are used to indicate biological, physical, or chemical change. (U.S. Forest Service, National Park Service, and U.S. Fish and Wildlife Service, 2010) (US Forest Service) AQRVs for the Class I areas on the Shoshone are surface waters and visibility. The Forest Service conducts pollution impact monitoring for precipitation chemistry, snowpack chemistry, lake water chemistry, and visibility in order to understand these AQRVs.

The Clean Air Act requires the Environmental Protection Agency (EPA) to set standards for air pollutants to protect the public health and welfare. The standards, known as National Ambient Air Quality Standards (NAAQS), limit the amount of these pollutants that can be present in the atmosphere anywhere in the United States. The EPA has set standards for six “criteria” air pollutants—ozone (O₃), particulate matter (PM), nitrogen dioxide (NO₂), sulfur dioxide (SO₂), lead (Pb), and carbon monoxide (CO). There are standards for two categories of particulate matter—one for suspended particles less than 10 micrometers in diameter (PM₁₀) and one for fine particles less than 2.5 micrometers in diameter (PM_{2.5}). Primary standards are designed to protect public health, while secondary standards are designed to protect public welfare (USDA Forest Service, 2014).

Areas that meet NAAQS are classified as being in attainment, while areas not meeting standards are classified as being in nonattainment. The EPA designated the Upper Green River Basin in Wyoming as a marginal nonattainment area for ozone. This nonattainment area includes all of Sublette County, and portions of Lincoln and Sweetwater counties. The eastern boundary of the nonattainment area runs along the Continental Divide at the western edge of the southern portion of the Shoshone. (WY DEQ) (US EPA, 2020) Approximately 9,700 acres of the nonattainment zone are on the Shoshone National Forest, and all but 829 acres are within wilderness. (USDA Forest Service, 2014)

3.13.1.1 Issues Addressed

This section includes issues pertaining to air quality that have been identified for detailed analysis.

Issue 1: Whether motorized routes and areas proposed under the alternatives, specifically the extent and location of motorized routes, may lead to air quality impacts.

3.13.2 Methodology

The assessment is based on the best available scientific information including peer reviewed journal articles, Forest Service publications, and state and federal statutes, laws, and regulations. The methodology for this analysis uses metrics to define effects from fugitive dust and vehicle emissions.

3.13.2.1 Data Sources

Data sources include the Shoshone National Forest geospatial library and associated road maintenance levels, road miles, and trail miles.

3.13.2.2 Fugitive Dust

Fugitive dust consists of lightweight soil particles, including silt and clay that become suspended in the air as a result of disturbance. Relative to roads, fugitive dust is a product of motor vehicle use on dry road surfaces that results in particulate matter suspended in the air. The quantity of dust emissions is linearly related to segment length and traffic volume but still varies based on the fraction of silt in the road surface materials (US EPA, 2018). The total miles of motorized use for trails and roads were compared by alternative.

3.13.2.2.1 General Assumptions:

- Fugitive dust is not applicable to OSV areas or trails.
- Fugitive dust is the major air pollutant from native-surface roads. Other pollutants from roads, such as trace metals and man-made chemicals may be attached to dust. Thus, the relative effects of the alternatives with regard to fugitive dust apply to trace metals and man-made chemicals.
- Pollutants such as smoke, ozone, and atmospheric deposition are not analyzed in the effects section. They either do not apply to the project or there is insufficient data to analyze them.
- Because of the information available, it is assumed that the designation of motorized routes does not translate to changes in numbers of motorized vehicles, just the location of use.
- Wind erosion contributes to dust; however, for this analysis only dust generated from roads as a direct result of motorized traffic is addressed.
- Road miles are used to represent comparisons between alternatives. The variability in road width was assumed similar enough that differences in dust would not be detectable.
- If potentially significant effects, for this analysis, are not identified outside of wilderness, it is assumed that there are also no detectable effects to the AQRVs in wilderness for either Class I or Class II areas.

- NFSTs designated open to all vehicles will be maintained as NFSRs consistent with Forest Service Handbook 7709.56.

3.13.2.2.2 *Data Limitations*

The amount of fugitive dust generated from NFSRs on Forest has not been quantified, nor is there sufficient data that documents the frequency or timing of travel that occurs on these roadways. In addition, the Forest does not have sufficient data associated with traffic numbers, vehicle weights, speeds used by motorized traffic, tire types, and other factors that are required to calculate fugitive dust emissions. Estimates of increases or decreases in potential air impacts created by fugitive dust generation are relative to corresponding increases and decreases in miles of NFSRs (by maintenance level (ML)) and NFSTs by alternative.

3.13.2.3 Vehicle Emissions

Vehicle emissions in the project area are most concentrated along federal and state highways. The Forest does not have jurisdiction on vehicle use levels or emissions in any of these concentrated motorized areas. The EPA has set standards for emissions of on-road and nonroad vehicles and engines to ensure compliance with the Clean Air Act. (US EPA, 2017) The effects analysis references relevant literature for OSV use in relation to air quality, and bases comparisons on miles of OSV trails. General statements are made regarding concentrated use areas such as parking and loading sites. (Musselman & Korfmacher, Air quality at a snowmobile staging area and snow chemistry on and off trail in a Rocky Mountain subalpine forest, Snowy Range, Wyoming, 2007)

3.13.2.3.1 *General Assumptions:*

- Wheeled vehicle uses and emissions in the project area are localized to NFSRs and NFSTs, with generally sufficient wind dispersion to avoid air quality concerns.
- OSV trails and areas have sufficient wind dispersion to avoid air quality concerns.
- If potentially significant effects, for this analysis, are not identified outside of wilderness then there are also no detectable effects to the AQRVs in wilderness for either Class I or Class II areas.

3.13.2.4 Relative Risk Analysis

This report uses a relative risk analysis to compare alternatives. Relative risk is considered the potential impact that can result from one action (alternative) measured against the potential impact that might result from a different action (alternative).

3.13.2.5 Resource Indicators and Measures

Indicators for air quality were selected that represent how a motorized route has the potential to impact this resource (Table 109). The thresholds used to evaluate significance were based on the potential to violate standards as established by the regulatory agencies, and the spatial extent of the analysis is Forest-wide as a whole because air does not follow boundaries and can come from local and long distance sources.

Table 110: Air Quality condition indicators and measures for assessing effects

Issue	Indicator or Measure	Source
Air Quality Impacts from Motorized Route Extent & Location	Miles of motorized NFSRs and NFSTs (<i>Quantitative</i>) and effects determination (<i>Qualitative</i>)	Air Emissions Factors & Quantification (US EPA, 2018) Relevant Literature Forest Plan (AIR-STAND-01, AIR-GUIDE-01; AIR-GUIDE-03)
	Direct Effects: Increase or decrease in fugitive dust. Indirect Effects: Change in visibility.	
Air Quality Impacts from Motorized Route Extent & Location	Winter: miles of designated OSV trail (<i>Quantitative</i>) and effects determination (<i>Qualitative</i>)	Emissions Standards Reference Guide (US EPA, 2017) Relevant Literature Forest Plan (AIR-STAND-01, AIR-GUIDE-01; AIR-GUIDE-03)
	Direct Effects: Increase or decrease in NAAQS. Indirect Effects: Increase or decrease in pollutant deposition to ecosystems.	

3.13.3 Environmental Consequences

The current wheeled NFS route system and OSV trail system miles are displayed below (Table 111 and Table 112); these tables show the differences in miles per alternative. The alternatives include minor differences that are difficult to differentiate with respect to the current analysis for Air resources. Because of this limited ability, the effects are discussed together.

A comparison of alternatives by miles shows an overall decrease in both Alternatives 2 and 3 for routes available for wheeled vehicle use and an increase in trails available for OSV use in Alternative 2.

Table 111: Wheeled Vehicle Use miles by alternative and categorized by NFSTs that are 50", 64", and single track (NFST), NFSTs that are Open to All (NFST Open to All), and all NFSRs by maintenance level (ML).

	Alternative 1	Alternative 2		Alternative 3	
	Miles	Miles	Change (from Alt. 1)	Miles	Change (from Alt. 1)
NFST	34.0	58.1	24.1	158.4	124.4
NFST Open to All	2.0	139.9	137.9	36.2	34.1
ML1	181.2	249.0	67.8	185.2	4.0
ML2	761.1	630.2	-130.9	603.7	-157.3
ML3	183.1	183.1	0.0	183.1	0.0
ML4	6.6	6.6	0.0	6.6	0.0
ML5	2.5	2.5	0.0	2.5	0.0
Total	1170.5	1269.2	98.9	1175.5	5.0

Table 112: Winter OSV trail miles by alternative.

	Miles	Change (from Alt. 1)
Alternative 1	288.8	--
Alternative 2	299.0	10.1
Alternative 3	288.8	--

3.13.3.1 Environmental Consequences for All Alternatives

3.13.3.1.1 Direct and Indirect Effects

The No Action alternative has the greatest number of miles for wheeled vehicle use and the same number of miles as Alternative 3 for OSV. Alternatives 2 and 3 have 8% and 0.4% more miles of NFS routes (NFSRs and NFSTs) than Alternative 1. There is an increase in miles for OSV trails in Alternative 2 that constitutes a 1% increase. Assuming that there is a linear relationship between miles of motorized routes and effects to both dust and vehicle emissions, Alternative 2 has the greatest impact to air quality for wheeled vehicle use with Alternatives 1 and 3 having the least impact. Alternative 2 also has the greatest impact for OSV vehicle emissions.

The impacts of road dust from unpaved roads is dependent on factors such as the amount of travel, size and speed of the vehicle, climatic conditions, and geology. On the Forest, road dust typically becomes an issue related to management activities when there is concentrated travel by large vehicles on unpaved roads. The amount of dust generated would be largely dependent upon the season of use, the amount of traffic, rainfall patterns, and materials selected for road construction. Dust issues would tend to be greatest where conditions are typically dry, and/or where roads are constructed from fine-grained materials and do not have a paved or gravel surface. Examples of these activities include timber management and oil and gas development, both of which require road access. These situations are remedied through project-specific mitigations such as dust abatement. Road dust is expected to be localized with short term impacts to particulate matter and visibility.

OSV recreation emissions include carbon monoxide, nitrogen oxides, and particulate matter. Overall air quality impacts of OSV recreation will not change measurably by alternative. The literature suggests that concentrated use areas for motorized use do increase emissions. This increase can exceed NAAQS for short durations of concentrated recreational use such as parking areas. There is also potential for increases in OSV recreation to increase air pollution along established trails. However, while there may be effects, they are not expected to exceed established regulatory standards. (Musselman & Korfmacher, Air quality at a snowmobile staging area and snow chemistry on and off trail in a Rocky Mountain subalpine forest, Snowy Range, Wyoming, 2007) Most of the effects of vehicle exhaust for both wheeled vehicle and OSV recreation are localized and temporary.

Within the Upper Green River Basin Nonattainment Area, all alternatives show OSV use allowed in the area outside of wilderness on the Wind River District. There are no existing or proposed roads or trails within this area. The data available do not suggest that the existing or proposed alternatives will have a detectable effect on the status of the air quality in this area.

3.13.3.1.2 *Cumulative Impacts Common to All Alternatives*

This cumulative impacts analysis considered the effects from past, ongoing, and reasonably foreseeable future activities that could cumulatively affect air quality when combined with effects described for each alternative. Emissions from these activities would contribute to the levels of pollutants already present in the atmosphere from other sources.

Air quality impacts are expected to increase with the growth of surrounding communities, industrial development, natural events, and use on the Forest. The primary activities that would have ongoing or future effects on air quality include smoke from wildfire, prescribed burning, residential wood-burning stoves, dust emissions arising from activities such as from driving unpaved NFS roads, increases in greenhouse gases from numerous sources that are changing regional climate patterns, emissions from nearby power plants and other industrial facilities, oil and gas development emissions, and increases in other emissions caused by increasing population trends. (USDA Forest Service, 2014)

With respect to effects on air quality, there is no substantial difference among the alternatives. None of the alternatives is likely to have a measurable adverse impact on air quality, compared to current conditions. The relative contribution of emissions from potential activities to the air pollution already occurring from other sources is expected to be small. Air quality in the Class I areas and airsheds is expected to remain in compliance with all State and Federal Clean Air Act standards.

3.13.4 Consistency with Relevant Laws, Regulations, and Policy

3.13.4.1 Land and Resource Management Plan

The Shoshone National Forest Land and Resource Management Plan (Forest Plan) provides standards and guidelines for Air Quality.

3.13.4.1.1 *Pertinent Forest Plan Goals*

- Air quality meets Clean Air Act and Wilderness Act requirements and Wyoming and national ambient air quality standards. (AIR-GOAL-01)
- Air quality is stable or improving in class I and class II Wilderness areas on the Shoshone. (AIR-GOAL-02)
- Air quality related values are not adversely impacted in class I and class II Wilderness areas. (AIR-GOAL-03)

3.13.4.1.2 *Pertinent Forest Plan Standard or Guideline*

- Meet State of Wyoming and Federal air quality standards and comply with local, State of Wyoming, and Federal air quality regulations and requirements. (AIR-STAND-01)
- Land management activities should not elevate air pollution concentrations to levels that cause decreasing air quality in class I or class II Wilderness areas on the Shoshone. (AIR-GUIDE-01)
- A general conformity analysis should be conducted for any new activities within the Upper Green River ozone nonattainment area. (AIR-GUIDE-03)

3.13.4.2 Other Relevant Law, Regulation, or Policy

3.13.4.2.1 *Forest Service Manual 2300 – Recreation, Wilderness, and Related Resource Management*

Specific policies are outlined in Section 2320.2 managing wilderness as one resource ensuring its character and values are dominant and enduring. Section 2323.6, Management of Air Resources states the objectives for managing air resources to protecting air quality in wilderness and its related values, including visibility with the policy stating the AQRVs should be defined, monitored, and protected.

3.13.4.2.2 *Forest Service Manual 2500 -- Watershed and Air Management –Chapter 2580 Air Resource Management*

The objectives are to protect air quality values within Class 1 areas, control and minimize air pollutant impacts from land management actions, and to cooperate with regulatory agencies to prevent significant adverse effects from air pollution and deposition on forest and rangeland resources.

3.13.4.2.3 *Federal Clean Air Act*

The 1970 Clean Air Act, as amended in 1977 and 1990 (42 U.S.C. §§ 7401 et seq.) provides the foundation for protections of clean air on Federal lands. The 1977 Clean Air Act amendments direct Federal land managers to “preserve, protect, and enhance the air quality” in 156 mandatory class I national parks and wilderness areas (42 U.S.C. §§ 7470 et seq.).

3.13.4.2.4 *The Wilderness Act (16 U.S.C. 1131-1136)*

The Wilderness Act of 1964 mandates that wilderness areas be preserved for wilderness character and managed preserve and protect natural wilderness conditions (16 U.S.C. §§ 1131-1136). The Wilderness Act requires wilderness areas (class I and II) to be administered “for the use of the American people in such manner as will leave them unimpaired for future use and enjoyment as wilderness.” While class II wilderness areas are protected by the Wilderness Act, class I areas have additional protections under the Clean Air Act. The Wilderness Act does not protect wilderness study areas or research natural areas.

3.13.4.2.5 *National Ambient Air Quality Standards (40 C.F.R. pt. 50)*

Under the Clean Air Act, national ambient air quality standards were established (40 C.F.R. pt. 50). National ambient air quality standards identified six criteria pollutants and established standards for each that must be met by state and Federal agencies and private industry with both primary and secondary standards.

3.13.4.2.6 *Regional Haze Rule (40 C.F.R. pt. 51)*

Haze is created when sunlight hits and is either absorbed or scattered by air pollution particles. EPA’s 1980 visibility rules (40 CFR §§ 51.301-307) were developed to protect mandatory class I areas from anthropogenic impairments attributable to a single or small group of sources. The Regional Haze regulations apply to all states, and require states to demonstrate reasonable progress for improving visibility in each class I area over a 60-year period (to 2064), during which visibility should be returned to natural conditions.

3.13.4.2.7 Conformity Determinations

The general conformity provisions of the Clean Air Act (section 176(c)) prohibits Federal agencies from taking any action within a non-attainment area that causes or contributes to a new or existing violation of the standards or delays the attainment of a standard.

3.13.4.2.8 State Implementation Plans

Each state is required under the Clean Air Act to have an EPA-approved state implementation plan (SIP) (section 110(a)(2)) which identifies a strategy to maintain or attain national ambient air quality standards (section 110(h)(1)). The State has the regulatory authority to implement and enforce air quality in Wyoming, at a standard equal to or more stringent than EPA Federal standards.

3.13.5 Conclusion

The decision regarding travel management and any cumulative impacts will not result in a significant contribution to air quality, as these impacts are short-term and localized. There are no unavoidable adverse or irreversible effects to air quality as a result of any alternative. All alternatives are in compliance with the Forest Plan, laws, regulations, and policies as they pertain to air quality.

3.14 Wildlife: Threatened and Endangered Species

3.14.1 Grizzly Bear (*Ursos arctos horribilis*)

3.14.1.1 Introduction

The Shoshone National Forest provides habitat for grizzly bears within the Greater Yellowstone Ecosystem grizzly bear population. The Yellowstone grizzly bear population has increased from an estimated 230-312 bears when listed in 1975 (Interagency Conservation Strategy Team 2016) to approximately 714 bears in 2018 (Haroldson et al. 2019). Similarly, the distribution of bears has nearly tripled in size during that same time period. (Bjornlie and Haroldson 2019) Currently, the entire Shoshone National Forest is within occupied grizzly bear habitat. (Bjornlie and Haroldson 2019) These bears are federally listed as threatened under the Endangered Species Act. The Forest manages activities, projects, and other actions that may affect grizzly bears consistent with federal law and a suite of decision-making tools. Directly applicable tools include the Land Management Plan: 2015 Revision for the Shoshone National Forest (Forest Plan 2015) and the 2016 Conservation Strategy for the Grizzly Bear in the Greater Yellowstone Ecosystem (Interagency Conservation Strategy Team 2016).

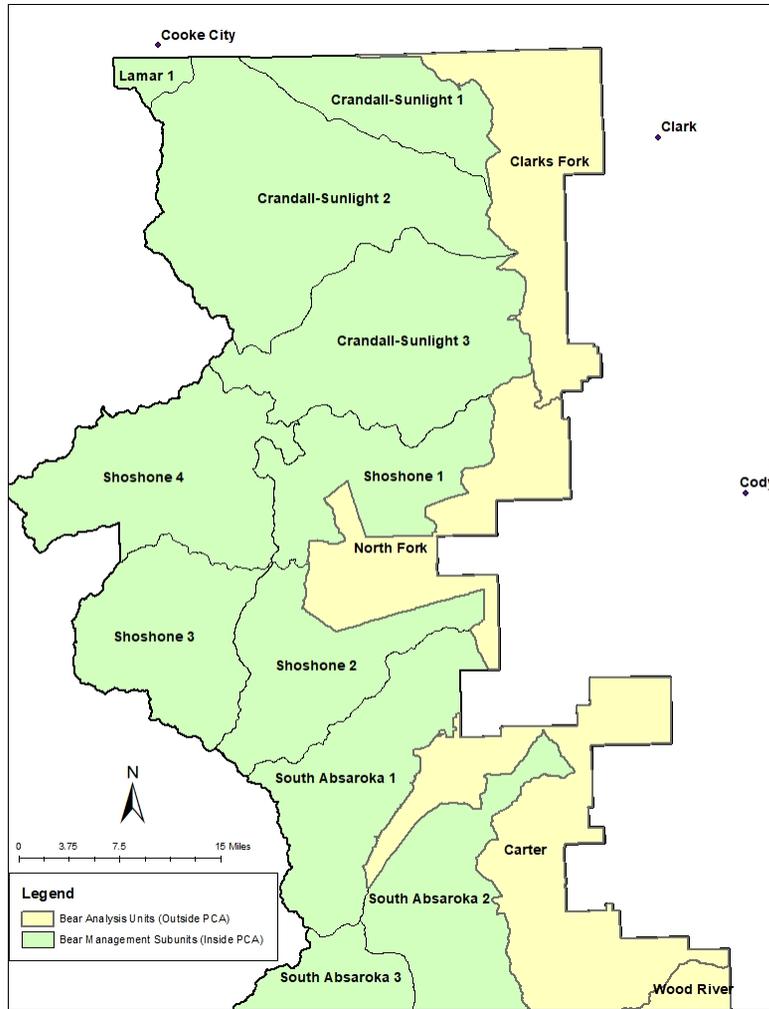


Figure 3: Bear Management Subunits (inside the Primary Conservation Area) and Bear Analysis Units (outside the Primary Conservation Area) within the northern portion of the Shoshone National Forest.

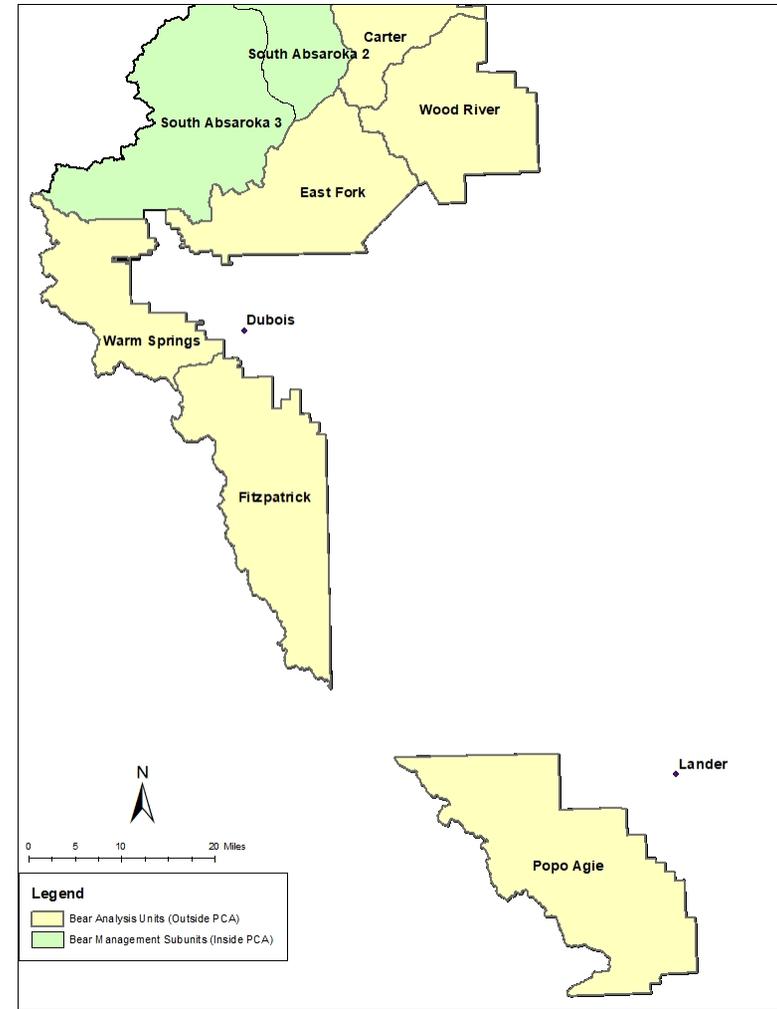


Figure 4: Bear Management Subunits (inside the Primary Conservation Area) and Bear Analysis Units (outside the Primary Conservation Area) within the southern portion of the Shoshone National Forest.

3.14.1.1.1 Issues Addressed

This section includes a description of the methods and data used in this analysis. The methods used to analyze effects differ for activities consistent with establishing the minimum road system needed (36 C.F.R. pt. 212, subpt. A, FSM 7710) and the roads and trails for motor vehicle use (36 C.F.R. pt. 212, subpt. B; FSM 7710), versus the trails and areas designated for OSV use (36 C.F.R. pt. 212, subpt. C; FSM 7710).

Issue 1: Whether and to what extent the Alternatives for wheeled vehicle use within the Shoshone National Forest will affect secure habitat for grizzly bears within the Primary Conservation Area during non-denning months.

Issue 2: Whether and to what extent the Alternatives for wheeled vehicle use within the Shoshone National Forest will affect secure habitat for grizzly bears outside the Primary Conservation Area during non-denning months.

Issue 3: Whether and to what extent the Alternatives for OSV use within the Shoshone National Forest will affect secure habitat for grizzly bears within and outside the Primary Conservation Area during denning months.

3.14.1.2 Methodology

3.14.1.2.1 Analysis of Roads and Trails for Motor Vehicle Use

The link between motorized access routes and grizzly bear mortality and habitat displacement is well-established. (Claar et al. 1999, Schwartz 2010a) Scientists developed the secure habitat metric to track, evaluate, and consider grizzly bear habitat throughout the Greater Yellowstone Ecosystem (GYE) in relation to road and motorized trail systems.

A GIS-based motorized access model estimates secure habitat for grizzly bears throughout National Forest and National Park units in the GYE, including the Shoshone National Forest. (Landenburger 2014) "Secure habitat" refers to contiguous areas at least 10 acres in size and more than 500 meters from an open or gated motorized access route (road or trail) or recurring low-level helicopter line during the March 1-November 30 non-denning period (Interagency Conservation Strategy Team 2016). When running the GIS model, a 500 meter buffer around NFSRs and NFSTs that are either open to or used by the public, or used by agency employees for administrative purposes, is withdrawn from secure habitat (roads and trails physically impassable to wheeled vehicles due to physical barriers including Kelly humps, dense vegetation regrowth, downfall, or road washouts do not decrease the secure habitat area in the model).

The Primary Conservation Area (PCA) was designated to ensure a recovered grizzly bear population is sustained in the GYE (Interagency Conservation Strategy Team 2016). The PCA is subdivided into Bear Management Subunits (BMSs) to analyze and monitor changes in habitat at a finer scale (Figures 1 and 2). In the Forest Plan, only one standard for management of grizzly bear habitat is relevant for travel management. Forest Plan standard TES-STAND-04 requires 1998 baseline levels of secure habitat to be maintained inside the PCA. The secure habitat standard (*i.e.*, comparison to the 1998 baseline) does not apply outside the PCA. Nonetheless, the Forest monitors secure habitat outside the PCA in areas termed Bear Analysis Units (BAUs). Changes in

secure habitat within and outside of the PCA are reported in the Interagency Grizzly Bear Study Team Annual Report.

This analysis reports 1998 baseline values for secure habitat of BMSs within the Forest. The Interagency Conservation Strategy Team selected this year as a baseline for the secure habitat standard inside the PCA because habitat conditions at that time represented those which sustained a growing grizzly bear population from 1983-2001 (Interagency Conservation Strategy Team 2016). Baseline values have not been estimated for BAUs outside the PCA, and therefore this analysis does not compare secure habitat values against a baseline for those areas.

Changes in motorized access routes (NFSRs and NFSTs), including both new motorized access routes and permanent closures of existing motorized routes, were evaluated by adding these changes to the motorized access database and running the model for each alternative and each BMS or BAU. To determine compliance with the Forest Plan secure habitat standard, model outputs of secure habitat values for BMSs inside the PCA were compared among all alternatives and with the 1998 baseline. Though the secure habitat standard does not apply outside the PCA in the BAUs, secure habitat values were estimated and compared among each alternative.

3.14.1.2.2 Analysis of Groomed and Ungroomed Trails and Areas for OSV Use

OSV use presents the potential for disturbance of denning grizzly bears in the GYE. (Podruzny et al. 2002) These impacts can also occur shortly after den emergence in the spring, when a female with cubs may be particularly vulnerable to disturbance from human activities. (Haroldson et al. 2002) While this potential exists, these effects have not been documented in the GYE and the grizzly bear population has continued to expand in number and distribution with existing OSV use.

Podruzny et al. (2002) developed a model to identify potential denning areas in the Greater Yellowstone Ecosystem. This model was used to compare the overlap between potential denning habitat and areas open to OSV use under each Alternative. Denning habitat identified in the Podruzny et al. (2002) model was further compared to the amount of area with consistent snow compaction. Forest Service personnel mapped areas with consistent snow compaction based on expert knowledge of recreational use patterns in specific areas (USDA Forest Service 2018) consistent with agency direction (USDA Forest Service 2000).

3.14.1.3 Environmental Consequences

3.14.1.3.1 Environmental Consequences of Alternative 1.

This section discloses the environmental impacts of Alternative 1, the no action alternative.

3.14.1.3.1.1 Direct and Indirect Effects of Alternative 1

Issue 1: Whether and to what extent Alternative 1 wheeled vehicle use within the Shoshone National Forest will affect secure habitat for grizzly bears within the Primary Conservation Area during non-denning months (i.e., summer).

Current use of NFSRs and NFSTs on the Forest has been compatible with grizzly bear habitat use within the PCA. Most BMSs within the Forest have very high secure habitat values when compared with the ecosystem-wide average values of 85.6% for 1998 and 87% for 2018. (Landenburger

2019) Secure habitat values have increased for six of eleven BMSs since 1998 and held constant for the remaining five (Table 113). BMSs contain adequate secure habitat to allow grizzly bear habitat use with minimal displacement and minimal human-bear conflict from current NFSR and NFST. Habitat characteristics in these subunits promote good reproduction and survival rates and allow for continued increases in grizzly bear distribution. (Bjornlie and Haroldson 2019, Figure S2 from Manen et al. 2016, van Manen and Haroldson 2019) Similarly, metrics used to track population status, based on the number and distribution of observations of sows with cub, indicates that bears in all of these subunits continue to exhibit good population performance. (Haroldson et al. 2019)

Table 113: Secure Habitat Values within Bear Management Subunits of Alternatives for Roads and Trails for Year-Round Motor Vehicle Use

Bear Management Subunit Name	Secure Habitat Standard (1998 Baseline)	No Action Alternative Secure Habitat Value	Alternative 2 Secure Habitat Value	Alternative 3 Secure Habitat Value
Lamar #1	89.4	89.9	89.9	89.9
Crandall/Sunlight #1	81.1	81.9	81.8	81.8
Crandall/Sunlight #2	82.3	82.7	82.7	82.7
Crandall/Sunlight #3	80.4	81.1	81.0	81.0
Shoshone #1	98.5	98.5	98.5	98.5
Shoshone #2	98.8	99.0	99.0	99.0
Shoshone #3	97.0	97.8	97.8	97.8
Shoshone #4	94.9	94.9	94.9	94.9
South Absaroka #1	99.2	99.2	99.2	99.2
South Absaroka #2	99.9	99.9	99.9	99.9
South Absaroka #3	96.8	96.8	96.8	96.8

Issue 2: Whether and to what extent Alternative 1 wheeled vehicle use within the Shoshone National Forest will affect secure habitat for grizzly bears outside the Primary Conservation Area during non-denning months (i.e., summer).

Current use of NFSRs and NFSTs on the Forest has been compatible with grizzly bear habitat use outside the PCA as well. Eight BAUs occur within the Forest but outside the PCA (Table 114). Secure habitat values are generally lower outside the PCA compared to inside of it, though most BAUs on the Forest have secure habitat values comparable to or higher than the average value of 73.3% for BAUs across the GYE (Landenburger 2019). These areas contain a substantial amount of wilderness and roadless areas which contribute to relatively high observed secure habitat values. In general, grizzly bear survival rates are lower outside the PCA than inside (IGBST 2012), which is likely related to the lower secure habitat values generally observed in these areas as well as other factors unrelated to motorized access. However, habitat characteristics in these areas allowed for good reproductive and survival rates and subsequent increases in grizzly bear distribution beyond the boundaries of Shoshone National Forest lands. (Bjornlie et al. 2014, Figure S2 from van Manen et al. 2016, van Manen and Haroldson 2019)

Table 114: BAU Secure Habitat Values of Alternatives for Roads and Trails for Year-Round Motor Vehicle Use

Bear Analysis Unit Name	No Action Alternative Secure Habitat Value	Alternative 2 Secure Habitat Value	Alternative 3 Secure Habitat Value
Carter	77.9	77.9	77.5
Clarks Fork	70.1	69.4	69.7
East Fork	73.2	72.9	73.2
Fitzpatrick	98.4	98.4	98.4
North Fork	78.2	78.2	78.3
Popo Agie	67.4	67.4	67.4
Warm Springs	29.4	28.5	29.2
Wood River	85.3	85.0	85.0

One exception is the Warm Springs BAU on the Wind River Ranger District. This area has an existing well-developed road system that impacts the secure habitat value. Bear trapping and monitoring efforts indicate that a considerable number of bears use the area despite low secure habitat values (Atkinson et al. 2018). Current wheeled vehicle use likely affects the grizzly bear population in this area. Some bears may avoid areas with high levels of wheeled vehicle activity entirely, while others may adopt strategies to use these areas while avoiding human activity, such as becoming more nocturnal (Schwartz et al. 2010b). The limited amount of secure habitat available in this area may contribute towards the potential for human-bear conflicts and mortality.

Issues 3: Whether and to what extent Alternative 1 OSV use within the Shoshone National Forest will affect secure habitat for grizzly bears within and outside of the Primary Conservation Area during denning months (i.e., winter).

Impacts to grizzly bear denning habitat within the PCA from OSV use in areas open to OSV use would be minimal. Just over 6% of the total denning habitat on the Forest and within the PCA is open to OSV use (Table 115). The overlap between grizzly bear denning habitat and areas of consistent OSV use are even more limited—less than 1% (Table 116). The intensity of use in certain areas may be greater than others. For example, the Crandall/Sunlight #1 BMS would have higher potential for OSV use within grizzly bear denning habitat. Disturbance of denning grizzly bears, or of grizzly bears recently emerged from dens, by OSV use would be unlikely to occur throughout most of the BMSs on the Forest. If such incidents did occur, they would likely be isolated events with no measurable effects to the population.

Table 115: BMS Denning Values under the No Action Alternative for Groomed and Ungroomed Trails and Areas for OSV Use

Bear Management Subunit (BMS) Inside PCA	Denning Habitat Acres (ac)	Denning Habitat Open to OSV Use (ac)	Open : BMS (%)	Mapped Motorized Compaction Within Denning Habitat (ac)	Compaction : BMS (%)
Lamar #1	9,316	15	0.1	0	0
Crandall/Sunlight #1	56,625	18,560	32	6,922	12
Crandall/Sunlight #2	200,576	37,402	18	41	.02
Crandall/Sunlight #3	141,982	475	0.3	0	0

Bear Management Subunit (BMS) Inside PCA	Denning Habitat Acres (ac)	Denning Habitat Open to OSV Use (ac)	Open : BMS (%)	Mapped Motorized Compaction Within Denning Habitat (ac)	Compaction : BMS (%)
Shoshone #1	78,223	0	0	0	0
Shoshone #2	84,742	0	0	0	0
Shoshone #3	90,071	0	0	0	0
Shoshone #4	120,827	0	0	0	0
South Absaroka #1	104,434	0	0	0	0
South Absaroka #2	121,959	0	0	0	0
South Absaroka #3	222,888	19,465	8.0	5,212	2.0

Impacts to grizzly bear denning habitat in areas outside the PCA from OSV use would be minimal. Overlap between grizzly bear denning habitat and areas where OSV use is currently occurring is higher than areas inside the PCA (Table 4), but still low overall. Disturbance of denning grizzly bears, or of grizzly bears recently emerged from dens, would be unlikely to occur in most areas outside of the PCA. If such incidents did occur, they would likely be isolated events with no measurable effects to the population.

Table 116: BMS Denning Values under the No Action Alternative for Groomed and Ungroomed Trails and Areas for OSV Use

Bear Management Subunit (BMS) Inside PCA	Denning Habitat Acres (ac)	Denning Habitat Open to OSV Use (ac)	Open : BMS (%)	Mapped Motorized Compaction Within Denning Habitat (ac)	Compaction : BMS (%)
Carter	81,935	12,217	14	0	0
Clarks Fork	29,360	19,692	67	0	0
East Fork	112,660	52,706	46	642	0.5
Fitzpatrick	45,233	798	1.7	0	0
North Fork	42,645	0	0	0	0
Popo Agie	129,479	85,188	65	546	0.4
Warm Springs	84,571	84,107	99	11,918	14
Wood River	91,144	20,990	23	0	0

3.14.1.3.2 Environmental Consequences of Alternatives 2 and 3

This section discloses the environmental impacts of Alternatives 2 and 3.

3.14.1.3.2.1 Direct and Indirect Effects of Alternatives 2 and 3

Issue 1: Whether and to what extent Alternative 2 and Alternative 3 wheeled vehicle use within the Shoshone National Forest will affect secure habitat for grizzly bears within the Primary Conservation Area during non-denning months (i.e., summer).

Inside the PCA, secure habitat values would stay the same in nine of eleven BMSs (Table 2). For those subunits, the effects would be the same as those described under the No Action Alternative. The Crandall/Sunlight #1 and Crandall/Sunlight #3 BMSs would have a small decrease in secure

habitat due to an added dispersed campsite access NFSR in the Crandall/Sunlight #1 BMS and an administrative NFSR to the system for forest management purposes in the Crandall/Sunlight #3 BMS (under both Alternatives 2 and 3). Overall secure habitat levels in these two subunits would exceed 1998 baseline values and allow grizzly bear habitat use with minimal displacement from human activities and minimized bear-human conflicts. Wheeled vehicle use under Alternatives 2 and 3 should have limited additional effects on grizzly bears compared to the no action alternative. These effects would include some changes in the timing and patterns of bear habitat use, but bears would not substantially alter their ability to secure food or avoid areas of human activity. Additionally, despite potential for some displacement and disturbance of bears from NFS route construction and route decommissioning, these effects would be very limited in intensity and duration due to the number, area impacted, and type of activities proposed.

Issue 2: Whether and to what extent Alternative 2 and Alternative 3 wheeled vehicle use within the Shoshone National Forest will affect secure habitat for grizzly bears outside the Primary Conservation Area during non-denning months (i.e., summer).

Outside the PCA, secure habitat values would still be relatively high and would continue to allow grizzly bear habitat use with minimal displacement from human activities and minimized bear-human conflicts. Secure habitat values remain the same for many of the BAUs under Alternatives 2 and 3 when compared with the Alternative 1: No Action Alternative, and the effects are similar to those described under Alternative 1 (Table 3). Secure habitat values in several BAUs would decrease under both Alternatives 2 and 3. These decreases are marginal under both action Alternatives, and expected impacts to secure habitat and grizzly bears are negligible. These areas should continue to provide secure habitat with relatively high values. An exception is the Warm Spring BAU, where open NFS routes as well as administrative NFSRs for forest management purposes under Alternatives 2 and 3 would decrease secure habitat. As discussed in Alternative 1, this area already has low secure habitat values. Further decreases in secure habitat may slightly increase the potential for displacement of grizzly bears and bear-human conflicts. This would include minor changes in the timing and patterns of bear habitat use, but bears would not substantially alter their ability to secure food or avoid areas of human activity.

Additionally, the effects to grizzly bears from NFS route construction and route decommissioning outside the PCA are similar to those described above with respect to inside the PCA.

Issue 3: Whether and to what extent Alternative 2 and 3 OSV use within the Shoshone National Forest will affect secure habitat for grizzly bears within and outside the Primary Conservation Area during denning months (i.e., winter).

The changes in OSV use under Alternatives 2 and 3 within grizzly bear denning habitat compared to Alternative 1 are small. These changes are not anticipated to change the potential for disturbance of denning or recently-emerged grizzly bears. Alternative 2 proposes two new designated OSV trails that occur partially within grizzly bear denning habitat. The first occurs in the Ghost Creek vicinity on the Clarks Fork Ranger District. This OSV trail would traverse a small amount of denning habitat (outside of the area mapped under Alternative 1). The second occurs in the Sublette Pass area on the Wind River Ranger District in an area already mapped as having consistent OSV use. The proposal also establishes two OSV use closure areas on the Wind River Ranger District. These changes are not expected to affect grizzly bear denning habitat or increase

the potential for disturbance when compared to Alternative 1. Alternative 3 proposes three new OSV use closure areas: two on the Wind River Ranger District and one on the Clarks Fork Ranger District would occur (the latter mostly outside of mapped grizzly bear denning habitat). The changes to OSV use within grizzly bear denning habitat under Alternative 3 compared to Alternative 1 are minimal and would have effects similar to those analyzed under Alternative 1.

3.14.1.3.3 Cumulative Effects of the Proposed Action

The primary land use practices and actions that affect wildlife habitat on the Forest, particularly grizzly bear habitat, include vegetation management, livestock grazing, outfitting/guiding, and other recreational uses. To a lesser extent, actions on private inholdings within the Forest boundary could also affect grizzly bears. Vegetation management activities (which, for purposes of this analysis, include timber or fuels management and wildlife habitat improvement projects) generally have minor impacts to grizzly bear habitat. Secure habitat must be restored post-project within the PCA, and outside the PCA the Forest generally restores secure habitat after projects are completed even though no requirement to do so exists. The effects to grizzly bears from these activities are typically relatively minor.

Grazing and recreation activities present more opportunities for bear-human conflict and attendant grizzly bear mortality. Many mortalities associated with recreational uses occur in backcountry areas and are not closely related to motorized access. As a result, activities proposed under Alternatives 2 and 3 are expected to have minimal effects on the frequency and severity of these occurrences in the future (similarly for activities that occur on private inholdings within the Forest).

3.14.1.4 Consistency with Relevant Laws, Regulations, and Policy

3.14.1.4.1 Land and Resource Management Plan

The Shoshone National Forest Land and Resource Management Plan provides standards, guidelines, and goals for grizzly bears. Consistency with relevant standards, guidelines, and goals was confirmed for this species (Table 117) Additional relevant analysis is set forth above.

Table 117: Forest Plan Consistency Review

Forest Plan Standards, Guidelines, and Goals*	Alternative 1	Alternative 2	Alternative 3
TES-STAND-01	Yes	Yes	Yes
TES-STAND-02	Yes	Yes	Yes
TES-STAND-04	Yes	Yes	Yes
TES-GUIDE-01	Yes	Yes	Yes
TES-GOAL-03	Yes	Yes	Yes

*Refer to the Forest Plan for information on compliance with these standards, guidelines, and goals.

3.14.1.4.2 Other Federal Law

Consistency with the Endangered Species Act will be addressed separately in consultation with the United States Fish and Wildlife Service.

3.14.1.5 Conclusion

A decision regarding travel management and any cumulative impacts will result in negligible impacts to grizzly bears. Any impacts to this species would likely be short-term and localized. All alternatives are in compliance with the Forest Plan, laws, regulations, and policies as they pertain to grizzly bears.

3.14.2 Wildlife: Lynx (*Lynx canadensis*)

3.14.2.1 Introduction

The Shoshone National Forest provides habitat for Canada lynx. Lynx are federally listed as threatened under the Endangered Species Act. The Forest manages activities, projects, and other actions that may affect lynx consistent with federal law and a suite of decision-making tools. Directly applicable tools include the Land Management Plan: 2015 Revision for the Shoshone National Forest (Forest Plan 2015), and Canada Lynx Conservation Assessment and Strategy (USDI Fish and Wildlife Service 2013).

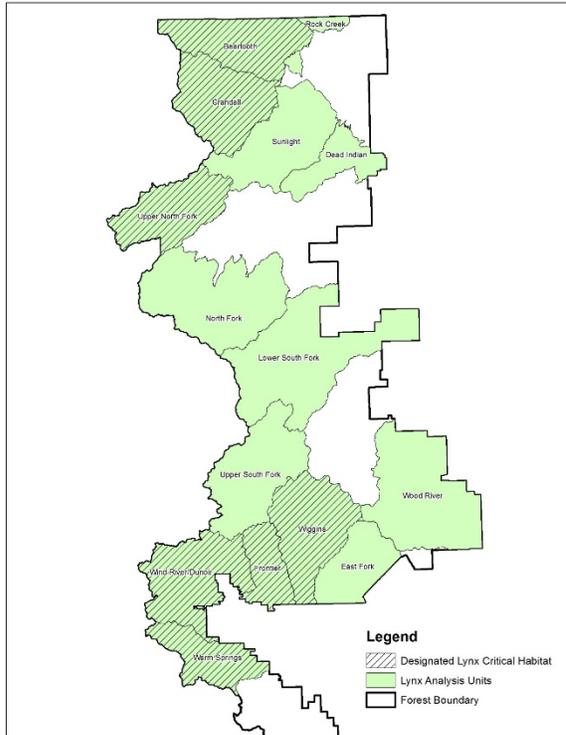


Figure 5: Lynx Analysis Units and Designated Lynx Critical Habitat on the Shoshone National Forest.

3.14.2.1.1 Issues Addressed

This section includes issues pertaining to Canada lynx (*Lynx canadensis*) that have been identified for detailed analysis. “An issue is a statement of cause and effect linking environmental effects to actions” (FSH 1909.15).

Issue 1: Whether snow compaction due to OSV use on groomed and ungroomed trails and in designated areas associated with Alternatives 1, 2, and 3 will impact Canada lynx.

Issue 2: Whether wheeled vehicle use over NFSRs and NFSTs associated with Alternatives 1, 2, and 3 will have direct or indirect effects on Canada lynx associated with vehicle strikes, illegal mortality, or habitat avoidance.

Issue 3: Whether wheeled vehicle use over NFSRs and NFSTs or winter OSV use associated with Alternatives 1, 2, and 3 will affect Canada lynx critical habitat.

3.14.2.2 Methodology

This section includes a description of the methods and data used in this analysis. The methods used to analyze effects differ for activities consistent with establishing the minimum road system needed (36 C.F.R. pt. 212, subpt. A, FSM 7710) and the roads, trails, and areas for designated for public wheeled vehicle use (36 C.F.R. pt. 212, subpt. B; FSM 7710), versus the trails and areas designated for OSV use (36 C.F.R. pt. 212, subpt. C; FSM 7710).

Two types of designated areas within the Forest are relevant for the purposes of this analysis: Lynx Analysis Units (LAUs) and Critical Habitat. LAUs are analysis scale units meant to approximate a

female lynx's annual home range, including seasonal habitats. (Interagency Lynx Biology Team 2013) These units were established in the wake of the listing of lynx as federally threatened under the Endangered Species Act in 2000. The Forest mapped LAUs are consistent with the Northern Rockies Lynx Management Direction (2007). Fifteen LAUs currently occur on the Clarks Fork, Wapiti, Greybull, and Wind River Ranger Districts of the Forest, covering approximately 597,000 acres (no LAU and corresponding Lynx habitat is mapped on the Washakie Ranger District).

The U.S. Fish and Wildlife Service (USFWS) separately designated approximately 648,480 acres of critical habitat for Canada Lynx on the Forest (including a mix of mapped lynx habitat and matrix habitat). These areas are within LAUs found on the Clarks Fork, Wapiti, and Wind River Ranger Districts. The primary constituent elements (PCEs) of lynx critical habitat includes deep and fluffy winter snow conditions. USFWS identified a list of federal actions with the potential to adversely modify critical habitat. (USDI Fish & Wildlife Service 2008) These actions are of the type that would cause large-scale reduction or removal of understory vegetation within boreal forest stands, permanent large-scale loss or conversion of boreal forest stands, or would increase traffic volumes and speed on roads that divide lynx critical habitat. Travel management could potentially affect traffic volumes and speeds or the extent of areas with deep, fluffy snow. A qualitative assessment of each alternative was made to determine if any of the alternatives would have the potential to alter the function of lynx critical habitat.

3.14.2.2.1 Analysis of NFSRs and NFSTs for Wheeled Vehicle Use

Scientific literature and Forest Service policy regarding lynx guided a qualitative analysis to determine effects to lynx from wheeled vehicle use over NFSRs and NFSTs on the Forest. Multiple studies have examined the impacts roads and motorized trails have for lynx and found these impacts to be minimal. Direct impacts to lynx from roads and motorized trails include increased human access that leads to vehicle caused mortality and habitat impacts associated with new road and trail construction. Lynx mortality from vehicle strikes on Forest Service roads is unlikely (Interagency Lynx Biology Team 2013). Use of Forest Service roads, and primarily unpaved roads, have much lower potential for such events when compared to paved roads and highways due to low traffic volumes and speeds. (Interagency Lynx Biology Team 2013, Northern Rockies Lynx Management Direction 2007) (Analysis of alternatives does consider any increase in paved road mileage within LAUs.) Additionally, lynx do not avoid forest roads with low traffic volumes and speeds (Interagency Lynx Biology Team 2013) and are therefore unlikely to be displaced from areas of important habitat. Studies have shown that lynx will utilize roadbeds for travel and foraging. (Squires et al. 2010, McKelvey et al. 2000) Finally, habitat loss from construction of roads is minimal. USFWS previously explained that within occupied lynx habitat, "the best information suggests that the types of roads managed by the Forest Service in the NRLA (Northern Rockies Lynx Amendment area) do not likely adversely affect lynx." (USDI Fish and Wildlife Service Biological Opinion on the Northern Rockies Lynx Management Direction 2007)

Effects from roads and motorized trails could include greater human access that causes a related increase in the potential for mortality or injury of lynx captured incidentally in traps aimed at other species or through illegal shooting. (Northern Rockies Lynx Management Direction 2007) Trapping and hunting is managed by the Wyoming Game and Fish Department, and there are no hunting or trapping seasons for lynx in Wyoming. There are no recent records of lynx mortality due to illegal shooting or from trapping on the Shoshone National Forest. The only known

human-caused lynx mortality in Wyoming occurred in 1993 as a result of a vehicle strike on a county road in southwestern Wyoming. (Nichole Bjornlie, Wyoming Game & Fish Department, personal communication, 03/26/2020)

3.14.2.2.2 Analysis of Groomed and Ungroomed Trails and Areas for OSV Use

The USFWS previously determined that packed snow trails were not a substantial threat to lynx (USDI Fish and Wildlife Service 2003). Despite this determination, an analysis of potential effects of OSV use to lynx was conducted. (See Interagency Lynx Biology Team 2013, noting potential increased competition to lynx from other carnivores due to snow compaction) This analysis was conducted pursuant to the guidance within the Land Management Plan 2015 Revision for the Shoshone National Forest, specifically HU-G11.

A quantitative geospatial analysis was used to assess impacts to lynx from OSV use along groomed and ungroomed trails and in areas designated open for use. Inputs to this analysis included mapped areas of snow compaction within the Forest due to OSV use (USDA Forest Service 2018). Forest Service personnel with expert knowledge of recreational use patterns in specific areas mapped impacts from dispersed OSV use activities and groomed or designated OSV trails. This mapping exercise was conducted according to agency direction. (USDA Forest Service 2000) These various inputs of snow compacting activities formed a baseline map from which to determine snow compaction change and compare alternatives for each LAU. The area within each LAU open to OSV use was also calculated and compared among alternatives.

3.14.2.3 Environmental Consequences

Mapped lynx habitat on much of the Shoshone National Forest is of relatively low quality. USFWS has generally characterized lynx habitat in the Greater Yellowstone Ecosystem (GYE) as “naturally marginal . . . with highly fragmented foraging habitat.” (USDI Fish & Wildlife Service 2014) (79 Fed. Reg. 54781, 54826 (2014)) These conditions are exaggerated on the Eastern side of the GYE and across the Forest. A precipitation-shadow effect, an abundance of unproductive volcanic substrate (dominant on the east side of the Absaroka Range), and extensive non-forested alpine areas create a fragmented landscape across much of the LAU-designated area within the Forest. Thus, despite large areas of the Forest being designated as lynx analysis units, many areas lack suitable habitat to support lynx. (Laurion and Van Fleet 2000)

Lynx were documented in portions of the Shoshone National Forest in the late 1990s up to the early 2000s. (Reeves et al. 1986, Laurion and Oakleaf 1998, Laurion and Oakleaf 2000) The most recent detections occurred in the mid-2000s but these were lynx dispersing from Colorado (Ivan 2017). The Forest Service has recently surveyed for the presence of lynx in some of the highest quality lynx habitat on the Shoshone National Forest, as well as similarly high-quality habitat on the Bridger-Teton National Forest and Grand Teton National Park. This three- year effort (2015-2017) utilized hair snare stations with camera traps. The study, however, failed to detect any lynx (J. Wilmot, Bridger-Teton National Forest, personal communication, 12/13/2018). This calls into question whether or not lynx continue to exist on the SNF.

3.14.2.3.1 Environmental Consequences of Alternative 1

This section discloses the environmental impacts of Alternative 1, the no action alternative.

3.14.2.3.1.1 Direct and Indirect Effects of No Action

Issue 1: Whether snow compaction due to OSV use on groomed and ungroomed trails and in OSV areas associated with Alternative 1 will impact Canada lynx.

Effects to lynx from snow compacting activities in LAUs are likely to be minimal. The highest levels of OSV use would occur within the Beartooth, Wind River/Dunoir, and Warm Springs LAUs (Table 118). These LAUs all have relatively large areas open to OSV use, and larger areas of snow compaction resulting from a system of groomed and designated OSV trails as well as areas of dispersed OSV use. The potential for adverse effects to lynx resulting from OSV travel would be highest in these LAUs. This increased potential is due to the attendant increased access to lynx habitat for other competitive carnivore species that snow compaction provides. The magnitude of these effects is expected to be relatively low given that large areas of uncompacted snow would still be available. Research to date has additionally suggested a low level of competition occurs between lynx and coyotes. (Interagency Lynx Biology Team 2013) Impacts to lynx in the Rock Creek LAU are expected to be minimal even though most of it is open to OSV use. This LAU is very small and all mapped snow compacting activity occurs in alpine areas outside of lynx habitat.

Table 118: The amount of area open to OSV use, acres of mapped snow compaction, and miles of mapped compacted routes within Lynx Analysis Units under Alternative 1.

LAU	LAU Area in Acres (ac)	% of LAU Open to Winter Motorized Use	Mapped Compaction (ac)	Miles of Motorized Compacted Routes
Rock Creek	9,250	83%	567	0
Beartooth	105,000	59%	13,547	41
Crandall	109,876	6%	0	0
Sunlight	120,860	7%	0	4
Dead Indian	65,113	17%	0	5
Upper North Fork	109,876	0	0	2
North Fork	170,207	0	0	2
Upper South Fork	125,172	0	0	0
Wiggins	135,188	18%	0	11
East Fork	113,604	4%	0	0
Frontier	77,505	31%	804	15
Wind River/Dunoir	140,365	56%	13,854	65
Warm Springs	89,558	74%	14,183	69
Lower South Fork	199,722	4%	0	7
Wood River	168,453	17%	0	0

Issue 2: Whether wheeled vehicle use over NFSRs and NFSTs associated with Alternatives 1, 2, and 3 will have direct or indirect effects on Canada lynx associated with vehicle strikes, illegal mortality, or habitat avoidance.

Existing use of NFSRs and NFSTs by wheeled vehicles likely has minimal effects on lynx across the Forest. The probability of lynx mortality from vehicle strikes on NFS roads would continue to be low. Such mortalities are typically associated with vehicle traffic on high-speed paved roads rather than typical NFSRs. There are no records of lynx mortality from vehicle strikes on the Shoshone. The potential for lynx mortality due to incidental trapping or illegal shooting related to the Forest road and trail system is also very low. There are no records of such mortalities on the Shoshone during the past 20 years.

Some habitat has been reduced as a result of past clearing activities associated with NFSRs and NFSTs, but this reduction has been an overall small amount of habitat, and the resulting effects on lynx is commensurate.

NFSRs with low traffic volumes and speeds are not avoided by lynx (Interagency Lynx Biology Team 2013), thus lynx would be unlikely to be displaced from habitat because of NFSRs and associated motorized use.

Issue 3: Whether wheeled vehicle use over NFSRs and NFSTs or winter OSV use associated with Alternative 1 will affect designated lynx critical habitat.

This system of NFSRs and NFSTs is not expected to inhibit movement of lynx within or between patches of designated lynx critical habitat because of the low volumes of vehicles and travel speeds. Vehicle speeds on NFSRs are slow in comparison to other public roads (e.g., highways) due to topography, more primitive substrates, and road conditions. The effects of NFSRs and NFSTs on designated critical lynx habitat would therefore be minor.

The effects of OSV use are expected to be minimal. The Beartooth, Wind River/Dunoir, and Warm Springs LAU's, which are the LAU's within designated critical lynx habitat with the highest levels of snow compaction and most area available for OSV use. Snow compaction resulting from OSV vehicle use under Alternative 1 would reduce the amount of deep, fluffy snow within these LAU's. However, large areas of un-compacted snow would still be available in these LAU's, and in the five other LAUs within critical habitat where little or no snow compaction occurs. Therefore, the effects of snow compaction from OSV use on designated critical lynx habitat would be small.

3.14.2.3.2 Environmental Consequences of Alternatives 2 and 3

This section discloses the environmental impacts of Alternatives 2 and 3.

3.14.2.3.2.1 Direct and Indirect Effects of Alternatives 2 and 3

Issue 1: Whether snow compaction due to OSV use on groomed and ungroomed trails and in designated areas associated with Alternatives 2 and 3 will impact Canada lynx.

Alternatives 2 and 3 propose small changes to OSV use. The changes, analyzed below, would have minimal impacts on lynx. Other OSV use would correspond to the use described under Alternative 1, and the effects to lynx are the same as analyzed for that alternative.

Alternative 2 proposes changes to OSV use in two LAUs: the Beartooth and the Wind River/Dunoir. In the Beartooth LAU, a new OSV route (ungroomed) approximately 5.5 miles in length would be designated. The route mostly occurs outside of stands mapped as lynx habitat (this area has patchy habitat that lacks the boreal forest characteristics and snow qualities that typify quality lynx habitat). Despite the increase to area of snow compaction within the LAU, the impacts to lynx are likely to be minor. In the Wind River/Dunoir LAU, a new OSV route (ungroomed) approximately 4.6 miles in length would be designated. This new route occurs within a pre-existing area of mapped snow compaction (associated with dispersed OSV use). This route is not expected to add to the snow compaction within this LAU and would consolidate use within the Wind River/Dunoir, thereby complying with Guideline HU G11 of the Forest Plan.

Alternative 2 separately proposes closing approximately 1,335 acres in the Wind River/Dunoir LAU to OSV use. The closure would not change the area of snow compaction within the LAU, because the area is mapped as snow compaction associated with a ski trail system. The effects of the changes under Alternative 2 are very similar to those described in Alternative 1, the No Action Alternative.

Alternative 3 proposes three new OSV vehicle closure areas. These closures are not likely to affect lynx and lynx habitat. Proposed closures in the Rock Creek and Beartooth LAUs occur primarily within alpine areas, and almost entirely outside of lynx habitat. A proposed closure in the Wind River/Dunoir LAU would continue to be used for an existing ski trail system (and remain mapped as a snow compaction area). This closure would not change the amount of snow compaction within the LAU, despite decreasing the OSV use. These proposed closures occur either outside lynx habitat or overlap with areas of continued compaction. Generally, effects of OSV use in all LAUs would be very similar to those described in Alternative 1, the No Action Alternative. The expected impacts are minimal and Alternative 3 would be consistent with Guideline HU-G11 .

Issue 2: Whether wheeled vehicle use over NFSRs and NFSTs associated with Alternatives 2 and 3 will have direct or indirect effects on Canada lynx associated with vehicle strikes, illegal mortality, or habitat avoidance .

The effects to lynx of wheeled vehicle use on NFSRs and NFSTs from Alternative 2 and Alternative 3 are expected to be minimal. Alternative 2 proposes new administrative or public use NFSRs and NFSTs in the Rock Creek, Sunlight, Dead Indian, Wood River, East Fork, Wiggins, Wind River/Dunoir, and Warm Springs LAUs; Alternative 3 proposes similar new administrative or public use NFSRs and NFSTs in the Rock Creek, Sunlight, Dead Indian, and Wood River LAUs. The segments proposed under both alternatives are short in length, and almost all segments currently exist as non-system roads. Construction of the new roads proposed under this alternative would not affect lynx connectivity because it would add only small amounts of low standard roads with low traffic speeds and volumes, thus Guideline HU-G7 would be met.

Both Alternatives would require minimal or no actual construction within lynx habitat, so only very small amounts of habitat would be lost. Wheeled vehicle use associated with NFS routes is not expected to alter the low probability of vehicle strikes or incidental/illegal mortality from trapping or shooting. Overall effects to lynx from wheeled vehicle use of NFS routes under both Alternatives 2 and 3 are expected to be similar as under Alternative 1.

Issue 3: Whether wheeled vehicle use over NFSRs and NFSTS or winter OSV use associated with Alternatives 2 and 3 will affect Canada lynx critical habitat.

None of the new NFSRs or NFSTS would measurably change the ability of lynx to move between or within patches of designated lynx critical habitat because they are all low standard routes not conducive to high traffic speeds or volumes. Therefore, the effects of these alternatives on designated critical lynx habitat would likely be minor and similar to those described under Alternative 1, the No Action Alternative.

The amount of snow compaction due to OSV use expected in designated lynx critical habitat is similar to or slightly less than that expected under Alternative 1, the No Action Alternative. Additionally, the effects of these OSV trails on snow compaction within lynx critical habitat are expected to be minor: the proposed Beartooth route is only partially within lynx habitat and generally does not support optimal snow conditions for lynx, and the Wind River/Dunoir route is located in an area of existing snow compaction.

3.14.2.3.3 Cumulative Effects of the Proposed Action

The primary land use practices and actions that affect wildlife habitat on the Forest, particularly lynx habitat, include vegetation management. Vegetation management activities (e.g., timber harvest) can influence the quantity and/or quality of snowshoe hare habitat for lynx. These activities can also facilitate increases in snow compaction by removing vegetation that limit access for OSVs. Vegetation management activities on the Forest occur on a small area and temporal scale, such that the effects of such activities on lynx are minimal (natural disturbance agents such as fire, insects, and disease play a much larger role compared to vegetation management in shaping lynx habitat characteristics on the Shoshone National Forest). Other forest management activities with even smaller effects on lynx habitat include: road maintenance (brushing), recreation and non-recreation special uses such as outfitting/guiding or rights of ways, developed recreation site management, and livestock grazing.

Several highways bisect potential lynx linkage areas (USDA Forest Service 2007) and are within designated lynx critical habitat on the Shoshone, including U.S. 26/287 in the Togwotee Pass area, U.S. 14/16/20 near the east entrance to Yellowstone National Park, and Wyoming 296 and U.S. 212 in the Beartooth Mountains. These highways have greater potential to cause lynx mortality than Forest Service roads. Tracking data for radio-collared lynx from Colorado indicate that several lynx made multiple crossing of all these highways (Ivan 2017), indicating that these highways are not precluding connectivity of lynx habitat in these areas. Therefore, Forest Plan Standard ALL S1 (requiring that habitat connectivity be maintained) is being met. Projects to upgrade highways that would increase traffic volume and speed are generally under the jurisdiction of the Federal Highway Administration. The Forest Service works with that agency to mitigate impacts to wildlife. Highways 26/287 and 14/16/20 were reconstructed in the late-1990's and early 2000's. A long term project to reconstruct U.S. 212 is ongoing. All of these projects have included measures to reduce the potential for wildlife mortality.

State and private actions are also not likely to impact lynx. State actions occurring within the action area include authorized hunting and trapping seasons. A very small potential exists for lynx mortality due to either incidental trapping of lynx during seasons for other species or illegal mortality of lynx from shooting; however, neither of these have been documented on the Forest

in recent years. Wyoming Game & Fish Department also manages inholdings within the Forest to provide winter range for ungulates and for timber. Winter ungulate areas are almost entirely outside lynx habitat, and no impacts to lynx from the management of these areas are expected. State trust lands managed for timber production may have an impact on lynx habitat. Any impact is likely minimal, as these areas are small in size (<1,200 acres).

Private actions on inholdings are also likely to have minimal impacts on lynx. There is the potential for land development and land clearing. The total amount of private land involved would be small in size (<5,000 acres) and scattered in smaller parcels across the Clarks Fork and Wind River Ranger Districts. Habitat fragmentation is possible, but the likely impact on lynx of these small scale activities is minimal.

The cumulative effects of these alternatives on lynx and designated critical lynx habitat are expected to be minor given the low intensity and spatial scale of the direct and indirect effects combined with the effects of federal, state, and private actions.

3.14.2.4 Consistency with Relevant Laws, Regulations, and Policy

3.14.2.4.1 Land and Resource Management Plan

The Shoshone National Forest Land and Resource Management Plan (forest plan) provides standards, guidelines, and goals for lynx. Consistency with relevant standards, guidelines, and goals was confirmed for this species (see Table 119). Additional relevant analysis is set forth above.

Table 119: Forest Plan Consistency Review

Forest Plan Standards, Guidelines, and Goals*	Alternative 1	Alternative 2	Alternative 3
TES-STAND-01	Yes	Yes	Yes
TES-STAND-02	Yes	Yes	Yes
TES-GUIDE-01	Yes	Yes	Yes
Standard ALL S1	Yes	Yes	Yes
Guideline HU G6	Yes	Yes	Yes
Guideline HU G7	Yes	Yes	Yes
Guideline HU G11	Yes	Yes	Yes
*Refer to the Forest Plan for information on compliance with these standards, guidelines, and goals.			

3.14.2.4.2 Other Federal Law

Consistency with the Endangered Species Act will be addressed separately in consultation with the United States Fish and Wildlife Service.

3.14.2.5 Conclusion

A decision regarding travel management and any cumulative impacts will result in negligible impacts to lynx. Any impacts to this species would likely be short-term and localized. All alternatives are in compliance with the Forest Plan, laws, regulations, and policies as they pertain to lynx.

3.14.3 Wildlife: Wolverine (*Gulo gulo*)

3.14.3.1 Introduction

The wolverine (*Gulo gulo*) is currently proposed for listing under the federal Endangered Species Act (ESA). Wolverines are low population density, widely dispersed animals that are known to occupy the Shoshone National Forest, including within the North Fork Shoshone River and Upper Wind River drainages, as well as the northern and southern portions of the Wind River Mountains. (Atkinson et al. 2018; *see also* Figure 5 from Atkinson et al. 2018)

3.14.3.1.1 Issues Addressed

This section includes issues pertaining to Wolverines (*Gulo gulo*) that have been identified for detailed analysis.

Issue 1: Whether and to what extent OSV use under the alternatives will affect wolverine use of maternal and primary habitat within the Shoshone National Forest.

Issue 2: Whether and to what extent wheeled vehicle use under the alternatives will affect wolverines within the Shoshone National Forest.

3.14.3.2 Methodology

This section includes a description of the methods and data used to determine effects to wolverines under the alternatives. Inman et al. (2013) provides baseline data of mapped wolverine maternal and primary habitat. Analysis through Geographic Information Systems (GIS) estimated the amount of mapped habitat open to OSV use under each alternative. The resulting overlap area reflects a "worst-case scenario," since many areas open to OSV use are used rarely or not at all.

Analysis next incorporated identified areas of concentrated OSV use, based on information from Forest Service employees familiar with OSV use patterns on the Forest (see USDA Forest Service 2007). This GIS exercise identified overlaps between concentrated motorized use areas and wolverine maternal and primary habitat. A key component of this analysis was the mileage of groomed and designated routes within wolverine maternal and primary habitat. This analysis provided a mechanism to evaluate increased use impacts and, thereby, consider the potential for disturbance and displacement to wolverines.

Also analyzed were effects associated with wheeled vehicle use. At least one study has documented wolverine avoidance of motorized routes, including those with low traffic volumes. (Scrafford et al. 2018) The analysis of potential effects was conducted similar to the OSV methodology. A GIS analysis compared the overlap of wheeled vehicle routes (NFSRs and NFSTs) with wolverine primary habitat. (Inman et al. 2013) Maternal habitat was not considered in this analysis because maternal dens are associated with areas of deep, persistent snow cover that are very unlikely to be exposed to wheeled vehicle use until after the denning season. Increasing mileage of NFS routes within wolverine primary habitat could cause increased disturbance or displacement of wolverines.

3.14.3.2.1 Resource Indicators and Measures

Table 120: Resource condition indicators and measures for assessing effects

Issue	Indicator or Measure	Source
Whether adverse effects contribute to loss of viability.	Management actions that have adverse effects on threatened, endangered, proposed, or candidate species or their habitats shall not be allowed if the effects of those actions would contribute to the loss of viability of the species.	Forest Plan TES-STAND-01
Whether design of activities avoids or minimizes adverse impacts during critical times.	Design management activities to avoid or minimize adverse impacts to proposed, threatened, endangered, and candidate species during breeding, young rearing, or at other times critical to survival.	Forest Plan TES-STAND-02
Whether design of activities avoids or minimizes adverse effects.	Management actions should be designed to avoid or minimize adverse effects to listed species and their habitats.	Forest Plan TES-GUIDE-01

3.14.3.3 Environmental Consequences

Observations of wolverine have occurred primarily in the Washakie and Fitzpatrick Wilderness Areas, as well as other high elevation locations within roadless areas of the Forest. These areas hold habitat strongly associated with wolverines: high-elevation alpine and subalpine settings with deep, persistent snow cover. Collectively, these areas encompass maternal or denning habitat. Wolverine maternal or denning habitat (i.e., natal dens, maternal dens, and rendezvous sites) tends to be upper elevation areas with a sustained snow layer depth of at least 1 meter, typically in talus rock slopes and cirque basins. (Magoun and Copeland 1998) Modelling exercises have identified this habitat across the Shoshone National Forest, including primary habitat (areas suitable for long-term survival by adult wolverines) and maternal habitat (areas suitable for use by female wolverines for reproductive den and rendezvous sites). (Inman et al. 2013)

Some of the habitat characteristics that wolverines select for during winter (such as deep, persistent snow cover) also attract recreational users such as OSVs. Areas with such habitat characteristics present, therefore, potential overlap between winter wolverine habitat and OSV use. Detailed data on the effects of OSV use and other forms of winter recreation on wolverines is limited, in part because of practical difficulties in implementing studies on low density species in remote environments. One study on this interaction did find that both male and female wolverines tended to avoid OSV use areas, leading to indirect loss of habitat within home ranges. (Heinemyer et al. 2019) (Home ranges are the area regularly travelled by a wolverine to fulfill its biological requirements and include primary habitat and, for reproductive females, maternal habitat.) The study also indicated that wolverines avoided areas subject to OSV use where that use was more intensive (high levels of concentrated use) and expansive (use dispersed over a broad area), and that female wolverines are more sensitive to OSV use than males. In summary, the study suggests that OSV use can cause habitat loss that would correlate to reduced access to forage or other resources. Disturbance of maternal dens could also result in den abandonment or mortality of kits.

3.14.3.3.1 Environmental Consequences of Alternative 1

This section discloses the environmental impacts of Alternative 1, the no action alternative.

3.14.3.3.1.1 Direct and Indirect Effects of Alternative 1

The direct (same time and place) and indirect (occurs later in time or further in space) impacts of the no-action alternative are discussed below.

Issue 1: Whether and to what extent OSV use under Alternative 1, the no action alternative, will affect wolverine use of maternal and primary habitat within the Shoshone National Forest.

The GIS analysis indicates that of the current mapped wolverine maternal habitat 8.1% is open to OSV use, with 16.4% of primary habitat open to OSV use. The amount of maternal and primary habitat affected is expected to be much less than these percentages indicate, because motorized use does not occur in all areas open to such use. The area impacted and percentage of habitat overlapping with motorized use decreases drastically when examining concentrated use: that use occurs on 1.4% of wolverine maternal habitat and 2% of wolverine primary habitat. Additionally, the density of groomed and designated OSV trails within wolverine maternal and primary habitat is very low.

Table 121: Wheeled vehicle routes and trails and areas open to OSV use within wolverine maternal and primary habitat on the Shoshone National Forest by alternative

Area Impact Assessment	Alternative 1	Alternative 2	Alternative 3
Maternal Habitat Open to OSV Use (acres/%)	83,675 acres, 8.1%	83,579 acres, 8.1%	79,339 acres, 7.7%
Primary Habitat Open to OSV Use (acres/%)	303,837 acres, 16.4%	303,115 acres, 16.4%	294,052 acres, 15.9%
Concentrated OSV Use Areas within Maternal Habitat (acres/%)	13,964 acres, 1.4%	13,964 acres, 1.4%	13,913 acres, 1.3%
Concentrated OSV Use Areas within Primary Habitat (acres/%)	37,445 acres, 2.0%	37,445 acres, 2.0%	37,468 acres, 2.0%
OSV Routes within Maternal Habitat (miles, density in miles/mi ² of maternal habitat)	27 miles, 0.02	31 miles, 0.02	27 miles, 0.02
OSV Motorized Routes within Primary Habitat (miles, density in miles/mi ² of primary habitat)	149 miles, 0.05	154 miles, 0.05	149 miles, 0.05
Open & Admin Wheeled Routes within Primary Habitat (miles, density in miles/mi ² of primary habitat)	265 miles, 0.09	270 miles, 0.09	265 miles, 0.09

Effects to wolverines from OSV use across the Forest are expected to be minor. When disturbance and/or displacement of wolverines due to OSV use occurs, it would most likely occur in the Beartooth Mountains, Upper Wind River/Brooks Lake area, and Union Pass area. Mapped OSV use has a higher percentage of overlap with wolverine maternal and primary habitat in these areas than in other areas on the Forest. Nonetheless, these areas are small relative to mapped wolverine home ranges across the GYE (Inman et al. 2012). For example, estimated concentrated OSV use areas within wolverine maternal and primary habitat in the Beartooth Mountains approximate 5,170 and 17,875 acres respectively. Despite these areas of concentrated use, large areas of habitat not subject to OSV use remain available. The overall effects to wolverines on the

Shoshone are likely to be minimal, and applicable Forest Plan standards and guidelines would be met.

Issue 2: Whether and to what extent wheeled vehicle use under Alternative 1, the no action alternative, will affect wolverines within the Shoshone National Forest.

Large areas of primary wolverine habitat occur within designated wilderness and roadless areas on the Shoshone, and the density of open and administrative NFS routes within wolverine primary habitat is very low. Temporary disturbance from wheeled vehicle use could occur on rare occasions, but trends of long-term displacement or mortality of wolverines (due to vehicle collisions) are both unlikely due to the rarity of the species and limited extent of motorized use within primary habitat. NFSRs and NFSTs would be very unlikely to increase the potential for wolverine mortality from incidental or illegal trapping or shooting due to the rarity of the species along with generally low motorized road and trail densities. There are no known wolverine mortalities from incidental or illegal trapping or shooting on the Shoshone during the past 20+ years, and only one known case in Wyoming from the Cheyenne area in 1996. (Nichole Bjornlie, Wyoming Game & Fish Department, personal communication, 03/26, 2020) Similarly, there are no documented wolverine mortalities from vehicle strikes on the Shoshone NF, and only one in the rest of Wyoming, which occurred on U.S. Highway 30 in 2004. (Nichole Bjornlie, Wyoming Game & Fish Department, personal communication, 03/26/2020) The effects to wolverines from wheeled vehicle use on designated NFSRs and NFSTs would be very minor and do not implicate Forest Plan standards and guidelines.

3.14.3.3.2 Environmental Consequences of Alternatives 2 and 3

This section discloses the environmental impacts of alternatives 2 and 3.

3.14.3.3.2.1 Direct and Indirect Effects of Alternatives 2 and 3

The direct and indirect impacts of alternatives 2 and 3 are set forth below.

Issue 1: Whether and to what extent OSV use under Alternatives 2 and 3 will affect wolverine use of maternal and primary habitat within the Shoshone National Forest.

The effects of OSV use on wolverine maternal and primary habitat under Alternatives 2 and 3 would be minor and very similar to those described under Alternative 1, the no action alternative. Alternative 2 does have slightly higher mileages of OSV routes within wolverine maternal and primary habitat, but this increase is small and does not alter the overall density of OSV routes when compared with the other alternatives (*see* Table 2). The additional OSV use closure in the Beartooth Mountains under Alternative 3 does reduce, marginally, the amount of wolverine maternal and primary habitat open to OSV use. Similarly, this closure under Alternative 3 would reduce very small areas within wolverine maternal and primary habitat where concentrated OSV use would occur under Alternatives 1 and 2. This change is almost immeasurable. Alternatives 2 and 3 would have minimal effects on wolverine maternal and primary habitat, and applicable Forest Plan standards and guidelines would be met.

Issue 2: Whether and to what extent Alternatives 2 and 3 for wheeled vehicle use within the Shoshone National Forest will affect wolverine primary habitat.

There would be almost no change in the miles or density of open and administrative NFS routes within wolverine primary habitat under Alternatives 2 and 3. The effects would be very minor and similar to those analyzed under Alternative 1, the no action alternative.

3.14.3.3 Cumulative Effects of Alternatives 2 and 3.

The primary land use practices and actions potentially affecting wolverine habitat on the Forest include vegetation management, livestock grazing, outfitting/guiding, and other recreational uses. Of these, non-motorized winter recreation is the most likely to affect wolverines. However, non-motorized winter recreation on the Shoshone National Forest consistently occurs in relatively small, isolated places amounting to less area than OSV use. Vegetation management activities (which, for purposes of this analysis, include timber and fuels management and wildlife habitat improvement) and grazing would have minor impacts to wolverine habitat the Shoshone.

Schwartz et al. (2009) identified a potential corridor for wolverine movement and dispersal on a north-south axis through the Absaroka divide in Yellowstone National Park and Shoshone National Forest lands, and continuing through the core of the Wind River Range on the Bridger-Teton and Shoshone National Forests. This area is almost entirely designated wilderness or National Park lands, but several highways bisect the corridor. These include U.S. 26/287 in the Togwotee Pass area, U.S. 14/16/20 near the east entrance to Yellowstone National Park, and U.S. 212 in the Beartooth Mountains. Traffic on these highways has greater potential to cause wolverine mortality than on Forest Service roads. However, it is unlikely that these highways are precluding movement or dispersal of wolverines within the GYE or to adjacent ecosystems. Forest Plan TES-GOAL-06 "Conserve the North American wolverine and its habitat by maintaining or improving contiguous habitat connectivity with the Greater Yellowstone Ecosystem" would be met.

Alternatives 2 and 3 are not expected to have any adverse effects to wolverines within the Forest when considered with these actions.

3.14.3.4 Consistency with Relevant Laws, Regulations, and Policy

3.14.3.4.1 Land and Resource Management Plan

The Shoshone National Forest Land and Resource Management Plan provides standards and guidelines for wolverines. Consistency with these standards and guidelines was confirmed for this species (see Table 122). Additional relevant analysis is set forth above.

Table 122: Forest Plan Consistency Review

Forest Plan Standards, Guidelines, and Goals*	Alternative 1	Alternative 2	Alternative 3
TES-STAND-01	Yes	Yes	Yes
TES-STAND-02	Yes	Yes	Yes
TES-GUIDE-01	Yes	Yes	Yes
TES-GOAL-06	Yes	Yes	Yes
*Refer to the Forest Plan for information on compliance with these standards, guidelines, and goals.			

3.14.3.5 Conclusion

A decision regarding travel management and any cumulative impacts will result in negligible impacts to wolverines. Any impacts to this species would likely be short-term and localized. All alternatives are in compliance with the Forest Plan, laws, regulations, and policies as they pertain to wolverines.

3.15 Wildlife: Management Indicator Species and Region 2 Sensitive Species

3.15.1 Introduction

This section examines the effects to Management Indicator Species and Region 2 Sensitive Species (excluding plant species, which are addressed separately). The Shoshone Forest Plan (2015) defines a management indicator species as “[t]errestrial and aquatic wildlife species that are used to promote more effective management of diversity and wildlife habitats on National Forest System lands.” Sensitive species, on the other hand, include “plant and animal species identified by a regional forester for which population viability is a concern, as evidenced by significant current or predicted downward trends in population numbers or density and/or significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution.” Region 2, which covers the Shoshone National Forest, has designated sensitive species found on the Forest.

3.15.1.1 Issues Addressed

This section includes issues pertaining to sensitive and management indicator species on the Shoshone National Forest that have been identified for detailed analysis.

Issue 1: Whether the use of NFSRs and NFSTs by wheeled vehicles identified under the alternatives for the Shoshone National Forest would affect sensitive and management indicator species and/or their habitat to the extent the effects contribute to declining populations and a trend toward federal listing.

Issue 2: Whether and to what extent use of OSVs and wheeled vehicles along designated NFS routes and in designated areas under the alternatives would affect sensitive and management indicator species during their winter and reproductive seasons.

3.15.2 Methodology

This section describes the methods and data used to analyze the effects of motor vehicle use on sensitive and management indicator species. The methods used to analyze effects differ for activities consistent with establishing the minimum road system needed (36 C.F.R. pt. 212, subpt. A, FSM 7710) and the roads, trails, and areas for motor vehicle use (36 C.F.R. pt. 212, subpt. B; FSM 7710), versus the trails, and areas designated for over-snow vehicle use (36 C.F.R. pt. 212, subpt. C; FSM 7710).

The assessment of potential effects from wheeled vehicle and OSV use relied on a qualitative and quantitative analysis drawing from background literature and considering on-the-ground and in-the-field impacts. Indicators used to assess the effects of these types of use on sensitive and

management indicator species included: the mileages and densities of NFSRs, NFSTs, and OSV routes open to the public or for administrative travel; the acreage available for motorized OSV use; and the mileage of seasonally restricted NFSRs. Seasonal restrictions on road use were often intended to reduce vehicle disturbance during winter and reproductive (breeding and natal) seasons of wildlife. Road density is the best available metric to compare effects to sensitive and management indicator species in the context of travel management. Although baseline data on road density impacts (i.e., thresholds related to effects) are not available for species analyzed here, road density provides a comparative metric to consider impacts consistent with Forest Service personnel observations and experience.

A GIS-based analysis used Landfire/GAP Land Cover Map Units (<https://www.landfire.gov/evt.php>) to estimate the mileages of motorized routes and acreages that intersect or overlap the forest's major vegetation and land cover types Table 123.

Table 123: Coverage of Landfire/GAP Land Cover Units on the Shoshone National Forest (see text).

Habitat	Forest-wide coverage (total Landfire acres)	Landfire/GAP Land Cover Unit ¹
Alpine	482,074	Rocky Mountain Alpine Dwarf-Shrubland Rocky Mountain Alpine Turf Rocky Mountain Alpine/Montane Sparsely Vegetated Systems
Subalpine forest	963,884	Northern Rocky Mountain Subalpine Deciduous Shrubland; Northern Rocky Mountain Subalpine Woodland and Parkland; Rocky Mountain Subalpine Dry-Mesic Spruce-Fir Forest and Woodland Rocky Mountain Subalpine Mesic-Wet Spruce-Fir Forest and Woodland
Douglas fir forest	315,348	Mesic Montane Douglas-fir Forest; Middle Rocky Mountain Montane Douglas-fir Forest and Woodland; Northern Rocky Mountain Mesic Montane Mixed Conifer Forest; Subalpine Douglas-fir Forest; Xeric Montane Douglas-fir Forest
Lodgepole pine forest	97,097	Rocky Mountain Lodgepole Pine Forest; Rocky Mountain Poor-Site Lodgepole Pine Forest
Limber pine & juniper forests	3,523	Rocky Mountain Foothill Limber Pine-Juniper Woodland
Aspen	41,120	Inter-Mountain Basins Aspen-Mixed Conifer Forest and Woodland; Rocky Mountain Aspen Forest and Woodland

Habitat	Forest-wide coverage (total Landfire acres)	Landfire/GAP Land Cover Unit ¹
Wet subalpine or Douglas fir meadows	108,106	Rocky Mountain Subalpine-Montane Mesic Meadow
Subalpine or Douglas fir grassland	58,446	Northern Rocky Mountain Subalpine-Upper Montane Grassland
Sagebrush steppe	178,895	Artemisia tridentate ssp. Vaseyana Alliance; Columbia Plateau Low Sagebrush Steppe; Columbia Plateau Low Sagebrush Steppe Inter-Mountain Basins Big Sagebrush Shrubland; Inter-Mountain Basins Big Sagebrush Steppe; Inter-Mountain Basins Montane Sagebrush Steppe; Northern Rocky Mountain Montane-Foothill Deciduous Shrubland Wyoming Basins Dwarf Sagebrush Shrubland and Steppe
Lowland grassland steppe	26,354	Introduced Upland Vegetation-Annual Grassland; Introduced Upland Vegetation-Perennial Grassland and Forbland; Northern Rocky Mountain Lower Montane-Foothill-Valley Grassland
Wet lowland meadows	1,177	Rocky Mountain Subalpine-Montane Mesic Meadow; Western Cool Temperate Pasture and Hayland
Riparian	12,282	Rocky Mountain Subalpine/Upper Montane Riparian Forest and Woodland; Rocky Mountain Subalpine/Upper Montane Riparian Shrubland; Rocky Mountain Montane Riparian Forest and Woodland Western Great Plains Floodplain Forest and Woodland Rocky Mountain Montane Riparian Shrubland
Wetlands	5,982	Northern Rocky Mountain Conifer Swamp; Rocky Mountain Wetland-Herbaceous
Open water	14,297	Open Water
Disturbed prairie and semi-desert	2,147	Inter-Mountain Basins Mixed Salt Desert Scrub; Inter-Mountain Basins Semi-Desert Grassland; Inter-Mountain Basins Semi-Desert Shrub-Steppe; Inter-Mountain Basins Sparsely Vegetated Systems
Barren (cliffs & caves)	136,128	Barren; Quarries-Strip Mines-Gravel Pits
Other	21,210	Other habits Outside Forest boundary

Habitat	Forest-wide coverage (total Landfire acres)	Landfire/GAP Land Cover Unit ¹
High gradient streams		Not currently identified

¹Described online at <https://www.landfire.gov/evt.php>.

Aggregated vegetation and cover types were used to represent the habitats of sensitive and management indicator species for breeding, parturition, foraging, local movements, and migration. The total mileage of NFSRs, NFSTs, and OSV routes within each species' habitat was calculated for each alternative, as were the extent of areas open to OSV use (Table 124 and Table 125). Effects from wheeled vehicle use along NFSTs were like those along NFSRs, especially with respect to noise disturbance. The effects from motorized use along both NFSRs and NFSTs to sensitive and management indicator species were therefore considered collectively. Where specific effects attributable to a type of route or type of motorized use differ, they were addressed individually.

Table 124: Mileages of roads and trails open to motorized travel by the public and for administrative use within habitat(s) used by sensitive (S) and management indicator (MI) species on the Shoshone National Forest, based on Landfire/GAP Land Cover Units (see Table 1). R2SA: U.S. Forest Service Region 2 Conservation Assessment; WSWAP: Wyoming State Wildlife Action Plan; MFG: Montana Field Guide; RMADC: Rocky Mountain Avian Data Center.

Sensitive or Management Indicator Species	Species' distribution and seasonal presence (data source)	Species habitat(s) ¹	Forest-wide coverage of species' habitats (acres) ^a	Public and administrative use: Total mileage of road and motorized trail in collective habitat(s) ^a (road & trail density in miles/mi ²)		
				Alternative 1	Alternative 2	Alternative 3
American marten (S)	Common; Widely distributed forest-wide; non-migratory (R2SA)	Subalpine forest; lodgepole pine forest; aspen	1,102,101	317.7 (0.18)	327.6 (0.19)	320.8 (0.19)
Fringed myotis (S)	Uncommon; Clark Fork River; non-migratory (R2SA)	All	2,468,071	925.3 (0.24)	945.6 (0.25)	930.0 (0.24)
Hoary bat (S)	Unknown abundance; Clarks Fork and Wapiti Ranger Districts; non-migratory (Montana Field Guide)	All	2,468,071	925.3 (0.24)	945.6 (0.25)	930.0 (0.24)
River otter (S)	Widely distributed forest-wide; non-migratory	Riparian; wetlands; open water	32,562	25.4 (0.5)	25.1 (0.49)	24.9 (0.49)
Water vole (S)	Widely distributed forest-wide; non-migratory (R2SA)	Subalpine forest; wet subalpine or Douglas fir meadows	1,071,989	303.7 (0.18)	311.0 (0.19)	306.8 (0.19)
Rock Mountain bighorn sheep (S)	Widely distributed forest-wide; migratory (R2SA)	Alpine, Subalpine or Douglas fir grasslands; Sagebrush steppe; Lowland grassland steppe; Disturbed prairie and semi-desert; Barren	884,043.80	372.4 (0.27)	379.0 (0.27)	372.9 (0.27)
White-tailed prairie dog (S)	Eastern half of forest and vicinity; non-migratory (R2SA)	Lowland grassland steppe; Disturbed prairie and semi-desert	28,500	45.0 (1.0)	44.6 (0.99)	45.0 (1.0)

Sensitive or Management Indicator Species	Species' distribution and seasonal presence (data source)	Species habitat(s) ¹	Forest-wide coverage of species' habitats (acres) ^a	Public and administrative use: Total mileage of road and motorized trail in collective habitat(s) ^a (road & trail density in miles/mi ²)		
Burrowing owl (S)	Clarks Fork District, off forest; non-migratory (R2SA)	Lowland grassland steppe; disturbed prairie and semi-desert	28,500	45.0 (1.0)	44.6 (0.99)	45.0 (1.0)
Ferruginous hawk (S)	Unknown abundance; uncommon on forest; Migratory (R2SA)	Lowland grassland steppe; disturbed prairie and semi-desert; sagebrush steppe; limber pine & juniper forests	210,918	316.8 (0.96)	323.0 (0.98)	317.0 (0.96)
Grasshopper sparrow (S)	Uncommon; on and off forest; migratory (R2SA)	Lowland grassland steppe; disturbed prairie and semi-desert	28,500	45.0 (1.0)	44.6 (0.99)	45.0 (1.0)
Loggerhead Shrike (S)	Common; WNDD records off forest; migratory (R2SA)	Lowland grassland steppe; disturbed prairie and semi-desert	28,500	45.0 (1.0)	44.6 (0.99)	45.0 (1.0)
Long-billed curlew (S)	Common; on and off forest; migratory (R2SA)	Wet lowland meadows	1,177	0.0 (0.01)	0.0 (0.01)	0.0 (0.01)
Mountain plover (S)	Common; on and off forest; migratory (R2SA)	Disturbed prairie and semi-desert	2,146	1.4 (0.47)	1.4	1.4 (0.45)
Short-eared owl (S)	Common; off forest; migratory (R2SA)	Lowland grassland steppe; disturbed prairie and semi-desert; sagebrush steppe; riparian; wetlands	225,660	338.4 (0.96)	344.3 (0.98)	338.2 (0.96)
Townsend's big-eared bat (S)	Freemont County; migratory and non-migratory (R2SA)	All	2,468,071	925.3 (0.24)	945.6 (0.25)	930.0 (0.24)
American peregrine falcon (S)	Widely distributed; migratory (WSWAP)	Riparian; wetlands; open water	32,562	25.4 (0.5)	25.1 (0.49)	24.9 (0.49)
Bald eagle (S)	Nests only along the North Fork Shoshone River; migratory (WSWAP)	All	2,468,071	925.3 (0.24)	945.6 (0.25)	930.0 (0.24)

Sensitive or Management Indicator Species	Species' distribution and seasonal presence (data source)	Species habitat(s) ¹	Forest-wide coverage of species' habitats (acres) ^a	Public and administrative use: Total mileage of road and motorized trail in collective habitat(s) ^a (road & trail density in miles/mi ²)		
Black-backed woodpecker (S)	Widely distributed; non-migratory (R2SA; Black Hills)	Subalpine forests; lodgepole pine forest; Douglas fir forest; aspen	1,417,449	397.4 (0.18)	410.1 (0.19)	400.9 (0.18)
Boreal owl (S)	Widely distributed; non-migratory (WSWAP)	Subalpine forests; lodgepole pine forest; aspen	1,102,101	317.7 (0.18)	327.6 (0.19)	320.8 (0.19)
Brewer's sparrow (S, MI)	Widely distributed; migratory (R2SA)	Sagebrush steppe	178,895	269.5 (0.96)	276.1 (0.99)	269.7 (0.96)
Greater sage-grouse (S)	Limited to east forest boundary; migratory and non-migratory (Wyoming Game and Fish Department website)	Lowland grassland steppe; disturbed prairie and semi-desert; sagebrush steppe	207,395	314.5 (0.97)	320.7 (0.99)	314.7 (0.97)
Harlequin duck (S)	Rivers and creeks; migratory (R2SA)	High-gradient waterways	Not available	-	-	-
Northern goshawk (S)	Widely distributed; migratory (R2SA)	Subalpine forests; lodgepole pine forest; Douglas fir forest; aspen	1,417,449	397.4 (0.18)	410.1 (0.19)	400.9 (0.18)
Northern harrier (S)	Widely distributed; migratory (R2SA)	Lowland grassland steppe; disturbed prairie and semi-desert; sagebrush steppe; riparian; wetlands	225,660	338.4 (0.96)	344.3 (0.98)	338.2 (0.96)
Olive-sided flycatcher (S)	Widely distributed; migratory (R2SA); RMADC: increasing since 2013)	Subalpine forests; lodgepole pine forest; Douglas fir forest; aspen	1,417,449	397.4 (0.18)	410.1 (0.19)	400.9 (0.18)
Trumpeter swan (S)	Does not occur on the Forest, but habitat present; migratory (R2SA)	Wetlands; riparian	18,264	23.9 (0.83)	23.6 (0.82)	23.5 (0.81)

Sensitive or Management Indicator Species	Species' distribution and seasonal presence (data source)	Species habitat(s) ¹	Forest-wide coverage of species' habitats (acres) ^a	Public and administrative use: Total mileage of road and motorized trail in collective habitat(s) ^a (road & trail density in miles/mi ²)		
Monarch butterfly (S)	Widely distributed; migratory	Lowland grassland steppe; disturbed prairie and semi-desert; riparian; wetlands	46,765	68.9 (0.94)	68.3 (0.94)	68.5 (0.94)
Western bumblebee (S)	Widely distributed; non-migratory	All	2,468,071	925.3 (0.24)	945.6 (0.25)	930.0 (0.24)
Ruffed grouse (MI)	Widely distributed; non-migratory (R2SA)	Aspen	41,120	47.7 (0.75)	48.6 (0.76)	48.3 (0.75)
Red-breasted nuthatch (MI)	Widely distributed; fully or partially migratory (MFG); RMADC: declining since 2014)	Subalpine forests; lodgepole pine forest; Douglas fir forest; limber pine & juniper forest Aspen	1,420,972	399.7 (0.18)	412.4 (0.19)	403.3 (0.18)
Hudsonian emerald (S)	Not likely to occur on or near the forest—not carried forward for analysis (R2SA)	Dismissed from further analysis				
Spotted bat (S)	Several sites in Wyoming; not known to occur on or near the forest (R2SA)	Dismissed from further analysis				
Black tern (S)	Uncommon; not known to occur on or near the forest (R2SA)	Dismissed from further analysis				
Lewis's woodpecker (S)	Uncommon; Clark Fork and Washakie Districts, off forest; migratory (R2SA)	Dismissed from further analysis due to lack of breeding habitat (ponderosa pine forests)				

Table 125: Mileages and densities of groomed and ungroomed trails and acreages of over-snow travel available in habitats used by non-migratory sensitive and management indicator species. Migratory species (not present during winter) were excluded. Table 3 lists the species' habitats and acreages, and their migratory status.

Sensitive or Management Indicator Species	Total mileage of groomed and ungroomed trails available for over-snow travel in species' habitat ^a (route density in miles/mi ²)			Total acreage of species' habitat open to over-snow travel (% of all available habitat)		
	Alternative 1	Alternative 2	Alternative 3	Alternative 1	Alternative 2	Alternative 3
American marten (S)	134.0 (0.08)	136.9 (0.08)	134.0 (0.08)	298,791 (27)	297,656 (27)	295,878(27)
Fringed myotis (S)	276.6 (0.07)	286.7 (0.07)	276.6 (0.07)	522,687 (21)	521,337 (21)	512,167 (21)
Hoary bat (S)	276.6 (0.07)	286.7 (0.07)	276.6 (0.07)	522,687 (21)	521,337 (21)	512,167 (21)
River otter (S)	13.2 (0.26)	13.8 (0.27)	13.2 (0.26)	11,473 (35)	11,451 (35)	11,093 (34)
Water vole (S)	13.2 (0.01)	13.8 (0.01)	13.2 (0.01)	11,473 (1)	11,451 (1)	11,093 (1)
Bighorn sheep (S)	60.9 (0.05)	65.0 (0.04)	60.9 (0.05)	114,900 (13)	114,829 (13)	108,003 (12)
White-tailed prairie dog (S)	3.1 (0.07)	3.3 (0.07)	3.1 (0.07)	7,453 (26)	7,451(26)	7,449 (26)
Burrowing owl (S)	3.1 (0.07)	3.3 (0.07)	3.1 (0.07)	7,453 (26)	7,451(26)	7,449 (26)
Townsend's big-eared bat (S)	276.6 (0.07)	286.7 (0.07)	276.6 (0.07)	522,687 (21)	521,337 (21)	512,167 (21)
Black-backed woodpecker (S)	142.4 (0.06)	145.8 (0.07)	142.4 (0.06)	361,280 (25)	360,103(25)	358,316 (25)
Boreal owl (S)	134.0 (0.08)	136.9 (0.08)	134.0 (0.08)	298,791 (27)	297,656 (27)	295,878 (27)
Greater sage-grouse (S)	37.9 (0.12)	40.8 (0.13)	37.9 (0.12)	56,413 (27)	56,361 (27)	56,328 (27)
Western bumblebee (S)	276.6 (0.07)	286.7 (0.07)	276.6 (0.07)	522,687 (21)	521,337 (21)	512,167 (21)
Ruffed grouse (MI)	15.8 (0.25)	15.9 (0.25)	15.8 (0.25)	21,624 (53)	21,522(53)	21,513 (53)
Red-breasted nuthatch (MI)	142.4 (0.06)	145.9 (0.07)	142.4 (0.06)	362,262 (25)	361,085 (25)	359,298(25)

For bighorn sheep, the mileage of open NFS routes within crucial winter range during the winter period (December 1 or January 1 through April 30) and the miles of open NFS routes during the birthing period within parturition areas were calculated for the Absaroka and Whiskey Mountain herds (Table 126). Bighorn sheep crucial winter range areas were generally not allocated for OSV use under the Forest Plan (except for select “exemption areas”), thus OSV use was not an issue.

Table 126: Miles of NFS routes for wheeled vehicle use within bighorn sheep crucial winter range and parturition range under the three travel management alternatives.

Herd Unit	Alternative 1		Alternative 2		Alternative 3	
	Miles in Crucial Winter Range	Miles in Parturition Range	Miles in Crucial Winter Range	Miles in Parturition Range	Miles in Crucial Winter Range	Miles in Parturition Range
Absaroka	30.3	24.5	30.3	24.3	28.3	22.0
Whiskey Mountain	3.5	0	3.5	0	3.5	0

Sensitive and management indicator habitats were identified from peer-reviewed literature, the Wyoming State Wildlife Action Plan, and Species of Greatest Conservation Need (online at <https://wgfd.wyo.gov/Habitat/Habitat-Plans/Wyoming-State-Wildlife-Action-Plan>), A Conservation Plan For Bats in Wyoming (Hester and Grenier 2005), the Montana Field Guide (online at <http://fieldguide.mt.gov/>), Wyoming Natural Diversity Database occurrence records, and the U.S. Forest Service Region 2 Conservation Assessments (online at <https://www.fs.usda.gov/detail/r2/landmanagement/?cid=stelprdb5177128>). Potential effects to species under the alternatives were also developed from this literature. The Wyoming State Wildlife Action Plan and Montana Field Guide provided detailed species accounts, including information on habitat requirements, distribution, population trends, and conservation concerns. The Rocky Mountain Avian Data Center (online at <http://rmbo.org/v3/avian/Home.aspx>) provided forest-wide trend data for some species.

3.15.2.1 Resource Indicators and Measures

Table 127: Effects indicators used to gauge and compare the effects of the alternatives on sensitive and management indicator species.

Issue	Effects Indicator	Source
Sensitive and management indicator species’ responses to disturbance by wheeled vehicles and habitat loss along NFSRs and NFSTs.	Mileage and densities of NFSRs and NFSTs available for wheeled vehicle use (public and administrative) in habitats of sensitive and management indicator species.	Forest Plan Standard SEN-STAND-07
Effects of wheeled vehicles and OSVs on sensitive and management indicator species during their winter and reproductive seasons.	Mileage and densities of OSV routes and acreage open to OSV use in habitats of sensitive and management indicator species. Mileage and densities of seasonally closed NFSRs and NFSTs.	Forest Plan Standards and Guidelines: SEN-STAND-02, SENS-Guide-03, SENS-Guide-06.

3.15.3 Environmental Consequences

3.15.3.1 Effects Common to All Alternatives

Abundant habitat for nearly all sensitive and management indicator species is available on the Shoshone National Forest, variously 29–3,800 mi² per taxa (Table 124). A “backcountry” Forest, much the Shoshone’s wildlife habitat lacks roads due to large acreages of designated wilderness (1.4 million acres forest-wide), areas managed as roadless habitat, or limitations on road construction imposed by steep terrain or unfavorable soils (Figure 6). Animals in roadless areas live “disturbance free,” that is, not directly affected by motorized travel. The Forest’s un-roaded habitat alone is likely enough acreage to support viable populations of most sensitive and management indicator species.

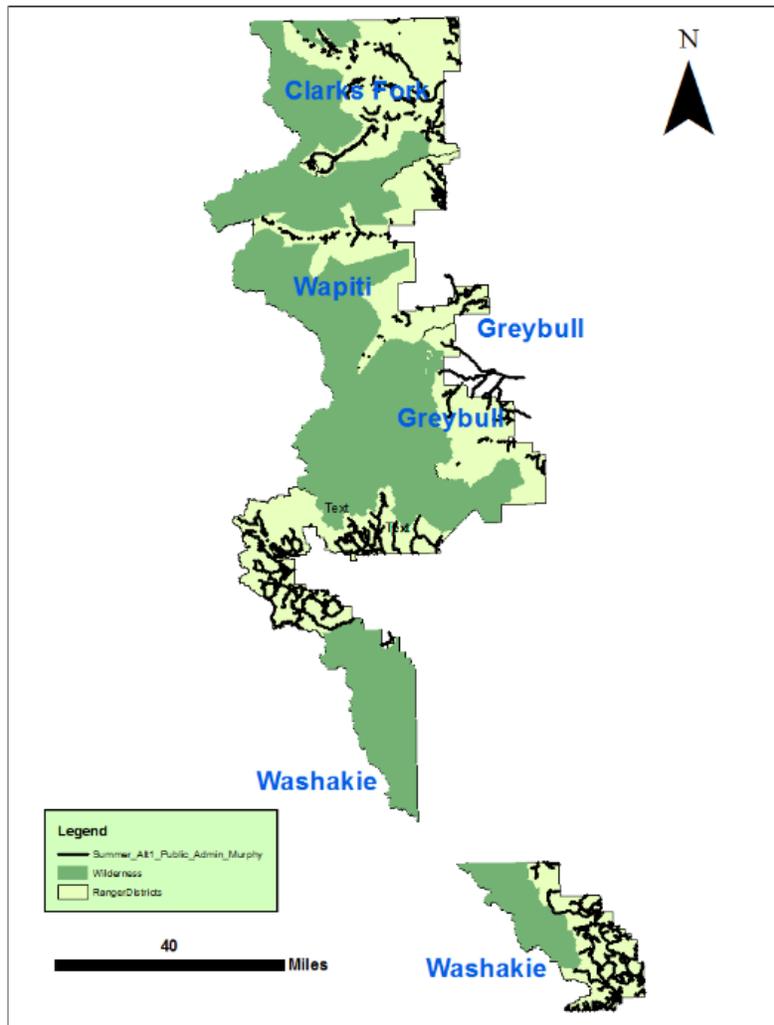


Figure 6: Roads and motorized trails open to the public and for administrative use only, Alternative 1. Nonetheless, motorized activity from wheeled vehicles on NFSRs and NFSTs may affect resident and migratory animals that live in the road corridor. Direct and indirect effects of this activity on

wildlife include mortality; noise and visual disturbance to breeding, offspring rearing, feeding, and sheltering; behavioral avoidance of road corridors and adjacent native habitats; habitat modification from construction, maintenance, and introduction of exotic species; impediments to road crossings; and habitat fragmentation. (Forman and Alexander 1998, Trombulak and Frizzell 2001, Coffin 2007, Barber et al. 2009) These effects depend upon the species' physical and behavioral characteristics, the mileage of roads in the area, the width of road corridors (the travel surface, road shoulder, and managed vegetation), and the number and speed of vehicles. Raptors such as goshawks are sensitive to human disturbances like motorized use during their breeding and nesting season. (Reynolds et al. 1992) In contrast, bats would be little affected by motorized activity because of their nocturnal and crepuscular habit, with activity peaks that have little temporal overlap with motorized activity during midday. Migratory species (Table 124) such as the ferruginous hawk would not be affected by OSV or wheeled vehicle use during the winter and early spring because they are absent from the Forest during these seasons.

Noise and visual disturbance from wheeled vehicle use on roads and trails is expected to decrease as the level of use decreases and the linear distance from the route increases. For example, visual and noise disturbance associated with wheeled vehicles might reduce bird density and diversity along highways, with an "effects zone" of wildlife disturbance that commonly extends up to 1,025 yards, depending on the species and habitat. (Reijnen et al. 1995, Reijnen et al 1996, Forman and Alexander 1998)

For NFSRs, the level and type of wheeled vehicle use—and associated effects on wildlife—is correlated to maintenance level, as well as open/close status. Maintenance level 2 and 3 roads—the most common type on the Forest—tend to be single lane, low speed, and support low-to-moderate levels of traffic. These roads are less likely to have mortality and disturbance effects for birds and mammals when compared with highways. These ML 2 and 3 roads are expected to have more wildlife disturbance than level 1 (primitive and closed to all travel) and seasonally closed roads. The former category also has larger impact zones (footprints) that reduce habitat for some wildlife.

Several factors potentially mitigate effects on sensitive and management indicator species from wheeled vehicle use of NFSRs and NFSTs. Travel activity generally occurs during daylight hours, which reduces avoidance of roadside habitat and road crossings by wildlife at night. Because little modification of native vegetation (wildlife habitat) beyond the 2-foot road shoulder would occur (i.e., clear zone not maintained, except for the removal of hazard trees), roads would have little effect on adjacent habitat. There would also be little management of peripheral vegetation along motorized trails, save for removal of hazard trees.

Effects to sensitive and management indicator species from wheeled vehicle use of administrative roads are expected to be much less when compared to effects from wheeled vehicle use of routes open to the public. Use of these roads is limited to Forest Service personnel, special use permittees, and other authorized officials. This use is therefore limited and intermittent.

Like the NFS routes for wheeled vehicles, the Forest provides large areas of wildlife habitat for sensitive and management species where OSV use is prohibited. However, some disturbance and displacement effects on sensitive and management indicator species due to OSV use is anticipated for all three alternatives. OSV use coincides with periods of increased energy demand

(i.e., winter season): wildlife requires additional energy due to thermal stress and movement through snow, as well as birthing, lactation, and provisioning offspring. Studies have documented disturbance and displacement of ungulates and wolves due to OSV use. (Dorrance et al. 1975, Moen et al. 1982, Creel et al. 2002) And studies have shown that snow compaction from OSV use increases thermal stress and metabolic rates of small mammals and creates barriers to movement. (Schmid 1971, Neumann and Merriam 1972) Beneficial impacts have also been studied. These include the increased movement and access that compacted OSV trails offer wildlife. (Neumann and Merriam 1972, Richens and Lavigne 1978)

To reduce motorized disturbance, the three alternatives include seasonal restrictions on the use of NFSRs and NFSTs and limit OSV use to specific areas of the Forest. Seasonal restrictions are intended to protect sensitive or management indicator species and other wildlife from disturbance during their winter and reproductive seasons. Likewise, 10 standards and guidelines that are applicable to the three alternatives under consideration are set forth in the Shoshone National Forest Plan. These also seek to reduce motorized disturbance. The Forest satisfies the standards and guidelines through project design features.

3.15.3.2 Environmental Consequences of Alternative 1

This section discloses the environmental impacts of Alternative 1, the no action alternative. It establishes the existing NFS route system, without extensive changes, as a baseline for the current effects of travel management on sensitive and management indicator species.

3.15.3.2.1 Direct and Indirect Effects of No Action

Issue 1: Whether the use of NFSRs and NFSTs by wheeled vehicles identified under Alternative 1 would affect sensitive and management indicator species and/or their habitat to the extent the effects contribute to declining populations on the Shoshone National Forest and a trend toward federal listing.

Large swaths of the Shoshone National Forest that are currently devoid of roads and motorized trails provide un-fragmented habitat, refugia from vehicle disturbance, and source populations of sensitive and management indicator species. These areas contribute to the persistence of populations, despite potential impacts to species in other areas subject to wheeled vehicle use. Where NFSRs and NFSTs occur, the important direct (same time and place) and indirect (occurs later in time or further in space) impacts of the no-action Alternative are disturbance and displacement of animals and minor habitat loss.

Average road densities across the Forest under this alternative do not exceed 1 mile per mi² in any species' habitat. In fact, habitat road densities across are often less than 0.5 mile of road per mi² of habitat (Table 124). Although road density of 1 mile per mi² is not a documented biological threshold for sensitive and management indicator species, it is often used to limit road densities in National Forest management. Road densities would be highest (> 0.5 miles per square mile) for species that use low-elevation grassland and sagebrush steppe such as the grasshopper sparrow and loggerhead shrike. In these habitats, displacement and disturbance effects of wheeled vehicle use would be greatest, but still unlikely to affect the trend of wildlife populations owing to the abundance of un-roaded habitat on the Forest.

Jurisdictions of the Forest with greater mileages of NFSRs and NFSTs would include non-wilderness portions of the Wind River and Washakie Ranger Districts. Here average route densities for all habitats combined would reach 0.81 and 1.1 miles per mi², respectively. Disturbance and displacement effects on wildlife will be greatest in these areas, though adequate un-roaded habitat would remain available elsewhere on the Forest.

Sixty-nine miles of NFSRs are designated as administrative use only under Alternative 1. Some effects from forest management activities such as timber sales may involve frequent but temporary use of these roads. When use presents the potential for discrete and articulable impacts to a species, mitigation strategies will be considered to minimize the effects. Furthermore, NFSRs designated as maintenance level 1 under Alternative 1 (totaling 179 miles) would have minor effects on sensitive and management indicator species: these roads are placed in storage and not open for any use.

Issue 2: Whether and to what extent the use of OSVs and wheeled vehicles identified under Alternative 1 would affect sensitive and management indicator species during winter and reproductive seasons.

Generally, OSV use proposed under Alternative 1 would have little effect on wintering or breeding activity of sensitive and management indicator species on the Forest. Density of OSV routes within habitats used by resident (non-migratory) sensitive and management indicator species would be low across the Forest as a whole, typically less than 0.20 miles per mi² of habitat (Table 125). These low densities characterize the Clarks Fork, Greybull, and Wapiti ranger districts that average less than 0.15 miles per mi². However, some localized impacts may occur where use is concentrated. OSV route densities would be highest in non-wilderness portions of the Wind River and Washakie Ranger Districts, averaging 0.41 and 0.27 miles of groomed and ungroomed trails per mi² (Figure 7).

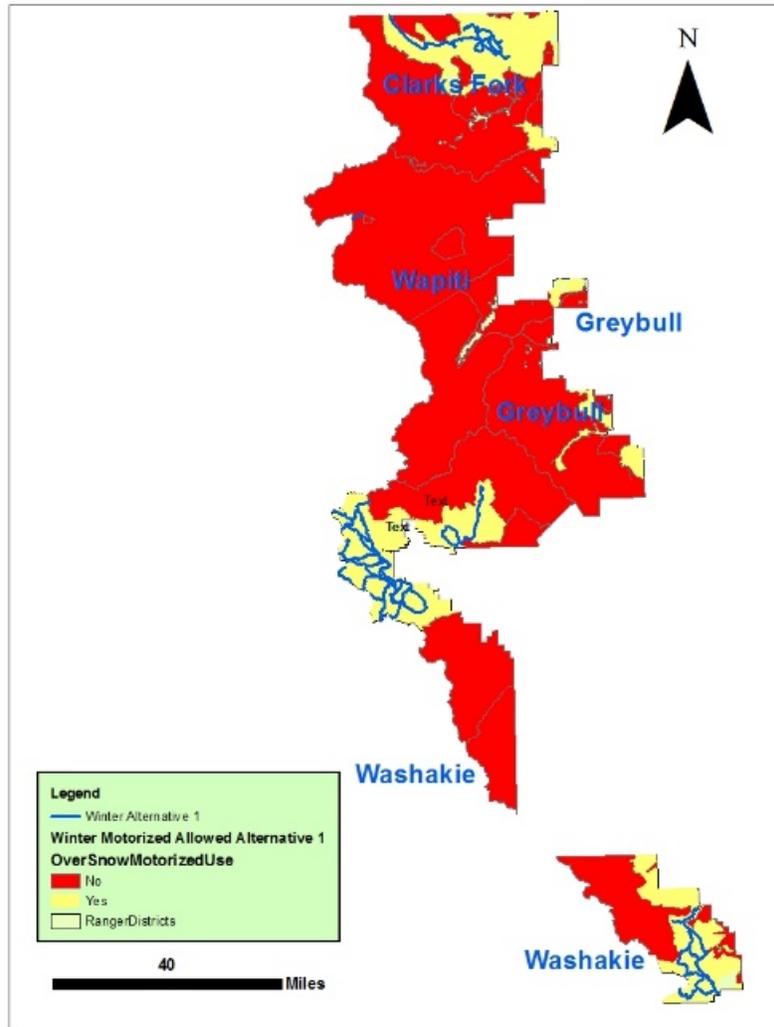


Figure 7: Groomed and ungroomed OSV trails and OSV use areas open to the public, Alternative 1.

The extent of overlap between areas open for OSV use and resident sensitive and management indicator habitats would typically be less than 30% forest-wide, meaning, less than a third of a species' habitat would be subject to disturbance and displacement effects of motorized travel, and the secondary effect of increased snow compaction. Other effects like damage to shrubs and young trees due to off-trail OSV travel may occur (Neuman and Merriam 1972) but are expected to be rare as this use occurs predominantly in alpine areas devoid of vegetation above the snow surface.

Alternative 1 would additionally apply seasonal restrictions to 301 miles of NFS routes (32% of all NFSRs and NFSTs open to the public). These restrictions, which include winter and spring periods, benefit sensitive and management indicator species by decreasing disturbance during periods of high energy demand and vulnerability.

The effects of motorized travel on bighorn sheep in crucial winter range and parturition areas would be small, especially for the Whiskey Mountain herd where motorized access during all

seasons is very limited (Table 126). By comparison, several crucial winter range and parturition areas identified for the Absaroka herd have greater densities of motorized routes. However, the Absaroka herd also has available large acreages of crucial winter and parturition range that do not support motorized use.

3.15.3.3 Environmental Consequences of Alternatives 2 and 3

This section discloses the environmental impacts of Alternatives 2 and 3. By modifying the NFSR and NFST system proposed in Alternative 1, these alternatives change disturbance and displacement impacts on sensitive and management indicator species and affect their habitats at roadside. The extent of effect is commensurate with total miles of NFSRs and NFSTs and seasonal restrictions on use.

3.15.3.3.1 Direct and Indirect Effects of Alternatives 2 and 3

The anticipated direct and indirect impacts of Alternatives 2 and 3 are very similar to those of Alternative 1, the No Action Alternative: motorized use would have minor effects on populations of sensitive and management indicator species at the forest-wide scale. Motorized use may affect populations of species along roads, but these effects would be limited in scale and scope.

Issue 1: Whether the use of NFSRs and NFSTs by wheeled vehicles identified under Alternatives 2 and 3 would affect sensitive and management indicator species and/or their habitat to the extent they contributed to declining populations on the Shoshone National Forest and a trend toward federal listing.

NFS route mileages and densities across the Forest would remain low under Alternatives 2 and 3—significant acreages of wildlife habitat lacking NFS routes open to wheeled vehicles would remain intact. Proposed changes in mileages of NFSRs and NFSTs would neither appreciably affect route densities, nor the extensive acreage of habitats available to most sensitive and management indicator species. Consequently, disturbance and displacement effects on sensitive and management indicator species, and effects on their populations, are expected to be minor at the Forest scale.

For both alternatives, road densities would not exceed 1 mile per mi² for all species and be less than 0.5 miles of road per mi² for most (Table 124). As with Alternative 1, displacement and disturbance effects of these alternatives are expected to be greater in habitats such as grasslands and sagebrush steppe because road densities in these and similar habitats would be the highest.

Average densities of NFSRs and NFSTs under Alternative 2 are higher (versus Alternative 1), especially in non-wilderness portions the Wind River Ranger District, reaching 1.1 miles per mi². Densities under Alternative 2 would decline to 1.0 miles per mi² in non-wilderness portions of the Washakie Ranger District. For Alternative 3, average road densities and the effects would be very similar to Alternative 1.

Alternatives 2 and 3 propose to add or remove NFSRs available for public or administrative travel, change (convert) the allowable wheeled vehicle use from NFSRs to NFSTs and add/or modify seasonal restrictions on the use of NFS routes. Alternative 2 would add three-fold more mileage of new NFSRs and NFSTs when compared with Alternative 3—though the number of new routes remains low under both alternatives.

Both Alternative 2 and Alternative 3 reduce impacts to sensitive and management indicator species through road decommissioning, road restrictions, and conversion to administrative use (Table 128). The conversion of several NFSRs to NFSTs in Alternative 2 (143 miles) and Alternative 3 (153 miles) would not affect sensitive or management indicator species because automobiles, ATVs, UTVs, and motorcycles would similarly disturb and/or displace animals from the road corridor except where motorized use may decline.

Table 128: Changes in management of National Forest System roads (NFSR) and trails (NFST) on sensitive and management indicator species, Alternatives 2 and 3, as compared the existing road system (Alternative 1). (+): positive effects (dark gray rows); (-): negative effects (light gray rows); (o): no effect (no shade).

Activity	Effect on sensitive and management indicator species	Alternative 2 (miles)	Alternative 3 (miles)
Decommission existing NFSR roads [G]	(++)	11	5
Convert existing NFSR public road to administrative use only [H]	(+)	6	10
Convert existing unclassified roads to Maintenance Level 1—closed to all travel [I]	(+)	68	4
Add existing unclassified roads to NFSR open to the public [J]	(-)	11	5
Add new motorized trails open to OHVs ≤ 64" width [K]	(--)	24	3
Convert existing roads to NFST open to OHVs ≤ 64" width or open to all size vehicles [L]	(o)	143	153

Issue 2: Whether and to what extent use of OSVs and wheeled vehicles identified under Alternatives 2 and 3 would affect sensitive and management indicator species during their winter and reproductive seasons.

OSV use proposed under Alternative 2 and Alternative 3 would not affect wintering or breeding activity of sensitive and management indicator species on the Forest as a whole. Mileages of OSV trails within habitats used by sensitive and management indicator species would be low under these Alternatives (typically < 0.2 miles per mi² of habitat forest-wide (Table 125)). Alternative 2 would add only 10 total miles of OSV trails compared with Alternative 1. These trails would occur primarily in subalpine fir and Douglas fir forests and meadows, as well as sagebrush steppe habitats. Alternative 3 proposes no changes in OSV routes and would affect species similarly to Alternative 1.

The overlap of species habitats with areas open to OSV use in Alternatives 2 and 3 (typically < 30%) would also differ little from Alternative 1 (Table 124). Alternative 2 would close 1,350 acres of wildlife habitat to OSV use. Alternative 3 would have more wildlife benefits by closing 10,525 acres to OSV use. The reduction in use of Class 2 OSVs on groomed and ungroomed trails in Alternative 2 and Alternative 3 would not measurably reduce disturbance to resident sensitive and

management indicator species because routes with this limitation would remain open to OSV travel.

Seasonal road restrictions under Alternatives 2 and 3 would affect sensitive and management indicator species similarly to Alternative 1. Alternative 2 proposes 518 miles of seasonally restricted NFSRs, accounting for 55% of all NFS routes open to the public. Alternative 3 proposes 513 miles of seasonally restricted NFSRs, accounting for 57% of NFS routes. Miles of open NFS routes within bighorn sheep crucial winter range and parturition range change little under both action alternatives, including for the Absaroka and Whiskey Mountain bighorn sheep herds.

Mitigation measures implemented as seasonal restrictions on NFS routes under Alternatives 2 and 3 and set forth in the Forest Plan will protect species from disturbance during their winter and reproductive seasons.

Biological evaluations require a determination of the effects of the project alternatives on sensitive species. The three alternatives are consistent with Forest Service policy for sensitive species. The direct, indirect, and cumulative effects of the three alternatives on sensitive species evaluated in this analysis “may impact individuals but are not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing.” Likewise, determinations for management indicator species evaluated in this report are: the direct, indirect, and cumulative effects of the alternatives would not contribute to declining populations on the Shoshone National Forest. An adequate quantity of healthy aspen, subalpine forest, and sagebrush habitat would be sustained if any of the three alternatives were implemented.

3.15.3.4 Cumulative Effects of Alternatives 2 and 3

The important past, present, and foreseeable actions that contribute cumulatively to the effects of the analyzed alternatives on sensitive and management indicator species include federal highway reconstruction (1 project); forest road improvement (1 project); vegetation management (11 projects as various commercial timber sales, non-commercial treatments, and prescribed fires), and grazing permit renewals and issuances. These actions pose discrete disturbance and displacement effects on sensitive and management indicator species during project implementation (*e.g.*, road construction, active vegetation management) and/or affect habitat acreage, horizontal and vertical structure of habitat, and food availability for sensitive and management indicator species over the long-term. Overall, the effects of the individual cumulative actions and the cumulative effects on sensitive and management indicator species are expected to be minor at the forest-wide scale because the projects would cover small areas and would be temporary (typically less than 3 years in duration). The effects of habitat modification associated with vegetation management and grazing would be longer term but minor in intensity because they also would occur over a small fraction of the entire Forest.

3.15.4 Consistency with Relevant Laws, Regulations, and Policy

3.15.4.1 Land and Resource Management Plan

The Shoshone National Forest Land and Resource Management Plan provides standards and guidelines for forest management activities that affect sensitive and management indicator species throughout the Forest:

- Design management actions in habitats for sensitive species to avoid contributing to a trend towards Federal listing (SENS-STAND-07);
- Design management actions to limit effects (disturbance, mortality, and snag loss) for nesting, denning, roosting, and wintering populations of birds and bats (SENS STAND-02, SENS STAND-03, SENS STAND-08, SENS STAND-09, SENS STAND-10; and SENS GUIDE-02);
- Apply seasonal access restrictions to bighorn sheep lambing and winter ranges to reduce human disturbance (SENS GUIDE-13); other Forest Plan guidance for bighorn sheep relative to crucial winter range and parturition habitat is similar to that described for elk, mule deer, and moose in the Species of Local Concern section; and
- Provision wildlife crossings as needed (SENS GUIDE-14 and SENS GUIDE-15).

All three travel management alternatives are consistent with this direction. Effects to sensitive and management indicator species would not be enough to trend Forest populations toward federal listing under the Endangered Species Act, though localized impacts from motorized use would be greater in intensity, especially for species that reside along roads. Despite these localized impacts, effects associated with motorized use proposed under the alternatives analyzed above would be consistent with the Forest Plan.

The alternatives would also be consistent with Forest Plan direction for the Absaroka and Whiskey Mountain bighorn sheep herds. Motorized use continued under Alternative 1 would be compatible with maintaining the function of crucial winter range and parturition areas for these herds. Similar results are expected under Alternatives 2 and 3 based on equivalent or slight decreases of motorized access in crucial winter range and parturition areas compared to Alternative 1. Goals, standards, and objectives with respect to the herd would also be furthered via road restrictions and project design features. These actions provide additional protection from disturbance and displacement from roadside areas during the winter and reproductive (late winter, spring, and early summer) seasons.

3.15.4.2 Other Relevant Law, Regulation, or Policy

3.15.4.2.1 *Biological Evaluation and Forest Service Sensitive Species Policy*

The report constitutes a biological evaluation that addresses Forest Service sensitive species in accordance with Forest Service manual direction (FSM 2672).

Sensitive species are defined as those plant and animal species (identified by the Regional Forester) for which population viability is a concern, as evidenced by a:

- Significant current, or predicted, downward trend in population numbers or density; or
- Significant current or predicted, downward trend in habitat capability that would reduce a species' existing distribution (FSM 2670.5).

The Forest Service objective for sensitive species management is to "ensure that Forest Service actions do not contribute to loss of viability of any native or desired non-native plant or contribute to trends toward Federal listing of any species, and (2) provide a process and standard

by which to ensure that threatened, endangered, proposed, and sensitive species receive full consideration in the decision making process (FSM 2672.41).

Sensitive native plant and animal species must receive special management emphasis to ensure their viability and to preclude trends toward endangerment that would result in the need for federal listing. There must be no impacts to sensitive species without an analysis of the potential significance of adverse effects on the populations, its habitat, and on the viability of the species. The Forest Service policy for sensitive species is to:

- Assist states in achieving their goals for conservation of endemic species;
- As part of the NEPA process, review programs and activities through a biological evaluation, to determine their potential effect on sensitive species;
- Avoid or minimize impacts to species whose viability has been identified as a concern;
- If impacts cannot be avoided, analyze the significance of potential adverse effects on the population or its habitat within the area of concern and on the species as a whole; and
- Establish management objectives in cooperation with the states when projects on National Forest System lands may have a significant effect on sensitive species population numbers or distributions.

3.15.4.2.2 National Forest Management Act of 1976

The National Forest Management Act provides for balanced consideration of all resources. It requires the Forest Service to plan for a diversity of plant and animal communities. Under its regulations, the Forest Service is to manage for viable populations of native and desired non-native species, and to maintain and improve habitat of management indicator species.

The three alternatives meet the National Forest Management Act by maintaining wildlife habitat and maintaining diverse and viable populations of sensitive and management indicator species. Motorized use would be balanced with management of wildlife habitat in wilderness and roadless areas. Seasonal restrictions on the use of roads and motorized trails and adherence to existing Forest Plan standards and guidelines would reduce impacts of motorized travel on wildlife during their winter and reproductive seasons.

3.15.4.2.3 Migratory Bird Treaty Act

The Migratory Bird Treaty Act prohibits the killing, capture, "take," or otherwise harming of birds listed as migratory. Migratory species include most types of birds, including waterfowl and most songbirds and hawks. Section 703 of the act states, "unless and except as permitted by regulations, it shall be unlawful at any time, by any means or in any manner, to take, capture, kill, attempt to take, capture, or kill, or possess any migratory bird, any part, nest, or eggs of any such bird." Executive Order #13186 dated January 10, 2001, further defines the intent of the act and directs that the act applies to Federal agencies.

The 3 alternatives are consistent with the Migratory Bird Treaty Act and Executive Order #13186 because project design features that protect migratory birds will be incorporated into individual travel management activities and projects during their implementation.

3.15.4.2.4 Executive Order 13443 (2007 FR 72(160: 46537) Facilitation of Hunting Heritage and Wildlife Conservation

The purpose of this order is to direct federal agencies that have programs and activities that have a measurable effect on public land management, outdoor recreation, and wildlife management to facilitate the expansion and enhancement of hunting opportunities and the management of game species and their habitat. Section 2 of the order states that federal agencies shall, consistent with agency missions:

- Evaluate the effect of agency actions on trends in hunting participation and, where appropriate to address declining trends, implement actions that expand and enhance hunting opportunities for the public;
- Consider the economic and recreational values of hunting in agency actions, as appropriate;
- Manage wildlife and wildlife habitats on public lands in a manner that expands and enhances hunting opportunities, including the use of hunting in wildlife management planning;
- Work collaboratively with State governments to manage and conserve game species and their habitats in a manner that respects private property rights and State management authority over wildlife resources;
- Establish short- and long-term goals, in cooperation with State and tribal governments, and consistent with agency missions, to foster healthy and productive populations of game species and appropriate opportunities for the public to hunt those species;
- Ensure that agency plans and actions consider programs and recommendations of comprehensive planning efforts such as State Wildlife Action Plans, the North American Waterfowl Management Plan, and other range-wide management plans for big game and upland game birds; and
- Seek the advice of State and tribal fish and wildlife agencies, and, as appropriate, consult with the Sporting Conservation Council and other organizations, with respect to the foregoing Federal activities.

Forest staff analyzed species of local concern (which are big game animals and sensitive bighorn sheep), consulted the Wyoming State Wildlife Action plan in preparing the sensitive species analysis, cooperated with Wyoming Game and Fish Department during preparation of the Revised Forest Plan which identified standards and guidelines for management of species of local concern; worked with them to identify seasonal restrictions to protect species during winter and reproductive seasons, and considered their comments in travel management analysis.

3.15.5 Conclusion

The important direct and indirect effects of wheeled vehicle and OSV use include disturbance and displacement of sensitive and management indicator species from roadside habitats, and local impacts on habitat quantity and quality. For all three alternatives, the effects travel management

on their populations would be minor at the forest-wide scale. The action alternatives add little to mileage and densities of NFSRs, NFSTs, and OSV trails across the Forest when compared with Alternative 1. NFSR, NFST, and OSV route densities, and their associated effects on wildlife, would be greatest in the non-wilderness portions of the Wind River and Washakie Ranger Districts. Nonetheless, the availability of non-roaded areas outside Ranger Districts with high-road density ensure adequate habitat. Seasonal restrictions on the use of NFSRs and NFSTs, and implementation of existing Forest Plan standards and guidelines during project implementation will also reduce impacts of motorized travel on wildlife during winter and reproductive seasons.

3.16 Wildlife: Species of Local Concern

3.16.1 Introduction

The Shoshone National Forest has identified the following species as Species of Local Concern: elk, moose, mule deer, Clark's nutcracker, and Yellowstone checkerspot. This analysis considers the effects to these species from the Alternatives proposed.

3.16.1.1 Issues Addressed

This section includes issues pertaining to Species of Local Concern identified in the Shoshone Forest Plan (USDA Forest Service 2015) that have been identified for detailed analysis.

Issue 1: Whether and to what extent wheeled vehicle and OSV use within the Shoshone National Forest will affect elk, mule deer, and moose use of crucial winter range.

Issue 2: Whether and to what extent wheeled vehicle and OSV use within the Shoshone National Forest will affect elk, mule deer, and moose use of parturition areas.

Issue 3: Whether and to what extent wheeled vehicle and OSV use within the Shoshone National Forest will affect elk security habitat.

Issue 4: Whether and to what extent wheeled vehicle and OSV use within the Shoshone National Forest will affect elk and mule deer migration corridors.

3.16.2 Methodology

This section includes a description of the methods and data used in this analysis. The analysis considers effects to elk, mule deer, and moose from wheeled vehicle and OSV use based on two primary metrics: crucial winter range and parturition areas according to herd units. The additional metric of elk security by herd unit offers a separate means of tracking effects to elk. Wyoming Game and Fish Department (WGFD) mapped winter ranges and parturition areas from survey and animal telemetry location data gathered over the years (Wyoming Game & Fish Department 2002).

Crucial winter ranges are those areas essential for a population to maintain itself at or above State population objectives. (Wyoming Chapter, The Wildlife Society 1990) The Forest Plan includes standards and guidelines that reflect the emphasis placed on protecting these areas and, by association, the big game animals that utilize them. (Forest Plan 2015, SPLC-STAND-03, SPLC-GUIDE-04, SPLC-GUIDE-05, SPLC-GUIDE-09) These standards and guidelines recognize the

potential effect motorized uses have on big game animals. (McCorquodale 2013, Proffitt et al. 2013) These effects include effects from both wheeled vehicle and OSV use (Canfield et al. 1999). These standards and guidelines apply equally to elk, mule deer, and moose.

Quantification of motorized NFS routes (NFSRs and NFSTs) within crucial winter range provides the most efficient and effective means of assessing effects to wintering elk, mule deer, and moose. The analysis calculated the miles of open NFS routes within crucial winter range during the winter period (December 1 or January 1 through April 30) by herd unit for each species. These figures were used as an indicator of the potential for disturbance and displacement from motorized use within these areas.

A similar quantification analysis examines impacts to elk, mule deer, or moose from motorized vehicle use (including wheeled vehicle and OSV use) outside winter dates. This analysis focuses on parturition habitat (rather than the crucial winter range). As with crucial winter range, the parturition area analysis calculated miles of open NFS routes within parturition habitat for each species by herd unit. These effects raise less concern than disturbance or displacement on winter range because (a) energetic costs are lower at this time of year and (b) forage is of higher quality and more widely available. Forest Plan direction (SPLC-GUIDE-09) reflects the diminished risks to these species, recommending (rather than requiring) "seasonal restrictions as needed on motorized use of travelways to reduce disturbance in sensitive big game areas, such as birthing areas and winter range."

An additional metric utilized to consider impacts to elk involves security habitat. The Forest Plan sets an objective to maintain security habitat for big game at or above the minimum condition of 30%, and a desired condition of increasing security habitat within elk herd units that are near or below the 30% level (USDA Forest Service 2015). The Forest Plan incorporated this metric from the analysis of Hillis et al. (1991). This analysis, which was developed in western Montana landscapes, considered elk security habitat as nonlinear blocks of hiding cover 250 acres or more in size and 0.5 mile or more from any open road.

The analysis conducted here incorporates refined methods from Ranglack et al. (2017). Ranglack et al. (2017) evaluated cow elk habitat use in nine populations in Southwest Montana during the fall. These herds include populations located adjacent to the Shoshone National Forest and in similar environments (open terrain and areas with little or no open roads). Based on data, Ranglack et al. (2017) defined elk security habitat during rifle seasons as >1,535 meters (0.95 miles) from open motorized routes, >20 km² in size, and with >9% forested canopy cover.

This analysis calculates the amount of elk security habitat for each herd unit under the alternatives based on the Ranglack et al. (2017) metrics. Specifically, GIS data queries identified elk security habitat based on the metrics. Then, the amount of returned elk security habitat was expressed as a percentage of the elk herd unit on Shoshone National Forest lands.

The analysis conducted includes a qualitative evaluation of the potential for wheeled vehicle and OSV use to affect elk and mule deer migration. Terrain has a strong influence on migration movements on the Shoshone National Forest, with migratory movements spread out and less constricted in areas of gentle terrain versus bottlenecks due to rugged terrain and narrow corridors. The qualitative analysis is based on WGFD animal movement data along this terrain. A quantitative analysis of impacts on migration corridors is not currently available because corridors

have not yet been identified for elk or mule deer herds on the Shoshone. The qualitative analysis incorporated available data from the Clarks Fork, Cody, and Wiggins Fork elk herds, and a smaller amount of data from the Clarks Fork, Upper Shoshone, Owl Creek/Meeteetse, and Dubois mule deer herds.

The analysis does not consider OSV use within elk, mule deer, and moose crucial winter range. The 2015 Forest Plan largely resolved this issue. Areas within crucial winter range are not allocated for OSV use except for select "exemption areas." These exemption areas are within crucial winter range with existing OSV use where WGFD and Shoshone National Forest biologists agreed that use could be accommodated. No changes are proposed in any of the alternatives that would potentially alter the Forest Plan analysis relative to OSV use within crucial winter range.

Additional species of local concern include the Yellowstone Checkerspot and Clark's Nutcracker. Qualitative assessments of the effects of wheeled vehicle and OSV use on the Yellowstone Checkerspot and Clark's Nutcracker were conducted.

The Yellowstone checkerspot is a butterfly with a very restricted range in North America. On the Shoshone, Yellowstone checkerspots have been located in two areas in the Beartooth Mountains, two locations in the Fitzpatrick Wilderness, and one site on the Washakie Ranger District (USDA Forest Service 2014). Yellowstone checkerspots are found in a variety of damp habitats in mountains including open, moist conifer forests, moist meadows, and streamsides (Vaughan and Shepherd 2005). Heavy grazing by domestic or wild ungulates has been identified as the primary threat to this species. Some potential habitat could be lost due to the removal of vegetation where NFS routes are present, but this would be a very small amount. Travel management would have few or no effects on the species under all alternative and effects to this species are not discussed further.

Clark's nutcrackers most likely occur throughout the Shoshone National Forest. A small amount of habitat for this species would be lost due to the removal of trees associated with NFS routes, but these effects would be very small due to the limited scale of the NFS route system and the limited changes proposed in the alternatives. There is no information available to suggest that this species is adversely affected by motorized use. Travel management would have few or no effects on the species under all alternatives and effects to this species are not discussed further.

3.16.3 Environmental Consequences

3.16.3.1 Species Considered in Detail

3.16.3.1.1 Elk

Elk occur across the Shoshone National Forest. The WGFD identified five herd units that overlap the Shoshone National Forest: the Clarks Fork, Cody, Gooseberry, Wiggins Fork, and South Wind River herds. These herds are generally near or above WGFD management objectives except for the Clarks Fork herd. (Wyoming Game & Fish Department 2018a, b) However, population segments of some herds are experiencing low calf recruitment (in turn, causing low elk numbers and reduced hunting opportunities). The Clarks Fork and Cody elk herds exhibit these attributes, with migratory segments having relatively low calf recruitment and non-migratory segments with relatively high recruitment. (Wyoming Game & Fish Department 2018a)

All these elk herds have crucial winter range on the Shoshone National Forest (with crucial winter range also on private, state, or BLM lands). The Clarks Fork and Cody elk herds both have large areas and a high proportion of their overall crucial winter range located on the Shoshone National Forest. The Gooseberry and Wiggins Fork elk herds have a substantial amount of crucial winter range on the Shoshone National Forest, but more of their total crucial winter range is located off the Forest. The South Wind River elk herd has a relatively small amount of crucial winter range on the Forest, and most of the overall crucial winter range for this herd is located off the Forest.

Elk calving season in Northwest Wyoming is generally mid-May through June. Some elk herds calve annually in the same locations and have calving (or parturition) habitats that are defined and mapped by the WGFD. Other elk herds, especially those making long-distance migrations, are more fluid in where they calve depending upon snow melt and forage conditions each year. All these elk herds have a substantial amount of parturition area mapped on the Shoshone National Forest, and for all herds except the Gooseberry herd most of their parturition areas are located on the Forest.

3.16.3.1.2 Mule Deer

Five mule deer herds overlap the Shoshone National Forest: Upper Shoshone, Clarks Fork, Owl Creek/Meeteetse, Dubois, and South Wind River. All these herds are below population objectives primarily due to low fawn recruitment. (Wyoming Game & Fish Department 2018*a, b*) Recent research is showing that many of the deer in these herds (with the likely exception of the South Wind River Herd) make long distance migrations to summer ranges in Grand Teton National Park, Yellowstone National Park, and the Bridger-Teton National Forest that are outside of the herd unit boundaries (University of Wyoming, unpublished data).

The Clarks Fork mule deer herd has a relatively large amount of crucial winter range and a high proportion of its overall crucial winter range on the Shoshone National Forest. The Upper Shoshone River mule deer herd has a relatively large amount of crucial winter range but a lower proportion of their overall crucial winter range located on the Forest. The Dubois and Owl Creek/Meeteetse mule deer herds have a much smaller amount of crucial winter range and a relatively low proportion of their overall winter range located on the Forest, while the South Wind River mule deer herd has almost no crucial winter range on the Forest. Parturition areas have not been mapped for any of these herds, except some for the South Wind River herd.

3.16.3.1.3 Moose

Moose occur at low densities throughout most of the Shoshone National Forest. They are primarily found in the scarce riparian habitats of the Forest. Three moose herd units that overlap the Shoshone National Forest are: the Absaroka, Dubois, and Lander moose herds. (Wyoming Game & Fish Department 2018*a, b*) Of these, the Lander Herd is the only herd with population data available. Current data indicates that population is near the management objective. The Dubois and Absaroka Herds are thought to be experiencing long-term population declines based on anecdotal evidence, although there is evidence that in recent years these herds have stabilized. (Wyoming Game & Fish Department 2018*a, b*)

Relatively large areas of crucial winter range are located on the Shoshone National Forest for all three moose herds, but the Absaroka herd has the largest proportion of its crucial winter range

on the Forest (Table Z). The Absaroka herd is the only moose herd with parturition areas identified on the Forest. Parturition areas have not been identified for the Dubois and Lander moose herds.

3.16.3.2 Environmental Consequences of Alternative 1

This section discloses the environmental impacts of Alternative 1, the no-action alternative.

3.16.3.2.1 Direct and Indirect Effects of Alternative 1

Issue 1: Whether and to what extent wheeled vehicle and OSV use within the Shoshone National Forest will affect elk, mule deer, and moose use of crucial winter range.

A low amount of open motorized routes (including NFSRs, NFSTs, and designated OSV use) occurs within crucial elk, mule deer, and moose winter range (Tables A, B, and C) given the overall amount of crucial winter range available (the South Wind River elk herd is the only exception, *see below*). Seasonal restrictions would preclude motorized uses on several elk and mule deer crucial winter range areas, including those in the Sunlight Creek, Dick Creek, Pickett Creek, and Wiggins Fork areas. However, some disturbance and displacement of elk, mule deer, and moose on crucial winter range would still occur as a result of motorized use on open routes. Despite this use, the amount of crucial elk winter range available on the Forest has been sufficient to provide for the biological needs of elk, mule deer, and moose herds.

For the South Wind River elk herd, there would be a comparably higher amount of open motorized routes relative to the small amount of crucial winter range available. The potential for disturbance and displacement of wintering elk due to use of wheeled vehicles is higher in this area. However, the majority of the crucial winter range for this herd is located off-Forest, limiting the effects to the herd as a whole.

Separately, open motorized routes can facilitate access to crucial winter range areas by horn hunters at a time when animals are vulnerable. Horn hunting has been recognized as an activity with high potential to cause disturbance and displacement of elk, mule deer, and moose because it occurs during the late winter period when animals may be most vulnerable, especially in severe winters. Anecdotal evidence indicates that horn hunting is increasing in popularity on the Forest and occurs at levels with potentially deleterious effects on wintering wildlife. However, horn hunters often access the Forest from highways using non-motorized travel such as hiking or horseback. Therefore, access for horn hunting is only partially controlled by the amount of open Forest Service system motorized routes.

Alternative 1 is consistent with Forest Plan direction applicable to travel management for species of local concern. The majority of motorized routes through crucial winter range would be seasonally closed. Remaining open routes would generally provide access to non-winter range lands or to developed areas such as recreation residences (this use is compatible with maintaining the overall function of crucial winter ranges and is allowed under the Forest Plan). Exceptions include crucial winter range areas on the Washakie Ranger District, where there are high levels of existing motorized use in elk, deer, and moose winter range that is not consistent with Forest Plan direction.

Issue 2: Whether and to what extent wheeled vehicle and OSV use within the Shoshone National Forest will affect elk, mule deer, and moose use of parturition areas.

For mapped parturition areas, the number of motorized routes open during the calving/fawning season are low relative to the overall availability of parturition areas. Seasonal restrictions of motorized uses would further limit potential disturbance and displacement in important parturition areas like Brent Creek and Wolf Creek on the Wind River Ranger District. Animals would have access to high quality parturition areas in places without motorized access.

An exception is the South Wind River elk and mule deer herds, where a significant amount of open motorized routes occurs within parturition areas. Potential disturbance and displacement of elk and deer from parturition areas is higher in these locations. Data indicate that elk and mule deer recruitment rates have been higher in these herd units than for others on the Shoshone National Forest in recent years, including those with lower open NFS route densities during calving/fawning season. (Wyoming Game & Fish Department 2018a, b) High levels of vehicle use within parturition areas on the Washakie Ranger District do not appear to have substantially impacted recruitment rates for these herd units as a whole.

Existing levels of motorized use have been compatible with big game parturition areas. Abundant parturition areas for elk, mule deer, and moose is available in backcountry areas far from motorized routes across much of the Shoshone. Some NFS routes through parturition areas would be seasonally restricted during the birthing period. Vehicle use under Alternative 1 is generally expected to have limited effects on parturition areas for these big game species.

Issue 3: Whether and to what extent wheeled vehicle and OSV use within the Shoshone National Forest will affect elk security habitat.

The Forest Plan objective for elk security habitat would be achieved for four of the five herds on the Shoshone. Elk security habitat would be above the recommended 30% level for the Clarks Fork and Wiggins Fork elk herds (Table D). The Wiggins Fork herd would have an adequate amount of security habitat, but the distribution would not be consistent across the herd unit. The Warm Springs/Union Pass area under the no action alternative has little security habitat due to high levels of open motorized routes and loss of cover due to the 2016 Lava Mountain fire. These low elk security values could result in higher bull elk mortality rates and displacement of elk to areas with higher security values. Security habitat outside this portion of the Wiggins Fork herd unit is abundant and not a concern.

The Cody and Gooseberry elk herds would have slightly less security habitat than the recommended 30% level despite having large amounts of wilderness and roadless areas with no motorized access. These lower values reflect a lack of forest cover due to extensive alpine or burned areas. For these herds, approximately 88% (Cody herd) and 73% (Gooseberry herd) of security habitat areas on Shoshone National Forest lands are more than 1,535 meters from an open NFS route. Motorized access is limited and has a small effect on elk security habitat for these herds.

For the South Wind River herd, the amount of elk security habitat is slightly below the minimum recommended level. The west half of the herd unit has security habitat located almost entirely within the Popo Agie Wilderness. The east half of the herd unit has very little security habitat due to high open NFS route densities. Bull elk seasons are currently short in this area, which is partially a reflection of high vulnerability to hunting due to limited security habitat outside the Popo Agie

Wilderness. The objective for elk security habitat for this herd does not meet Forest Plan direction with respect to this objective.

Issue 4: Whether and to what extent wheeled vehicle and OSV use within the Shoshone National Forest will affect elk and mule deer migration corridors.

Vehicle use would generally have low potential to affect elk and mule deer migrations on the Forest under Alternative 1. Wheeled vehicle use along the Sweetwater Road (FSR 423) and Elk Fork Road (FSR 424)—located on the Wapiti Ranger District—could impact the Upper Shoshone Mule Deer Herd. These roads bisect migration routes for mule deer, and also attract high numbers of hunters due to the relative ease of access to highly vulnerable migrating deer. These NFSRs may facilitate increased buck harvests and lower buck to doe ratios.

Other areas of high NFS route density through which elk and deer migrate include the South Pass, Loop Road, and Warm Spring/Union Pass areas. Wheeled vehicle use likely influences how animals move through these areas as well as vulnerability to hunting during fall migrations. Nonetheless, this use does not preclude animals from accessing important seasonal ranges.

Table 129: Miles of open NFS routes (NFSRs and NFSTs) within elk crucial winter range and parturition range under three travel management alternatives.

Herd Unit	Alternative 1		Alternative 2		Alternative 3	
	Miles in Crucial Winter Range	Miles in Parturition Range	Miles in Crucial Winter Range	Miles in Parturition Range	Miles in Crucial Winter Range	Miles in Parturition Range
Clarks Fork	28.1	70.8	22.8	70.8	22.8	70.8
Cody	34.5	36.1	29.4	35.1	27.8	32.2
Gooseberry	11.8	10.6	2.4	6.9	1.2	6.9
Wiggins Fork	13.6	25.2	13.4	21.2	13.6	16.1
South Wind River	10.1	56.0	0	56.5	0	56.5

Table 130: Miles of open NFS routes (NFSRs and NFSTs) within mule deer crucial winter range and parturition range under three travel management alternatives. Parturition range has only been mapped for the South Wind River herd.

Herd Unit	Alternative 1		Alternative 2		Alternative 3	
	Miles in Crucial Winter Range	Miles in Parturition Range	Miles in Crucial Winter Range	Miles in Parturition Range	Miles in Crucial Winter Range	Miles in Parturition Range
Clark's Fork	10.7	N/A	10.9	N/A	10.9	N/A
Upper Shoshone River	18.9	N/A	13.8	N/A	13.8	N/A
Owl Creek/Meeteetse	4.5	N/A	4.5	N/A	4.5	N/A
Dubois	12.2	N/A	14.1	N/A	14.1	N/A
South Wind River	0.4	8.7	0.4	8.7	0.4	8.7

Table 131: Miles of open NFS routes (NFSRs and NFSTs) within moose crucial winter range and parturition range under three travel management alternatives. Parturition range has only been mapped for the Lander herd.

Herd Unit	Alternative 1		Alternative 2		Alternative 3	
	Miles in Crucial Winter Range	Miles in Parturition Range	Miles in Crucial Winter Range	Miles in Parturition Range	Miles in Crucial Winter Range	Miles in Parturition Range
Absaroka	26.8	8.3	25.9	8.3	24.6	8.3
Dubois	21.5	N/A	22.7	N/A	21.5	N/A
Lander	28.4	N/A	2.5	N/A	2.5	N/A

Table 132: Elk security area as a percentage of each elk herd unit on the Shoshone National Forest for each of three travel management alternatives.

Herd Unit	Elk Security-No Action Alternative	Elk Security- Alternative 2	Elk Security- Alternative 3
Clarks Fork	32.1%	32.0%	32.1%
Cody	29.3%	29.4%	29.5%
Gooseberry	27.6%	27.5%	27.5%
Wiggins Fork	35.7%	35.7%	36.2%
South Wind River	29.1%	29.2%	29.0%

3.16.3.3 Environmental Consequences of Alternatives 2 and 3

This section discloses the environmental impacts of Alternatives 2 and 3.

3.16.3.3.1 Direct and Indirect Effects of Alternatives 2 and 3

Issue 1: Whether and to what extent wheeled vehicle and OSV use within the Shoshone National Forest will affect elk, mule deer, and moose use of crucial winter range.

Alternative 2 and 3 propose more seasonal restrictions during the winter/spring period. These seasonal restrictions would reduce the miles of open NFS routes within crucial winter range for all elk herds (except the Wiggins Fork herd). An attendant decrease in potential for disturbance and displacement of wintering elk would occur. These restrictions would limit the potentially detrimental effects of horn hunting in places like Pat O'Hara Mountain (with a seasonal restriction on Forest Road 401). Additionally, seasonal restrictions would be implemented on all roads within crucial winter range for the South Wind River elk herd, leading to reductions in the potential for displacement and disturbance of wintering elk. For the Wiggins Fork elk herd, the miles of open motorized route within crucial winter range would be very similar to Alternative 1.

The Upper Shoshone mule deer herd and Lander moose herd (Tables B and C) would also have a substantial reduction in the miles of open NFS routes within crucial winter range. Disturbance and displacement of wintering animals within these herds would be reduced as a result. For all other mule deer and moose herds across the Forest, the miles of open NFS routes within crucial winter range would be similar or slightly greater than in Alternative 1, with similar effects.

Alternatives 2 and 3 would be more consistent with Forest Plan direction for crucial winter range than Alternative 1, especially with respect to the South Wind River elk and Lander Moose herds.

These herds have the highest potential for disturbance and displacement due to high levels of wheeled vehicle use under Alternative 1. Seasonal restrictions on motorized routes within crucial winter range would substantially reduce the potential for disturbance and displacement of animals wintering on National Forest lands for these herds. Some herds would have similar mileage of open NFS routes within crucial winter range compared to Alternative 1, but for these herds the proposed levels of vehicle use within crucial winter range would be compatible with maintaining the function of winter range.

Issue 2: Whether and to what extent wheeled vehicle and OSV use within the Shoshone National Forest will affect elk, mule deer, and moose use of parturition areas.

Similar effects to parturition areas for most elk, mule deer, and moose herds are expected under Alternatives 2 and 3 as described under Alternative 1. The number of miles of open NFS routes within parturition areas is similar across alternatives. The South Wind River elk and mule deer herds would continue to have high levels of use within parturition habitat, while the Gooseberry and Wiggins Fork elk herds would see reductions in the miles of open NFS routes within parturition areas. The potential for disturbance and displacement of elk during calving would be somewhat reduced for these herds compared to Alternative 1.

Alternative 2 raises a unique concern related to elk parturition areas. The alternative proposes a new motorized trail from Line Creek to Little Rock Creek on the Clarks Fork Ranger District. This trail crosses areas not mapped by WGFD as parturition area but known to support elk during the late winter and spring. Elk in the Clarks Fork herd are known to carry brucellosis, a disease that can be transmitted to cattle when the two species co-mingle. (Wyoming Game & Fish Department 2015) Wheeled vehicle use on this trail would increase the potential to displace elk to private lands adjacent to the National Forest during the high-risk period for transmission of brucellosis (February-May), where they could co-mingle with cattle and potentially transmit brucellosis. A seasonal restriction applied to the trail decreases this risk. As a result, the potential for wheeled vehicle use on the new NFST to displace elk and lead to brucellosis transmission to cattle would be slightly higher than under Alternatives 1 and 3 (which would not allow the new NFST to be constructed).

Alternatives 2 and 3 are generally consistent with Forest Plan direction for parturition areas. Seasonal restrictions during the birthing period would reduce the potential for disturbance and displacement of elk in the Cody, Gooseberry, and Wiggins Fork herds. For most other herds, proposed levels of motorized use within parturition areas would be compatible with maintaining their function. Exceptions would be the South Wind River elk and mule deer herds, where high levels of motorized access would not be consistent with Forest Plan direction for parturition areas.

Issue 3: Whether and to what extent wheeled vehicle and OSV use within the Shoshone National Forest will affect elk security habitat.

Under Alternatives 2 and 3, elk security habitat values would change very little for all elk herds. This is because the proposed changes under the alternatives during the fall period are minor, especially when measured at the scale of an elk herd unit. Notable changes would include a small increase in elk security habitat within the Wiggins Fork herd under Alternative 3. This increase would occur in the Bear Basin area as a result of closing a portion of Forest Road 501. However, this area already has relatively abundant elk security habitat. Additionally, there would be a small

decrease in elk security habitat in the South Wind River herd under Alternative 3. This herd already has very little security habitat outside of the Popo Agie Wilderness, and this reduction could cause increased displacement of elk during the hunting season.

Alternatives 2 and 3 would generally be consistent with Forest Plan direction for elk security habitat. The exception would be the South Wind River herd, which would have slightly less than the recommended 30% security areas for that portion of the herd on Shoshone National Forest lands. Alternative 2 would be more consistent with Forest Plan direction for elk security areas for this herd, because security area values would be slightly improved.

Issue 4: Whether and to what extent wheeled vehicle and OSV use within the Shoshone National Forest will affect elk, and mule deer migration corridors.

None of the new routes proposed under Alternatives 2 and 3 would be within migratory bottleneck areas, nor would they be likely to measurably influence elk or mule deer migration compared to Alternative 1.

3.16.3.4 Cumulative Effects of the Alternatives

The primary land use practices and actions that affect elk, mule deer, and moose habitat on the Forest include livestock grazing and vegetation management. Livestock grazing can have both beneficial or negative effects on the quantity and quality of forage available to deer, elk, and moose. Although isolated impacts may occur, in general current livestock grazing practices have been compatible with elk, deer, and moose populations on the Shoshone. Vegetation management activities (e.g., timber harvest) can also influence the quantity and/or quality of forage and cover for these species. However, these activities occur on a small area and temporal scale on the Forest, and their effects on deer, elk, and moose habitat are minimal. Natural disturbance agents such as fire, insects, & disease play a much larger role compared to vegetation management in shaping habitat characteristics on the Shoshone National Forest. Other forest management activities with even smaller effects on elk, deer, and moose habitat include: recreation and non-recreation special uses such as outfitting/guiding, and developed and dispersed recreation site management.

3.16.4 Consistency with Relevant Laws, Regulations, and Policy

3.16.4.1 Land and Resource Management Plan

The Shoshone National Forest Land and Resource Management Plan (forest plan) provides standards, guidelines, and goals for Species of Local Concern. Consistency with relevant standards, guidelines, and goals was confirmed for these species (see Table 133Table 95). Additional relevant analysis is set forth above.

Table 133: Forest Plan Consistency Review

Forest Plan Standards, Guidelines, and Goals*	Alternative 1	Alternative 2	Alternative 3
SPLC-OBJ-01	Yes	Yes	Yes
SPLC-STAND-03	Yes	Yes	Yes

Forest Plan Standards, Guidelines, and Goals*	Alternative 1	Alternative 2	Alternative 3
SPLC-GUIDE-03	Yes	Yes	Yes
SPLC-GUIDE-04	Yes	Yes	Yes
SPLC-GUIDE-05	Yes	Yes	Yes
SPLC-GUIDE-09	Yes	Yes	Yes
*Refer to the Forest Plan for information on compliance with these standards, guidelines, and goals.			

3.16.5 Conclusion

A decision regarding travel management and any cumulative impacts will result in negligible impacts to Species of Local Concern. Any impacts to these species would likely be short-term and localized. All alternatives are in compliance with the Forest Plan, laws, regulations, and policies.

3.17 Wildlife: Aquatic Species

3.17.1 Introduction

The following analysis considers the impacts to aquatic species and associated habitat from motorized use on the Shoshone National Forest. The National Forest System contains some of the nation’s healthiest and most intact ecosystems, providing abundant clean water, high-quality fisheries, and aquatic biodiversity strongholds (Roper et al. 2018). Roads and motorized trails, through construction, presence, and use, impact these resources. Motorized routes can increase sedimentation, decrease sinuosity, reduce shading, impact large woody debris recruitment and retention, and serve as vectors for non-native species introductions (Roper et al. 2018).

Impacts vary depending on the circumstances of the motorized route. Impacts to aquatic habitat tend to be greater on roads compared with motorized trails, with intersection points especially impacted. Roads require drainage structures (e.g., culverts), have larger footprints, and have higher compaction/erosion levels than narrower motorized trails. Motorized trails tend to roll with the terrain, decreasing the necessity for cut/fills and installations of culverts or drainage structures.

A related challenge is motorized use along unauthorized routes. These user-created routes are not designed, engineered, or constructed to Forest Service standards. Many of the unauthorized routes are more prone to erosion or sediment production than system routes. And the Forest does not commit funds to maintain the footprint of the routes, with the result that the conditions of the routes may deteriorate and impact resources. The presence of these pioneered routes indicates a desire by motorized user communities for increased access.

This analysis considers the direct and indirect effects to aquatic species in the context of travel management.

3.17.1.1 Scope of Analysis

This section analyzes effects to aquatic resources including fisheries, amphibians, and aquatic habitats related to the Shoshone National Forest’s Travel Management Project (Project). This section illustrates the environmental consequences of the proposed alternatives with a focus on

these resources. The scope of the aquatics analysis includes a review of the existing condition and the impacts that may occur as a result of implementing the proposal(s). The analysis in this report is commensurate with the anticipated affects to aquatic resources.

Since travel management is a Forest-wide decision that involves all Ranger Districts, the planning and analysis area for this report is broadly described as the Shoshone National Forest. The Forest provides habitat for at least 15 fish species (Table 134) and at least 5 amphibians (Table 135). Many of these species, as indicated in the table, are classified under the 2015 SNF Plan as Management Indicator Species (MIS) or in the FSH as Regional Forester’s Special Status Species (R2S). Impacts to Management Indicator Species and Region 2 Sensitive Species are included as part of the environmental consequences or biological evaluation included in this report.

Table 134: Fish species on the Shoshone National Forest. Special status species are indicated in far columns.

Scientific Name	Common Name	Status: MIS*	Status: R2S**
<i>Catostomus catostomus</i>	Longnose sucker		
<i>Catostomus commersonii</i>	White sucker		
<i>Catostomus platyrhynchus</i>	Mountain sucker		X
<i>Cottus bairdii</i>	Mottled sculpin		
<i>Couesius plumbeus</i>	Lake chub		X
<i>Cyprinus carpio</i>	Common carp		
<i>Oncorhynchus aguabonita</i>	Golden trout		
<i>Oncorhynchus clarkii bouvieri</i>	Yellowstone cutthroat trout	X	X
<i>Oncorhynchus clarkii spp.</i>	Cutthroat trout hybrids	X	
<i>Oncorhynchus mykiss</i>	Rainbow trout	X	
<i>Prosopium williamsoni</i>	Mountain whitefish		
<i>Rhinichthys cataractae</i>	Longnose dace		
<i>Salmo trutta</i>	Brown trout	X	
<i>Salvelinus fontinalis</i>	Brook trout	X	
<i>Salvelinus namaycush</i>	Lake trout		
<i>Thymallus arcticus</i>	Arctic grayling		

*Management Indicator Species under Shoshone National Forest Plan

**Region 2 Regional Forester’s Sensitive Species

Table 135 Amphibians documented on the Shoshone National Forest. Several are Region 2 Sensitive (R2S).

Scientific Name	Common Name	Status: R2S
<i>Ambystoma tigrinum</i>	Tiger salamander	
<i>Anaxyrus boreas boreas</i>	Boreal Toad	X
<i>Lithobates pipiens</i>	Northern leopard frog	X
<i>Pseudacris maculata</i>	Boreal chorus frog	
<i>Rana luteiventris</i>	Columbia spotted frog	X

3.17.1.2 Issues Addressed

Travel management decisions invariably impact aquatic habitats and the populations that rely on them. Appropriate siting, construction, use, and maintenance can minimize the impacts from motorized use. Disconnecting stream courses and wetlands from travel corridors (to the extent possible) offers the optimal strategy to minimize impacts. Situations exist where this disconnect is infeasible, however, due to local topography, elevation, use (type and duration), and physical conditions (i.e. soil type). Appropriately timing construction, use (and closure), and maintenance can further limit impacts to species including fish and amphibians to varying degrees depending on their specific biological requirements.

This analysis utilized five issues to consider impacts from each alternative to aquatic resources. Each respective issue examines a discrete interaction between motorized use on the Forest and aquatic resources. Guided by these inquiries, the analysis assessed a scale of impacts with respect to each alternative. The issues are described below in Table 136.

Table 136: Aquatic habitats and the populations that rely on them can be impacted to varying degrees depending on which alternative is selected under the travel management decision.

General Issue	Specific Issue
Whether and to what extent motorized use proposed under Alternatives 1, 2, and 3 impacts aquatic habitats and the populations that rely on them.	Issue 1: Whether and to what extent motorized use proposed under Alternatives 1, 2, and 3 causes excessive sedimentation and changes to substrate composition.
	Issue 2: Whether and to what extent motorized use proposed under Alternatives 1, 2, and 3 impacts aquatic habitats such as pools and riffles.
	Issue 3: Whether and to what extent motorized use proposed under Alternatives 1, 2, and 3 impacts aquatic organism passage at points of intersection.
	Issue 4: Whether and to what extent motorized use proposed under Alternatives 1, 2, and 3 alter streambed and streambank stability.
	Issue 5: Whether and to what extent motorized use proposed under Alternatives 1, 2, and 3 impacts, directly or indirectly, wetland habitat for aquatic species.

3.17.1.2.1 *Specific Issue 1: Whether and to what extent motorized use proposed under Alternatives 1, 2, and 3 causes excessive sedimentation and changes to substrate composition.*

Sediment is likely the largest single source of stream pollution by volume on the Forest. Sedimentation can have adverse impacts to fish and amphibian populations (Figure 8). Sediment can smother trout eggs, abrade gills, reduce foraging success, reduce the number of aquatic invertebrate species preferred by trout, and reduce or eliminate habitats preferred by several fish species. Trout, for example, require cold, clean water to survive. They build redds (“nests”) and deposit their eggs in clean gravels. Excessive sediment can smother eggs and prevent oxygen exchange. Additionally, fry may have difficulty emerging if interstitial spaces in gravel redds are buried in silt.



Figure 8: Trout eggs in a forested stream.

Sediment also impacts amphibians. Sedimentation of amphibian habitats can reduce the amount of shallow pools and other habitats used as foraging areas for larvae. (Keinath and McGee, 2005) Additionally, sediment can impact turbidity and plant cover preferred by many species of amphibians. (Tombulak and Frissell, 2001)

As a measure to compare alternatives, the aquatics analysis relies on the mileage of roads (open and closed) and motorized trails within 100 and 300 feet of streams classified as “perennial” on the National Hydrography Dataset. Evidence indicates sediment from roads and motorized trails may reach streams from 300 feet, but the effect of roads and trails within 100 feet is much greater (INFISH; Forest Service 1995). Additionally, Forest Service Handbook direction and Best Management Practices Guides acknowledge the importance of these buffer distances (USDA 2006, 2012).

3.17.1.2.2 Specific Issue 2: Whether and to what extent motorized use proposed under Alternatives 1, 2, and 3 impacts aquatic habitats such as pools and riffles.

Fish seek out certain habitats to fulfill their life history needs. Coldwater trout seek out pools for resting, feeding, overwintering, and rearing habitat. Many fish species also rely on riffles for feeding, and spawning. Pools and riffles can be impacted directly where roads intersect stream channels; in these instances, channel structure and geometry are frequently disrupted. Pool and riffle habitats can also be impacted indirectly by sedimentation, bank alteration, and channel degradation, particularly during storm events or in situations where roads or motorized trails parallel aquatic habitats.

Roads constructed within natural flood plains can result in high degrees of impact to aquatic habitats. (Figures 2-3) Many stream systems on the Shoshone move laterally across the floodplain and vertically in response to flow conditions, geology, gradient, channel roughness, and other features. Stream systems originating in the Absaroka volcanics can have high year-to-year variation in lateral and vertical adjustment. Stream systems originating in the decomposed granitics are typically much more stable. Roads can alter surface flow paths, sometimes resulting in high consequences to natural stream environments.

Sediment from motorized routes can fill pools and degrade aquatic habitat for fish species. Motorized use and lack of maintenance of routes in or adjacent to sensitive riparian areas can result in undesirable consequences for numerous aquatic species and aquatic habitats. Once degraded, it can take decades for the stream system to re-establish functional pools, riffles, and other aquatic habitats. Downstream, the channel will be processing additional sediment for years until the channel re-establishes sediment processing equilibrium. Encroachment of roads along mainstem channels or floodplains may be the most direct effect roads have on channel morphology in many watersheds. (Gucinski et al. 2001)



Figure 9: Upper Sunlight Creek jumped into an old road bed, essentially creating a new stream channel.



Figure 10: Roads (NFSR 123) that parallel riparian areas such as this road along Line Creek, capture sediment where it is diverted into the stream channel (hidden by woody vegetation).

3.17.1.2.3 *Specific Issue 3: Whether and to what extent motorized use proposed under Alternatives 1, 2, and 3 impacts aquatic organism passage at points of intersection.*

The Forest Service Handbook (USDA FS 2014) requires that road and stream crossings provide aquatic organism passage. New construction that involves stream crossings (roads or motorized trails) on fish-bearing streams must ensure aquatic organism passage, accommodate peak flood flow (100-year events), and not constrict the stream channel. The engineering complexity and cost range from the high end with bridges, to the medium range with bottomless arches, to the low end with low water crossings. All require design and periodic maintenance to avoid adverse impacts to water quality

Culverts are an integral part of the design features. Improperly sized and installed culverts can impact aquatic species. Fragmenting stream systems by installing undersized culverts can imperil fish and other aquatic organisms, especially when additional stressors occur that inhibit escape or even recolonization (such as fire or flood events). Undersized culverts can also affect sediment transport, increase erosion, and reduce large woody debris recruitment and deposition. Occasionally, culverts that are undersized result in total failure, further degrading aquatic habitats (Figure 11).¹⁵



Figure 11: An undersized culvert on Line Creek (NFSR 123) did not pass flood flows during a storm event. The pipe was likely plugged by woody debris, forcing water over the road and carrying road fill downstream where it was eventually deposited into aquatic habitats. Fire consumed much of the watershed and a flood event also contributed to the failure of this stream crossing.

The Forest continues to address the issue of undersized culverts and aquatic organism passage, despite funding limits. These efforts include removing undersized culverts and replacing them

¹⁵ The Shoshone National Forest has inventoried most of the culverts on fish-bearing streams and has been working to upgrade undersized pipes in several drainages, effectively restoring fish passage. This work has occurred in partnership with several organizations and agencies. Nationally, the Forest Service celebrated replacing the 1,000th undersized culvert in 2015. Most of the undersized culverts on streams occupied by Yellowstone cutthroat trout on the Shoshone have been replaced with bottomless arches, low water crossings, or bridges; significant investments have occurred in the Greybull, Wind River and Long Creek areas to date.

with low water crossings (fords). This exchange creates trade-offs: aquatic organism passage is restored but the motorized route network remains connected to the stream (i.e., failure to achieve disconnect). These crossings are generally not suitable on higher volume roads, in areas where late fall/winter use occurs (due to icing on the approaches), or at crossings where streamflows have potential to present unacceptable risks to human safety. Low water fords can also be chronic sources of sediment input, especially when approaches are not maintained or adequately armored; in these instances, runoff can be directed into stream channels, degrading water quality and aquatic habitats (Figure 12: A low water crossing on the Christina Lake Road (NFSR 355). While aquatic organism passage is unimpeded at stream crossings such as this, low water crossings can become chronic sources of sediment inputs. Habitats at these types of crossings tend to be unnaturally wide, shallow, and generally provide poor fish habitat. This road would be converted to a motorized trail under Alternative 2.). Vertical adjustment of stream channels, especially in the Absaroka volcanics can also make for challenging low water crossings due to year-to-year variations in sediment transport and deposition.

In terms of aquatic organism passage, bridges are preferred, followed by bottomless arches, low water crossings, and corrugated metal pipes.



Figure 12: A low water crossing on the Christina Lake Road (NFSR 355). While aquatic organism passage is unimpeded at stream crossings such as this, low water crossings can become chronic sources of sediment inputs. Habitats at these types of crossings tend to be unnaturally wide, shallow, and generally provide poor fish habitat. This road would be converted to a motorized trail under Alternative 2.

3.17.1.2.4 Specific Issue 4: Whether and to what extent motorized use proposed under Alternatives 1, 2, and 3 alter streambed and streambank stability.

Fish rely on pools for rearing, resting, feeding, and overwintering. Pools typically form due to the presence of lateral channel bends or formative feature such as rocks, woody debris, or other features; these formative features are typically stable in unmodified stream channels and may persist in some environments for decades. Low water crossings and other road construction, use, and maintenance in some riparian areas have destabilized stream channels resulting in excessive erosion, channel widening, and filling of channels. In other areas, lateral migration has been impacted. Roads can affect the formative features that create and maintain pool habitats (rocks, woody debris, or other features), especially when they intersect stream channels. Pools that lose

volume due to sediment deposition support fewer fish, with the fish present susceptible to increased mortality (Alexander and Hansen 1986).

Fish also rely on riffle habitats for feeding, spawning, and as movement corridors. Streambank stability is required for the development and maintenance of riffle habitats. Because riffles typically have shallow depth, stable streambanks, and uniformly-sized substrates, they are often preferable locations for low water crossings or installations of culverts.

3.17.1.2.5 Specific Issue 5: Whether and to what extent motorized use proposed under Alternatives 1, 2, and 3 impacts, directly or indirectly, wetland habitat for aquatic species.

Motorized use can cause a range of impacts to wetlands, including sedimentation, compaction of soils, rutting and alterations to flow paths, changes to vegetation, and soil structure. Wetlands provide important habitat for all amphibian species on the Forest; they also help filter, store, and release water to streams utilized by numerous fish and wildlife species. The recovery time for impacted wetlands can be substantially higher than streams due to intrinsically slower processes that build and maintain wetland features.

Wetlands may be permanent or ephemeral; impacts to ephemeral wetlands can be difficult to detect, avoid, and mitigate, especially when roads or motorized routes are identified during late summer/early fall (or during drought periods) when typical indicators show limited surface wetland characteristics. Roads or motorized trails constructed through wetlands can be extremely difficult to maintain to standard. When such routes can no longer be maintained (typically due to cost and/or feasibility constraints) impacts can increase. "Pioneering" of new dual routes can occur which results in cumulatively larger impacts to wetland areas (Figure 13, Figure 14). If continued lack of maintenance occurs, erosion can continue, resulting in effectual closure or downgrading of motorized routes; routes that were originally constructed as roads may be impassable to full-size vehicles, resulting in downgrading to motorized trails.



Figure 13: NFSR 534 intersects a wetland adjacent to Fish Lake. Difficult travel conditions lead to "pioneering" or the creation of new routes that, in time, can conditionally degrade to equally adverse condition. There are opportunities in travel management to relocate roads in high-risk areas such as this to more responsible locations (a reroute is proposed

under Alternative 3). When roads and motorized trails cross wetlands or road cuts intercept groundwater, traditional fixes such as filling problem areas with earthen material are usually temporary in nature.



Figure 14: The dual routes drain directly into Fish Lake, degrading water quality in an otherwise pristine area.

3.17.2 Methodology

Numerous tools were used to analyze potential impacts that would result from a travel management decision, including existing data sets, Geographic Information System (GIS) analysis, field surveys/validation, communication with other specialists, line officers, the public, cooperating agencies and organizations and professional judgment. To begin, analysis of effects focuses on wheeled vehicle travel. Winter (over-snow) use is not believed to result in detectable impacts to aquatic habitats or populations of fish and amphibians that rely on them. This analysis, therefore, addresses the impacts associated with wheeled vehicle use (where OSV use may affect related resources such as hydrology or soils, those effects are analyzed separately with respect to that particular resource area).

General and specific knowledge of the existing road system, geology, habitat conditions, and habitat requirements of potentially impacted species were used to make determinations. In locations where site specific information was unavailable, professional judgement was used to make determinations based on observed or likely species presence data and GIS data that was sourced from a variety of sources including Wyoming Game and Fish Department (WGFD) and Wyoming Natural Diversity Database (WYNDD).

GIS queries were used to determine how aquatic habitats and the populations that rely on them could be impacted by a travel management decision with respect to the five issues in Table 134. The National Hydrography dataset was queried to determine where perennial streams were in proximity (100 feet and 300 feet) of roads and motorized trail proposals. Perennial streams may or may not provide suitable habitat for fish or amphibians; however, they do serve as conduits and, in many instances, are capable of transporting sediment into occupied streams or wetlands.

A GIS layer for fish-bearing streams from Wyoming Game and Fish's Stream/Lakes database was used to determine the number of stream crossings. This derived layer is somewhat dated (2011); however, fish distribution seldom expands or contracts to substantial degrees at the analysis scale. The dataset provides, therefore, valid conclusions of fish-bearing streams. This information was also cross-referenced with the Yellowstone cutthroat trout database, which is updated

annually for streams where Yellowstone cutthroat trout reside
[\(http://fwp.mt.gov/gis/maps/yctAssessment/\)](http://fwp.mt.gov/gis/maps/yctAssessment/)

The National Hydrography Dataset also has mapped wetlands for many areas of the Forest. This dataset does have some limitations, particularly for forested areas, and it may not indicate the total acreage of wetlands that exist on the landscape. Groundwater dependent ecosystem surveys provided additional insight into affected wetlands that were potentially omitted from the National Hydrography dataset.

There are a number of GIS products that were used to perform analyses; while these provide a meaningful broad-level view of anticipated impacts, they have limitations and should be used in conjunction with site-specific information during the design/layout and eventual implementation phase.

3.17.2.1 Resource Indicators and Measures

Varied indicators and measures were used to differentiate how the travel management alternatives might impact aquatic habitats and the populations that rely on them. Since streams and wetlands can be affected directly and indirectly by construction, maintenance, and use of roads or motorized trails, a series of indicators were used to help describe the magnitude, extent, duration, and likelihood of potential impacts (Table 137). One hundred and 300-foot stream buffers were generated for perennial streams; potential stream crossings were identified, and potential entries into mapped wetlands were used to differentiate impacts between alternatives.

Table 137*: Aquatic Species Issue Assessment Matrix

Specific Issue	Measures	Methods:	Question:	Source:
Issue 1: Excessive sedimentation and changes to substrate composition can result from NFSRs and NFSTs.	Proximity of motorized routes within 100 feet and 300 feet of perennial streams	Buffer routes by 100 feet and 300 feet and determine where this overlap intersects with perennial streams.	Under various alternatives (existing and wheeled motorized) where might roads/trails be in close or moderate proximity to streams?	National Hydrography Dataset, Travel Management Proposals
Issue 2: Aquatic habitats such as pools and riffles can be impacted by NFSRs and NFSTs.	Proximity of motorized routes within 100 and 300 feet of perennial streams	Buffer routes by 100 feet and 300 feet and determine where this overlap intersects with perennial streams.	Under various alternatives (existing and wheeled motorized) where might roads/trails be in close or moderate proximity to streams?	National Hydrography Dataset, Travel Management Proposals
Issue 3: Aquatic organism passage can be impacted where NFSRs and NFSTs intersect streams.	Presence of stream crossings on fishbearing streams	Determine where and the number of new motorized routes and roads will intersect fishbearing streams.	Where will we need to cross fishbearing streams?	Forest Fisheries layer, WGFD stream:lake database, Forest barrier information, YCT database

<p>Issue 4: Streambed and streambank stability can be altered by NFSRs and NFSTs.</p>	<p>Proximity of motorized routes within 100 feet and 300 feet of perennial streams</p>	<p>Buffer routes by 100 feet and 300 feet and determine where this overlap intersects with perennial streams.</p>	<p>Under various alternatives (existing and wheeled motorized) where might roads/motorized trails be in close or moderate proximity to streams?</p>	<p>National Hydrography Dataset, travel management proposals</p>
<p>Issue 5: Wetlands can be directly or indirectly impacted by NFSRs and NFSTs.</p>	<p>Acres of wetlands directly impacted by motorized routes intersecting wetlands</p>	<p>Calculate widths of proposed disturbance from motorized trails and roads (Maintenance level) and determine acreage of direct impact to wetlands.</p>	<p>Under various alternatives (existing and wheeled motorized) where and to what extent will roads/motorized trails intersect wetlands?</p>	<p>National Hydrography Dataset, Forest groundwater dependent ecosystems layer, travel management proposals</p>

*: Proximity of roads and motorized trails to perennial streams were used to help differentiate impacts from the various travel management alternatives. Proximity of roads and trails within 100 feet and 300 feet were used to help determine impacts related to issues 1, 2, and 4 for each of the alternatives. Proposals that may intersect fish-bearing streams was used to analyze issue 4, and wetland buffers were also generated to analyze impacts to wetlands (issue 5).

3.17.3 Environmental Consequences

Roads and motorized trails are generally detrimental to fish and amphibian populations and aquatic habitats. Roads and trails have environmental consequences to streams and wetlands. Known impacts associated with roads include:

- Roads directly and indirectly contribute more sediment to streams than any other land management activity.
- Serious degradation of fish habitats can result from poorly planned, designed, located, constructed, and maintained roads.
- Roads have the potential to affect water quality through applied road chemicals and occasional toxic spills.
- Roads directly affect sediment and hydrologic regimes by altering streamflow, sediment loading, sediment transport and deposition, channel morphology, channel stability, substrate composition, stream temperature, water quality, and riparian conditions in a watershed.
- Poor road location, concentration or interception of groundwater by sub-slope roads, inadequate maintenance, undersized culverts, and side-cast materials can result in road-related mass movements.
- Road/stream crossings can be a major input of sediment to streams resulting from road fill around culverts and subsequent road crossing failures.

Trails can also impact aquatic environments. These impacts may occur to a lesser degree as NFSTs typically have narrower footprints, and the vehicles that use them have different tire pressures and vehicle weight that tend to result in less ground compaction (and resulting sedimentation).

Currently, there are about 45 miles of NFSRs within 100 feet of perennial streams and about 175 miles of road within 300 feet of streams. Modification of NFS routes under the various alternatives are summarized in Table 5 and Figure 8 below).

Table 138: Miles of Open NFSRs within 100 and 300 feet of perennial streams. These figures include administrative roads and excludes closed or decommissioned road mileage that would occur under Alternatives 2 and 3.

Alternative	Miles of Open NFSRs within...	
	100 Feet of Streams	300 Feet of Streams
1	45	175
2	39	160
3	39	156

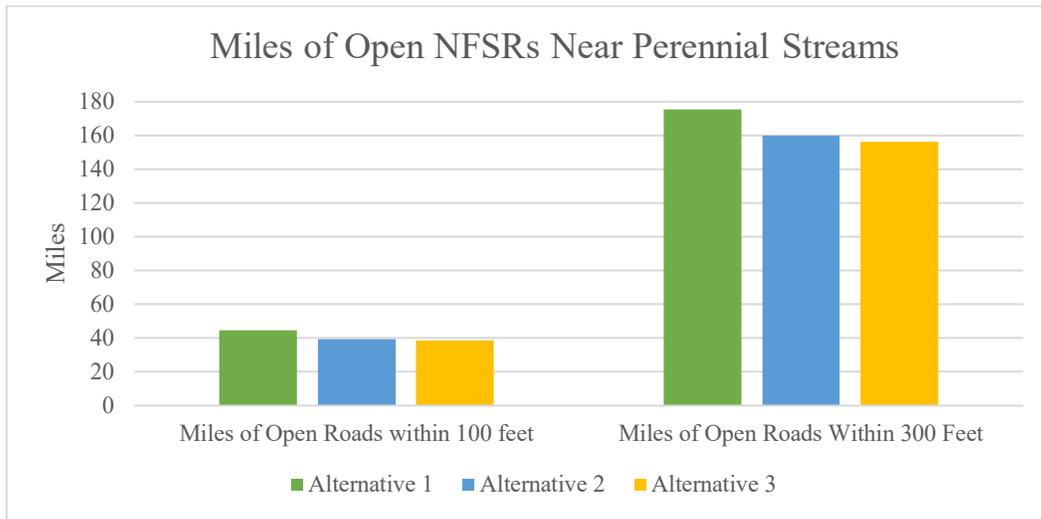


Figure 15: Miles of open NFSRs within 100 and 300 feet of perennial streams (Data from Table5 displayed graphically)

Similarly, there are about 2 miles of NFSTs within 100 feet of perennial streams and about 7 miles of NFSTs within 300 feet of perennial streams. Modification of these trails under the various alternative are summarized in Table 6 and Figure 9 below. Alternatives 2 and 3 would increase the mileage of NFSTs open to wheeled vehicle use adjacent to streams.

Table 139: Miles of Motorized Trail within 100 and 300 Feet of Perennial Streams. These figures exclude decommissioned trail mileage that would occur under Alternative 2.

Alternative	Miles of Open NFSTs within...	
	100 Feet of Streams	300 Feet of Streams
1	2	7
2	7	23
3	8	26

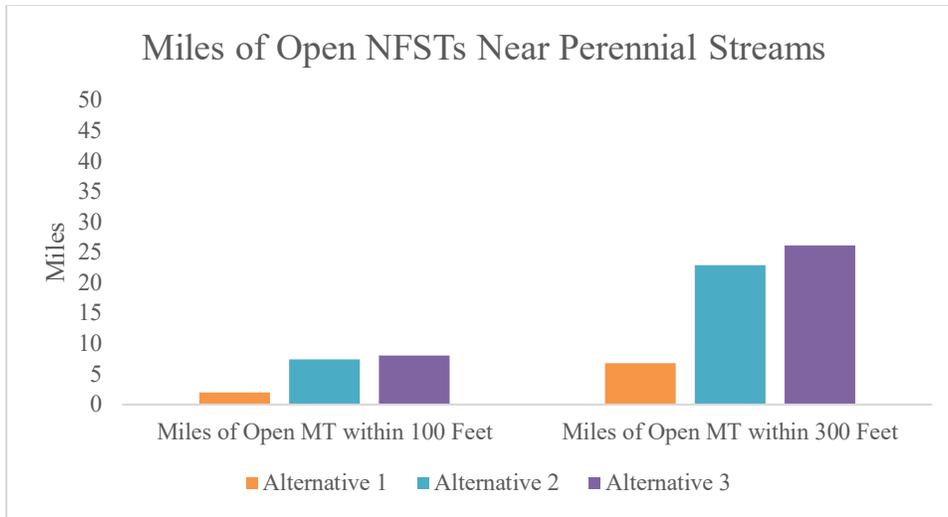


Figure 16: Miles of open NFSTs within 100 and 300 feet of perennial streams (Data from Table 6 displayed graphically)

The mileage of motorized NFS routes (NFSRs and NFSTs) that intersect wetland habitats are displayed in Table 141. Since impacts from NFSRs and NFSTs to wetlands would result in similar impacts, mileages were added for simplification; this aggregation is shown graphically in Figure 17.

Table 140: Miles of NFSRs and NFSTs that intersect mapped wetlands. Data is derived from the National Wetland Inventory and also consists of buffered groundwater dependent ecosystem data collected by the Forest Service.

Alternative	Miles of motorized NFS routes intersecting wetlands	
	Miles of Motorized Trails Intersecting Wetlands	Miles of Roads Intersecting Wetlands
1	1.80	19.06
2	4.67	20.47
3	4.73	19.21

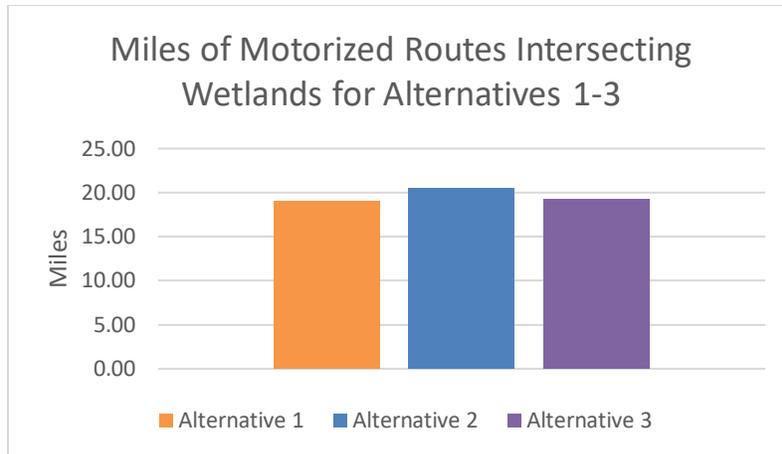


Figure 17: Miles of motorized NFS routes (NFSRs and NFSTs) intersecting mapped wetland habitats (Data from Table 7 displayed graphically)

3.17.3.1 Alternative 1: Direct and Indirect Effects

Current NFS routes for wheeled vehicle use are impacting aquatic habitats in several locations across the Forest. There are currently approximately 45 miles of open NFSRs within 100 feet of streams and about 175 miles of open NFSRs within 300 feet of streams (Table 5, Figure 8). There are only 2 miles of open NFSTs within 100 feet of perennial streams and about 7 miles of open NFSTs within 300 feet of perennial streams (Table 6, Figure 9). These routes are likely contributing to sediment loading of streams, rivers, or wetlands with likely impacts to fish and amphibian populations. Examples of where these effects occur include Fish Lake and Sweetwater Creek. These areas would continue to be affected under the no-action alternative.

Sedimentation impacts and stream crossing effects to aquatic habitats would continue to the same degree. No new stream crossings are proposed, though the Forest would continue restoring fish passages along routes where undersized culverts exist. Streambed and streambank stability would continue to be affected in areas where roads or motorized trails intersect stream courses. Wetlands would continue to be affected to their current degree. Pioneering of new routes would likely continue under this alternative and would possibly increase with user demand.

3.17.3.2 Alternative 2: Direct and Indirect Effects

Under Alternative 2 there would be approximately 39 miles of NFSRs within 100 feet of streams, and about 160 miles of NFSRs within 300 feet of streams, a slight reduction compared with Alternative 1. The number of NFSTs within 100 feet of stream courses would triple (7 miles within 100 feet of streams) and the number of NFSTs within 300 feet of perennial streams would also nearly triple to 23 miles.

Alternative 2 would implement seasonal restrictions to many routes. The restrictions, intended to reduce impacts to wildlife on crucial winter range, would also benefit aquatic habitat. Effects would be especially beneficial during the spring seasons, when conditions on existing NFS roads are wet or muddy with the potential for increased sediment loading. Seasonal restrictions would be especially beneficial for the Long Creek area (Wind River), which has a high number of native-surface roads prone to severe rutting and erosion, and Gwynn Fork (Greybull), which has been

impacted by grazing pressure. Successful implementation of seasonal restrictions would reduce chronic sediment delivery that occurs each year during the runoff period.

Alternative 2 separately involves new construction or designation of user-created routes that consist of small spurs to existing camping sites. While many of these camping sites are near water and additional traffic/camping along lakeshores or riparian areas can result in erosion and impacts to water quality, there is a strong public demand at these locations and eliminating vehicles from these areas can be difficult once vehicles and the public have been accessing them (i.e., via user-created routes). The commissioning of these routes would result in a relatively small amount of the overall mileage of roads and trails on the Shoshone.

There would be an increase in the amount of closed and administrative roads added to the system under Alternative 2. Many of these roads cross or parallel perennial stream systems. Most of the additions occur on the Wind River Ranger District, where NFSRs would be used for future timber management or other purposes. Adding these roads (many of them proposed to be added at ML 1) onto the system presents articulable risks. Road failures, stream crossings, or other impacts may not be discovered until considerable degradation has occurred. Maintenance that may be required on these routes also would impact our ability to fund maintenance needs on other roads. And the current condition of these routes is not well known (for example, status of drainage structures and road surface condition). Routes added to the system as administrative roads are not expected to benefit aquatic resources: they should be viewed as being potentially detrimental to aquatic ecosystems where they occur in proximity to aquatic habitats.

There are about 10 miles of roads that would be decommissioned under Alternative 2, a small proportion of which (2 miles) occur within 300 feet of perennial streams. Decommissioning of routes that are in proximity to streams is expected to have positive benefits, such as reduced sedimentation, restored physical stream habitat, restored wetland function, and improved aquatic habitat conditions.

Under alternative 2, there are about 116 miles of NFSRs on the Washakie District where roads would be converted to NFSTs. Areas where roads are converted to trails are mostly a designation change and are not expected to result in substantive benefits or detrimental impacts to aquatic resources at the Forest scale.

Under this alternative, new stream crossings on fish-bearing streams would be required and will be developed according to BMPs and other guiding project design features once funding is available for the project (*see* Appendix D for BMPs and other relevant requirements applicable to route construction). Alternative 2 proposes a new NFST that would likely necessitate construction of stream crossings on Bennett Creek (NZ-01), Warm Springs Creek (WR-13), and Elk Creek (WR-78). These crossings occur in known fish-bearing stream reaches. Impacts from constructed stream crossings typically range from minimal adverse impacts to major adverse impacts, depending on the type of crossing constructed and how well fish passage is maintained.

There are several stream crossings associated with proposal WR-86, which would add a number of ML 1 roads to the system. Streams that may be affected by stream crossings related to proposal WR-86 include crossings on fish-bearing streams such as the Middle Fork of Long Creek, the Wiggins Fork, Bull Creek, Cow Creek, Spruce Creek, and Elk Creek. There is also a proposal on

Washakie District (WK-36) that proposes adding a new ML 1 road to the system on Roaring Fork Creek.

Under Alternative 2, excess sedimentation and changes to substrate composition is not believed to occur to degrees that would adversely impact fish or amphibian populations at the planning level. Aquatic habitats such as pools and riffles would be most affected in areas where streams are in close proximity to NFS routes. There may be specific reaches that are impacted to higher degrees than others, but these habitat features are unlikely to be substantively modified if Alternative 2 were selected. The decommissioning of the upper portion of NFSR 423 (Sweetwater) is expected to benefit watershed condition.

Under Alternative 2, there would likely be increased impacts to wetlands from NFST construction, however, these impacts would be offset by a reduction in the mileage of wetlands that would be intersected by NFSRs. In summary, this degree of change is not expected to result in adverse impacts to fish or amphibian populations at the planning scale.

3.17.3.3 Alternative 3: Direct and Indirect Effects

Alternative 3 proposes to have approximately 39 miles of NFSRs within 100 feet of streams, and about 156 miles of NFSRs within 300 feet of streams. These mileages reflect an overall reduction in the mileage of roads impacting perennial streams when compared with Alternative 1. There would be increases in the number of NFSTs within 100 feet of streams (8 miles) and within 300 feet of streams (26 miles)—this increase is reflected in construction of new NFSTs or conversion of NFSRs to NFSTs.

Similar to Alternative 2, new seasonal restrictions would limit wheeled vehicle use on many NFS routes. These restrictions would result in positive impacts to fish and aquatic habitats by reducing use during spring periods when these routes are prone to rutting and accelerated erosion. Seasonal restrictions in the Long Creek watershed and Gwinn Fork area would be implemented to similar degrees as those under Alternative 2.

Alternative 3 would propose constructing new road spurs (NFSRs) and NFSTs and designating user-created routes that consist of small spurs to existing camping sites. Functionally, the expected impacts from selection of this alternative are like those analyzed under Alternative 2. Several camping sites are near water and additional vehicle traffic/camping along lakeshores or riparian areas can result in erosion and impacts to water quality, there is a strong public demand at these locations and eliminating vehicles from these areas can be difficult once vehicles and the public have been accessing them.

Alternative 3 would change the use on most of the Elk Fork Road (NFSR 424) and Sweetwater Road (NFSR 423) to administrative use; the upper end of NFSR 423 would be decommissioned under Alternative 3. Converting use to administrative use only would reduce stream and wetland impacts (Figure 19). With limited use, vegetation on the road prism would likely increase, reducing impacts from erosion to a small-to-moderate degree. Similar benefits to aquatic resources may occur to the Sweetwater Road (NFSR 423) from administrative closure (Figure 20).



Figure 18: The Elk Fork Road (NFSR 424) would be converted to administrative use only under Alternative 2. This would eliminate off-road rutting and may help re-establish vegetation that would reduce rutting and sedimentation through Elk Fork wetland habitats.



Figure 19: Runoff travels down the Elk Fork road, eventually depositing into the stream channel. An administrative closure of the Elk Fork road would help re-establish vegetation and likely reduce chronic sedimentation from reaching the Elk Fork.



Figure 20: Sweetwater Creek parallels NFSR 423. Remediation efforts in this area that have attempted to reduce erosion and improve streambank stability have been met with mixed results. Under Alternative 3, the road would be converted to administrative use only; the uppermost portion of the road would be decommissioned.

Under Alternative 3, two stream crossings would be eliminated as part of the Bear Basin decommissioning (NFSR 501). Crossings on Bear Creek and Castle Rock Creek would be eliminated if the alternative were selected. In addition to improving stream condition, adjacent wetland areas would also improve if this alternative were selected. In addition, one low water crossing on the Elk Fork would be closed to the public and two stream crossings on Sweetwater Creek would be closed to the public. These crossings likely contribute sediment into the channel, and aquatic habitat at the crossings is likely marginal. Reducing the frequency of trips across fish-bearing streams would benefit aquatic habitats and populations that rely on them.

Similar to Alternative 2, Alternative 3 also involves decommissioning a number of NFSRs that were identified as “not needed” under the TAR. Decommissioning of roads, especially segments that are in close (100 feet) or moderate (300 feet) proximity to stream channels is expected to have positive impacts by reducing sedimentation, reducing impacts to aquatic habitats, and improving wetland condition.

Alternative 3 would improve wetland conditions near Fish Lake by relocating a section of road away from the lake (Figure 21) This improvement would reduce sediment and improve impaired wetland condition.



Figure 21: Alternative 3 would move this road uphill onto an adjacent bench. There is a high probability erosion into Fish Lake would be reduced and wetland habitats could be restored if Alternative 3 were selected.

3.17.3.4 Effects from Over-Snow Motorized Use

Over-snow vehicle use seldom disturbs soils or causes loss of ground cover or erosion, due to the layer of snow separating the machine from the ground. Snow plowing near stream roads to get vehicles and snow machine trailers to trailheads has been an issue on other forests, but it is not expected to occur on the Shoshone. For these reasons, no effects to fisheries/aquatics are attributed to over-snow vehicle use, and they will not be discussed further as a fish and aquatic habitat effect.

3.17.3.5 Cumulative Effects of the Proposed Action

Alternatives 2 and 3 would incrementally result in both positive and negative impacts to aquatic habitats, and these incremental changes would cumulatively add to previous effects to aquatic habitats and fish and amphibian populations that rely on them. Past actions have substantially contributed to the existing condition of fish and aquatic habitats that occur on the Forest today. The construction of National Forest System roads, associated primarily with timber management and their past, present, and reasonably foreseeable use, continue to contribute to adverse effects to fish and aquatic habitats in a few areas. The installation of undersized culverts, which now effectively serve as fish barriers, continue to challenge the Forest. Substantial investments and progress have already been made to upgrade some of the structures, but many issues remain to address. As depicted in several of the preceding photos in this document, road construction, use, maintenance (or lack thereof) poses effects and potentially negative impacts to aquatic habitats. Areas on the Forest continue to be impacted by excessive sedimentation, destruction or modification of aquatic habitats, bank alteration, barrier culverts, and impacted wetlands.

The Shoshone National Forest is comprised mostly of wilderness areas. While there are specific areas on the landscape where aquatic habitat has been degraded, at a broad planning level view, the Forest still provides good-to-excellent habitat in most areas of the Forest. It is not believed that a decision under the Travel Management Planning Project with respect to Alternatives 1, 2, or 3 would translate into a significant impact to aquatic organisms or the habitat on which they rely.

Other cumulative impacts primarily involve legacy issues. These issues include fish stocking and timber harvest practices on the Forest. For instance, decades of fish stocking have resulted in localized extinctions of native Yellowstone cutthroat trout populations through competitive displacement or hybridization. While stocking expanded some fish populations in areas that were historically fishless (i.e., much of the Clarks Fork drainage above the Sunlight/Dead Indian and much of the Wind River range) it has resulted in impacts to native fish populations including Yellowstone cutthroat trout.

Several streams in the Upper Wind River drainage were heavily impacted by railroad tie cutting and associated tie drives that helped develop the transcontinental railroad. Timber harvest for ties on the Wind River Ranger District began in 1906 and persisted through 1946 where approximately 300,000,000 board feet were removed (Neal et al. 2010). Timber harvested and hand hewn into ties were transported down streams and rivers via constructed flumes, splash dams, and tie booms. Streams were channelized, straightened, and rocks were blasted to transport ties to Riverton.

Historic activities including tie hacking and timber harvest have had lasting impacts on stream habitat conditions, conditions still apparent today. Tie affected streams are less complex, have reduced amounts of woody debris, have more riffles and less secondary channel pools and plunge pools (Young et al. 1990). In addition, stream channels affected by tie drives are narrower, shallower, have lower cross-sectional roughness and wider width-to-depth ratios when compared to non-tie affected streams (Ruffing et al. 2015).

Moving from the past to the present and future, climate change will likely result in impacts to fish populations, particularly for species that are intolerant of warm temperatures. Climate change is expected to be a major threat to Yellowstone cutthroat trout because it exacerbates negative issues resulting from species introductions and habitat modification (Gresswell 2009). Recent and future changes in climatic conditions are expected to substantially alter aquatic ecosystems in the Greater Yellowstone Ecosystem (Shepard et al. 2016). Most of the Shoshone will fare better than other parts of the Greater Yellowstone Area due to the higher elevations on the Forest, but stream systems on the eastern edge of the Forest may experience thermal regimes that are unfavorable for cold-water species. Warming of stream systems could favor species shifts, favoring non-native species that are more tolerant of warmer stream conditions than coldwater species that currently exist on the Forest (Rice et al. 2012).

Increases in fire return intervals may also adversely impact fish populations. Fires have shaped the Shoshone and have impacted aquatic habitats. However, current projections indicate earlier, longer fire seasons, reduced summer spring runoff and wetter winters for the Shoshone (Rice et al. 2012). While native fish populations co-evolved with fire regimes, their ability to adapt to future events is questionable, especially for native fish populations that remain poorly connected to refugia habitats due to the presence of natural or artificial fish barriers (i.e., undersized culverts). Thermal heating during events or post-fire debris flows can threaten isolated populations if they are unable to escape these events or recolonize affected stream reaches.

Dewatering is currently an issue for fish populations on the Forest and remains a primary threat to existing Yellowstone cutthroat trout populations throughout their range. Major diversion structures exist on or off-forest that impede fish migrations, result in entrainment, or reduce

aquatic habitats downstream. As human populations increase, there will certainly be increasing demands for water consumption, especially in the West. The Forest has benefitted from Trout Unlimited's involvement with screening several of the irrigation structures located on and off-forest to reduce the impacts of such diversions.

Disease, parasites, pathogens and aquatic invasive species represent a threat to existing fish and amphibian populations. Many diseases including whirling disease and chytrid fungus (both occur on the Forest) can be transported to new environments via a number of different vectors, and motorized road access may contribute the spread of these diseases, organisms, and pathogens. Opportunities for new introductions inadvertently transported by Forest users is likely increased as vehicle access increases. New Zealand mudsnails and curly leaf pondweed infestations are increasing in watersheds below the Forest boundary; the possibility of infestations occurring on-forest increases with additional motorized vehicle access.

3.17.4 Consistency with Law, Regulation, and Policy

3.17.4.1 Land and Resources Management Plan

The management approach under the Shoshone National Forest Plan is to conserve intact and functioning stream reaches within their natural ranges of variability and restore those that do not meet or are trending away from desired stream conditions. In addition, a number of Forest Plan standards, goals, and objectives provide direction that are relevant to managing aquatic habitats, species, and motorized road/trail systems:

- Maintain aquatic and terrestrial species passage at road and trail stream crossings (MIS-goal-02).
- Provide well-distributed habitat and connective corridors important to sustaining management indicator species and other wildlife species (MIS-goal-04).
- Restore and maintain healthy watersheds, including wetlands, riparian areas, and floodplains. (S&W Goal 02).
- Disturbed areas resulting from management activities or infrastructure are disconnected from streams, lakes, and wetlands (S&W Goal 02).
- Provide habitat capable of contributing to conservation and viability of sensitive species, which will keep sensitive species from being listed under the Endangered Species Act (Sens-Goal-02).
- Yellowstone cutthroat trout occupy more suitable stream habitat than was occupied when the Plan was approved (Sens-Goal-02).
- Design management actions within known boreal toad, Columbian spotted frog, and Northern leopard frog habitat to maintain or improve habitat conditions (Sens-Stand-11).
- Newly constructed stream crossings should provide aquatic and terrestrial species passage and should not constrict the stream channel (Sens-Guide-15).

Effects to aquatic habitats and species from motorized use would not be enough to trend Forest populations toward federal listing under the Endangered Species Act, though localized impacts from motorized use would be greater in intensity, especially for species that reside along roads.

3.17.4.2 Biological Evaluation: Environmental Consequences: Region 2 Sensitive Aquatic Species

The objective of this Biological Evaluation is to:

1. Ensure Forest Service actions do not contribute to loss of viability of threatened, endangered, proposed, or sensitive plant and animal species, or contribute to a trend towards Federal listing under the Endangered Species Act of any species.
2. To incorporate concerns for sensitive species throughout the planning process, identifying opportunities for enhancement and reducing any potential negative impacts.

The Region 2 Regional Forester’s Sensitive Species List was reviewed prior to completing this biological evaluation. There are several R2S aquatic species on the Region 2 Regional Forester’s Sensitive Species List (December 18, 2018) in the project area that could be impacted by the proposed action. These species are summarized in Table 141. Species not known to occur in the project area or those that would not be impacted by the proposed action have been dismissed from further consideration. The Forest Plan contains the following goals, standards, and guidelines for sensitive species:

- SENS-GOAL01: Provide habitat capable of contributing to conservation and viability of sensitive species, which will keep sensitive species from being listed under the Endangered Species Act.
- SENS-Stand-07: Design and implement management actions in occupied sensitive species habitats to avoid actions that contribute to a trend towards Federal listing for those species.
- SENS-GUIDE-15: Design management actions within known boreal toad, Columbian spotted frog, and northern leopard frog habitat to maintain or improve habitat conditions.

Table 141: Region 2 Sensitive aquatic species carried forward for analysis.

SPECIES	Status ¹	Sensitive Species Carried Forward for Analysis
Boreal toad <i>(Anaxyrus boreas boreas)</i>	S	Yes: Species has been documented in the analysis area.
Columbia spotted frog <i>(Rana luteiventris)</i>	S	Yes: Species has been documented in the analysis area.
Northern leopard frog <i>(Lithobates pipiens)</i>	S	Yes: Species has been documented in the analysis area.
Mountain sucker <i>(Catostomus platyrhynchus)</i>	S	Yes: Species has been documented in the analysis area.

SPECIES	Status ¹	Sensitive Species Carried Forward for Analysis
Lake chub (<i>Couesius plumbeus</i>)	S	Yes: Species has been documented in the analysis area.
Yellowstone cutthroat trout (<i>Oncorhynchus clarkii bouvieri</i>)	S	Yes: Species has been documented in the analysis area.

1. S = sensitive species

3.17.4.2.1 BOREAL TOAD

Boreal toads' range over much of northwestern North America, from the southern Yukon to Nevada. In Wyoming, they occur in the western and south-central mountain ranges. Boreal toads require shallow wetlands for breeding, terrestrial habitats for foraging, and burrows for winter hibernation (Loeffler 2001). Adult toads spend up to 90% of their adult life in upland terrestrial habitats and may travel long distances (> 5 miles) to fulfill natural history requirements (Jones et al. 2000). They have low reproductive output; females do not begin breeding until they are six years old, do not breed every year, and are unlikely to live past 9 years (Keinath and Mcgee 2005). Boreal toads rely on rodent burrows, deadfall piles, rockslides, or even slash piles as winter hibernacula. In October 2017, the USFWS announced the eastern population of boreal toad was not warranted for listing under the ESA.

Specific knowledge of how toads use upland terrestrial habitats, migration corridors, and overwintering habitat across the Forest is low. They are most frequently encountered on the Clarks Fork Ranger District and less frequently on the other Forest ranger districts.

With respect to motorized use, wheeled motorized vehicles can directly impact boreal toads by crushing them, and toads are especially vulnerable during dispersal periods from breeding sites and during late summer when adults migrate into upland habitats. High mortality has also been observed when roads and trails occur in boreal toad habitats and migration corridors. In some studies, this source of mortality has caused substantial impacts to amphibians (Lehtinen et al. 1999). Sedimentation into breeding ponds can also affect boreal toads directly and indirectly by affecting water quality and reproductive success.



Figure 22: Unimproved stream crossings such as this one pose hazards to boreal toads as well as forest users. During breeding season, toads may be attracted to warmer water found in wheel ruts. Here, boreal toads lay eggs in the wheel

ruts as opposed to the adjacent waterbody the ruts drain into. Egg masses and toads are then frequently displaced as vehicles attempt to cross. This process likely restricts recruitment in some locations on the Forest.

Under Alternative 1, there would be no impact to boreal toads.

Under Alternative 2, the proposal may adversely impact individuals, but is not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing. The travel management system proposed under Alternative 2 comprises a relatively small proportion of available habitats on the Shoshone National Forest.

Under Alternative 3, the proposal the proposal may adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing. The travel management system proposed under Alternative 3 comprises a relatively small proportion of available habitats on the Shoshone National Forest.

3.17.4.2.2 COLUMBIA SPOTTED FROG

Columbia spotted frogs occur only in northwestern North America from British Columbia to Utah. In Wyoming and Region 2, their distribution occurs on the Bighorn and Shoshone National Forests. They inhabit a variety of vegetation communities, including coniferous or mixed forests, grasslands, and riparian areas. Typically, they are found near water since relative humidity at 65% at 77o F (25o C) is lethal to spotted frogs in approximately 2 hours (Dumas 1964).

The species appears stable across the Greater Yellowstone Ecosystem (Patla and Keinath 2005), though trend information for Columbia spotted frogs on the Shoshone is sparse. Most of the documented Columbia spotted frog breeding sites on the Shoshone National Forest are concentrated in the tributaries to the Upper Wind River and Clarks Fork of the Yellowstone River. They have also been documented in the Lava Mountain area, North Fork Shoshone River corridor, Soda Butte watershed, and tributaries of the Wind River.

Columbia spotted frogs can be directly or indirectly impacted by travel management activities by crushing, loss of cover, and alterations in microsite conditions that can affect humidity and temperature. Habitat fragmentation or isolation that can result as a consequence of road construction activities are examples of indirect impacts to the species. Avoidance of wetlands and stream courses would minimize impacts to Columbia spotted frogs.

Under Alternative 1, there would be no impact to Columbia spotted frogs.

Under Alternative 2, the proposal may adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing. Proposals under consideration for Alternative 2 represent a relatively small amount of available habitats on the Shoshone National Forest.

Under Alternative 3, the proposal the proposal may adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing. Proposals under consideration for Alternative 3 represent a relatively small amount of available habitats on the Shoshone National Forest.

3.17.4.2.3 NORTHERN LEOPARD FROG

Northern leopard frogs range across North America, but distribution is spotty in arid portions of the West. They are found in a variety of habitats, from grass and brush lands to high montane areas. Northern leopard frogs primarily rely on perennial wetlands but may forage far from water in damp vegetation (Stebbins 1985). Regionally, these frogs occur as high as 11,000 ft. (3,353 m) throughout much of Wyoming (except the Tetons and Red Desert). The Forest is aware of several observations occurring on the Wind River Ranger District during the mid-1990s, however, reports of recent sightings are rare.

Numerous factors are responsible for the Northern leopard frog's decline. In Region 2, populations have been negatively impacted from fish stocking, grazing, recreation, road development, facilities construction, logging, and hydrologic alteration caused by the development of water resources. Other threats include introductions of infectious diseases, such as chytrid fungus. Populations of northern leopard frogs are declining across Wyoming (Smith and Keinath 2007).

Under Alternative 1, there would be no impact to Northern leopard frogs.

Under Alternative 2, the proposal may adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing. Proposals under consideration for Alternative 2 represent a relatively small amount of available habitats on the Shoshone National Forest.

Under Alternative 3, the proposal the proposal may adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing. Proposals under consideration for Alternative 3 represent a relatively small amount of available habitats on the Shoshone National Forest.

3.17.4.2.4 MOUNTAIN SUCKER

Mountain suckers are found throughout most of western North America, ranging from southern Canada to Utah and from California to western South Dakota. In Region 2, they are widely distributed in some areas, but sparsely distributed in others. At a regional scale, information regarding mountain sucker populations is insufficient to identify population trends (Belica and Nibbelink 2006); however, the Natural Heritage Network ranks mountain suckers as secure in Wyoming.

Stream connectivity, changes in habitat quantity, habitat fragmentation, and introduction of non-native fish species have been identified as risk factors for mountain sucker populations. Mountain suckers can be found as high as 10,000 feet in the Wind River Mountains (Baxter and Stone 1995). On the Shoshone National Forest, they appear to be widely distributed, occurring in many of the larger streams or river systems.

Under Alternative 1, there would be no impact to Mountain sucker populations.

Under Alternative 2, the proposal may adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing. Fish passage at newly constructed stream crossings would be maintained under this alternative. Alteration of aquatic habitat is not anticipated to impact Mountain sucker populations at the planning scale.

Under Alternative 3, the proposal the proposal may adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing. Fish passage at newly constructed stream crossings would be maintained under this alternative. Alteration of aquatic habitat is not anticipated to impact Mountain sucker populations at the planning scale.

3.17.4.2.5 LAKE CHUB

Lake chub are considered fairly common in Wyoming and have been used as bait fish at times, especially in the Riverton area (Baxter and Stone 1995). Region 2 is considered to be the southern extent of the species' range, which extends north into Canada. They are found in the Tongue and Bighorn River drainages, in the Sweetwater, and Upper North Platte drainages as well. Watersheds on the east side of the Continental Divide are considered native habitats, which includes areas of the Shoshone National Forest. They are considered secure in Wyoming (with the exception of the Platte system), but in other states, populations are critically imperiled (SD and NE) or state endangered (CO). Water development, introduction of exotic predators, and habitat degradation are partly responsible for the species' decline (Stasiak 2006).

Lake chub require relatively clear water; sedimentation can be detrimental since they feed primarily by sight. They generally prefer smaller streams but can also inhabit lakes. They have been reported in Brooks Lake and the lower tributary streams of the Wind River and are common in Upper Sunshine Reservoir (Greybull tributary, Baxter and Stone 1995).

Under Alternative 1, there would be no impact to lake chub populations.

Under Alternative 2, the proposal may adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing. Fish passage at newly constructed stream crossings would be maintained under this alternative. Alteration of aquatic habitat is not anticipated to impact lake chub populations at the planning scale.

Under Alternative 3, the proposal the proposal may adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing. Fish passage at newly constructed stream crossings would be maintained under this alternative. Alteration of aquatic habitat is not anticipated to impact lake chub populations at the planning scale.

YELLOWSTONE CUTTHROAT TROUT

Yellowstone cutthroat trout historically occupied about 17,720 miles of habitat in Montana, Wyoming, southern Idaho, northwestern Utah and northeastern Nevada. In Wyoming, conservation populations occupy about 4,050 stream miles (Endicott et al. 2016). Yellowstone cutthroat trout are the only native trout on the Shoshone National Forest. Most tributary streams with sufficient flow are also thought to have likely contained Yellowstone cutthroat trout in areas where they weren't excluded by the presence of cascades, waterfalls, or other gradient barriers.

Threats to Yellowstone cutthroat trout include non-native fish introductions, irrigation, agriculture, logging, mining, and over harvest. Most stream mileage currently occupied by Yellowstone cutthroat trout occur on federal or tribal government lands, and 28% of occupied stream mileage is within National Parks or federally designated Wilderness areas (May et al. 2007).

Non-native fish introductions are the greatest threat to persistence of populations due to direct/indirect competition or hybridization (Kruse et al. 2000, Thurow et al. 1997, Gresswell 2010). Extensive fish stocking dating to as far back as the late 1800's have resulted in substantial hybridization of Yellowstone cutthroat trout populations, and many streams that historically contained Yellowstone cutthroat trout now consist of only hybridized populations that are of limited conservation value from a species conservation perspective.

Population declines and extirpations of Yellowstone cutthroat trout have been greatest in larger, low-elevation streams where anthropogenic activities, including agriculture, livestock grazing, and resource extraction, are common, and where abundant access encouraged angler harvest and non-indigenous species introductions (Gresswell 1995, 2009, Thurow et al. 1997).

Region 2 is signatory to the Conservation Agreement for Yellowstone Cutthroat Trout. The goal of the agreement is to ensure the persistence of Yellowstone cutthroat trout throughout its historic range by maintaining populations, ensuring connectivity, and increasing abundance where feasible.

Road construction and installation of drainage features such as culverts, low water crossings, and bridges have impacted fish populations to varying degrees in the analysis area. Barrier culverts have isolated some fish populations. The Shoshone has been replacing undersized or barrier culverts where there are likely to be substantial benefits to fish populations; other barrier culverts (Stonefly Creek) are being currently maintained to prevent genetic extinction via invasion and subsequent hybridization between native and non-native trout.

Under Alternative 1, there would be no impact to Yellowstone cutthroat trout populations.

Under Alternative 2, the proposal may adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing. As indicated earlier, several stream crossings on fishbearing streams would be required (Bennett Creek, Warm Springs Creek; newly constructed routes would need to be designed such that fish passage is maintained. The Gwinn Fork route is not expected to result in significant detrimental impacts to the population, though it is unlikely to improve habitat conditions either. The addition of several miles of administrative roads to the system is of concern and could degrade habitat conditions in localized areas including the Wiggins Fork, East Fork Wind River, and Long Creek area.

Populations in Sweetwater Creek would likely benefit from decommissioning of the upper end of the Sweetwater Road. In addition, there would be opportunities to restore degraded habitat in a small section of the Elk Fork (tributary to North Fork Shoshone). Seasonal restrictions across the Forest under Alternative 2 would minimize impacts resulting from runoff in some areas.

Under Alternative 3, the proposal may adversely impact individuals, but is not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing. The Sweetwater Road and Elk Fork Road may benefit populations from reduced vehicle entries, though the roads would still be open for administrative use with the exception of the upper Sweetwater Road which would be decommissioned. The Gwinn Fork addition would be considered neutral. This alternative is likely to have less detrimental impact to populations than Alternative 2.

3.17.4.3 Environmental Consequences: Forest Management Indicator Species

Forest Management Indicator Species include stream trout such as Yellowstone cutthroat trout, Snake River cutthroat, rainbow-cutthroat hybrids, brook trout, and brown trout. These species occur in many perennial streams across the Forest and occupy most streams with adequate flows. All Management Indicator Species (with the exception of Yellowstone cutthroat trout) were historically absent from the Forest but were introduced and have naturalized in many areas through decades of stocking efforts.

The Forest Plan contains the following guideline for managing MIS habitat:

- (MIS-Guide-02): Management activities that affect large woody debris should retain natural and beneficial volumes of large woody debris for fish habitat, stream energy dissipation, and as sources of organic matter for the stream ecosystem.

Impacts to stream trout as a result of implementation of Alternative 1, Alternative 2, or Alternative 3 is expected to be negligible and undetectable at the Forest scale. Stream trout such as brook trout and brown trout generally have higher tolerance for increases in stream temperature, increases in sedimentation, and simplification of aquatic habitats as opposed to cutthroat trout or rainbow trout populations which can be more sensitive to increases of thermal regimes or sedimentation.

Following handbook direction and implementing best management practices that are designed to protect the watershed influence zone, stream courses, wetland habitats, soils, as well as Yellowstone cutthroat trout and amphibian populations are adequate to protect stream trout. *Populations of stream trout are expected to continue at or near current densities with implementation of the Travel Management Project at the Forest Scale.*

3.17.5 Conclusion

There are currently a number of NFSRs and NFSTs that are impacting aquatic habitats and fish and amphibian populations that rely on them. Travel management provides an opportunity to address some of these issues.

Alternative 2 would result in a substantial addition of closed roads to the system, would involve construction of NFSTs, establish several new stream crossings, and implement seasonal restrictions. The overall impacts of Alternative 2 to aquatic habitats is expected to result in a higher degree of detrimental impacts than Alternative 3.

Alternative 3 would result in fewer adverse impacts due primarily from not adding dozens of miles of ML 1 roads to the system. It also would require less construction/reconstruction of routes across fishbearing stream channels and a few stream crossings would be rehabilitated. Alternative 3 addresses chronic degradation issues that have occurred near Fish Lake, Sweetwater Creek, and the Elk Fork by establishing reroutes, decommissioning, and changing designations to administrative use only.

3.18 Wildlife: Sensitive Plant Species

3.18.1 Introduction

This analysis examines effects to listed, proposed, and sensitive plant species known or expected to be in the project area or that the project potentially affects.

3.18.1.1 Issues Addressed

This section includes issues pertaining to botany that have been identified for detailed analysis. "An issue is a statement of cause and effect linking environmental effects to actions" (FSH 1909.15).

Issue 1: Whether and to what extent wheeled vehicle use proposed under the Alternatives will affect Regional Forester's Sensitive Plant Species.

Issue 2: Whether and to what extent wheeled vehicle use proposed under the Alternatives will affect Plant Species of Local Concern.

Issue 3: Whether and to what extent OSV use proposed under the Alternatives will affect Regional Forester's Sensitive Plant Species.

Issue 4: Whether and to what extent OSV use proposed under the Alternatives will affect Plant Species of Local Concern.

3.18.2 Methodology

This methodology incorporates analysis of listed, proposed, and sensitive plant species known or expected to be in the project area or that the project potentially affects. GIS data from the Wyoming Natural Diversity Database (WYNDD) was examined for element occurrences of Regional Forester's Sensitive Species (RFSS) and Species of Local Concern (SOLC) that occur within 50 feet of a travel element associated with any of the 3 alternatives. Fifty feet was chosen based on personal experience reflecting that the typical distance at which impacts to plants from roads and trails (physical damage, introduction of invasive species, dust, etc.) are measurable (with impacts not measurable at greater distances). Status-species (RFSS and SOLC) not known to occur on the Forest based on this geospatial screening are not analyzed further, and decisions under this Travel Management project are expected to have No Impact. Thirty-one plant species were identified that did have potential effects attributable to the proposed alternatives under consideration.

Species known to occur within 50 feet of a travel element¹⁶ (23 RFSS and 8 SOLC) were analyzed for how individuals and that species' habitat will interact with the changes or lack of changes proposed in each of the three alternatives. The analysis examines impacts for two distinct groups of species. The first group of species are those that just so happen to be within 50 feet of a travel element but their habitat and viability are not influenced by travel management. That is to say that the structure and function of these species' habitat is independent of the things that travel

¹⁶ For purposes of this analysis, a travel element is considered any NFSR, NFST, or the entirety of an area open to OSV use.

management tends to directly affect. The second group are species where the structure and function of their habitat is largely and directly influenced by the things that travel management influences or whose habitat is in the same physical place where travel infrastructure tends to be located. These species (all of which are RFSS) are shaded in Table 1. Descriptions of effects explain the potential interactions between species and habitat and travel infrastructure under the alternatives.

There are no known plant species protected under the ESA in the analysis area or that the project affects iPAC date 5/27/2020.

This Botany Effects Analysis has all of the required elements for a Biological Evaluation consistent with FSM 2672.42.

3.18.3 Environmental Consequences – Across All Alternatives

This section discloses the environmental impacts of consistent across all alternatives.

3.18.3.1 Direct and Indirect Effects

No RFSS will lose viability or have a trend towards federal listing due to effects from any of the alternatives even though there may be direct, indirect, or cumulative impacts to individuals. Some species were found to be impacted by the no action alternative since the existing infrastructure already exists and may be impacting individuals but since no species has lost viability the no action alternative remains above that threshold for RFSS.

Four elements combine to limit the impacts associated with any of the Alternatives and support the analysis herein. First, impacts to populations from existing infrastructure are likely minimal, as new ground disturbance outside the route footprint is not anticipated. Second, standard mitigation measures for existing infrastructure (i.e., continued use measures) and similar measures for proposed infrastructure further decrease potential impacts. Third, site surveys for proposed infrastructure identify potential at-risk localized species communities, providing the opportunity for the fourth and final factor: specialized mitigation to address particular species issues. This combined suite of circumstances and management tools, juxtaposed with the confined footprint of motorized use on the Forest (due to land use designations such as Wilderness, Inventoried Roadless Areas, etc.), supports the determinations made below with respect to sensitive species and species of local concern.

Table 142 lists the individual RFSS with a description of habitat and known occurrences and a summary of determined effects. Analysis considered how motorized travel would interact with a particular species within the 50 feet of the travel corridor. The analysis indicated No Impact (“NI”) or may impact individuals but is not likely to cause a trend to federal listing or loss of viability in the Planning Area (“MII”). For three species, travel management effects under any of the alternatives are not expected to have any impact. These species are: *Sphagnum angustifolium*, *Primula egaliksensis*; *Salix myrtillifolia*. Eighteen RFSS are expected to have impacts associated with motorized use under all alternatives, but not expected to cause a trend to federal listing or loss of viability (the MII category). One species, *Amerorchis rotundifolia*, will have no impact under Alternatives 1 and 3, but falls under MII for Alternative 2. And a final species, *Descurainia torulosa*, falls within the MII category for Alternatives 1 and 3, with no impacts expected under Alternative

2. The determination of effects and rationale column in Table 142 explains how impacts were assessed for these species and conclusions of impact developed.

Table 142: RFSS Assessment

Scientific Name	Common Name	Habitat Description and distribution on the SHF	Determination of effect and rationale
<i>Amerorchis rotundifolia</i>	Round-leaved orchid	Mossy, moist seepage areas in conifer forests, often associated with white spruce, horsetails, sedges and rushes 20 EO total on the SHF – 10 are within 50 feet of a travel element, with 9 of these around Swamp, Lake where a closed road will remain closed.	Alts 1 & 3 – No Impact – Occurrences that overlap in these alternatives are for currently closed NFSRs that will remain closed, with no impact expected Alt 2 – MII – Occurrence along new ungroomed OSV Class 1 trail (NZ-04w) along lower Ghost Creek. Individuals may be impacted but most of the other occurrences of this species will not be influenced by travel management with no loss of viability will result
<i>Botrychium ascendens</i>	Upward-lobe moonwort	Wyoming populations are in moist meadows along streams, in mossy seeps within Douglas-fir, lodgepole pine and Engelmann spruce forests, and riparian willow 8 total EO on SHF – half are within 50 feet of a travel element some of which have coexisted with travel elements since at least 1978. There are 2 EOs within areas open to OSV use.	All 3 alternatives – MII – each alternative may impact individuals but more than half of the occurrences on the SHF are independent of travel management and there are several occurrences that have co-existed with travel infrastructure since at least 1978 and thus the species will remain viable. Travel infrastructure can tend to be located in mountain meadows where it is easier to build roads and trails. Such meadows are largely structured by fire history and insect outbreaks which are largely independent of travel management. The 2 EOs in OSV areas are in forested areas and it's unlikely they would be directly impacted, though some damage is still possible. Even with potential direct impacts, viability would be maintained.
<i>Carex diandra</i>	Lesser paniced sedge	On floating and non-floating moss mats, pond edges, and hummocks in open shrub and sedge meadows. Water chemistry is often influenced by limestone. 35 EO total on SHF – 16 are within 50 feet of a travel element or are within an area open to OSV use	All 3 alternatives – MII – Each alternative has travel infrastructure that may impact individuals, but other occurrences on the SHF are independent of travel management and will thus remain viable. Fens and sedge meadows are almost entirely structured by water quality, chemistry, and topographic location. Water quality and chemistry can be influenced by travel elements if such elements change the amount or chemistry of runoff.
<i>Carex livida</i>	Livid sedge	Floating mats, bogs, fens, and marls dominated by Carex species, often on wet hummocks. 29 EO Total on SHF – 3 within 50 feet of a travel element	All 3 alternatives – MII – Each alternative has travel infrastructure that may impact individuals, but the majority of occurrences on the SHF are independent of travel management and will thus remain viable. Fens and sedge meadows are almost entirely structured by water quality, chemistry, and topographic location. Water quality and chemistry can be influenced by travel

Scientific Name	Common Name	Habitat Description and distribution on the SHF	Determination of effect and rationale
			elements if such elements change the amount or chemistry of runoff.
<i>Descurainia torulosa</i>	Wyoming tansymustard	Sandy soil at the base of cliffs composed of volcanic breccia or sandstone, under slight overhangs, in cavities in the volcanic rock or on ledges. 30 EO total on SHF – 2 are within 50 feet of a travel element	Alternatives 1 and 3 – MII – Each alternative has travel infrastructure that may impact individuals, but the majority of occurrences on the SHF are independent of travel management and will thus remain viable. Alternative 2 – No Impact – new ungroomed OSV trails proposed in the vicinity of this occurrence, but area closure for breccia cliffs (this species’ habitat) results in no impact.
<i>Drosera anglica</i>	English sundew	Floating bogs, swamps, and sedge meadows, with soils that are saturated or in very shallow standing water 10 EO total on SHF – 2 are within 50 feet of a travel element, both of which are also in an area open to OSV use	All 3 alternatives – MII – Each alternative has travel infrastructure that may impact individuals, but most occurrences on the SHF are independent of travel management and will remain viable.
<i>Eriophorum chamissonis</i>	Russet cottongrass	In Wyoming, found in montane swamps and bogs 9 EO total on SHF – 1 is within 50 feet of a travel element	All 3 alternatives – MII – Each alternative has travel infrastructure that may impact individuals, but most occurrences on the SHF are independent of travel management and will remain viable.
<i>Eriophorum gracile</i>	Slender cottongrass	Sedge meadows and floating bogs in saturated soil to shallow standing water 16 EO total on SHF – 3 are within 50 feet of a travel element; 6 are within areas open to OSV use	All 3 alternatives – MII – Each alternative has travel infrastructure that may impact individuals, but most occurrences on the SHF are independent of travel management and will remain viable.
<i>Festuca hallii</i>	Hall’s fescue	Montane meadows, slopes, and edges of open coniferous woods and meadows at 6800-11000 feet. Usually on soils derived from calcareous parent material. Reports of this species on volcanic soils. Can occur in edge between open meadows lodgepole pine Engelmann spruce forests or in tundra. 17 EO total on SHF – 6 are within 50 feet of a travel element (many have co-existed with a road since at least 1978); these EO are also within areas open to OSV use	All 3 alternatives – MII – Each alternative has travel infrastructure that may impact individuals, but the majority of occurrences on the SHF are of travel management and will thus remain viable. Current occurrence that overlap with travel elements have been coexisting with travel since at least 1978. Travel infrastructure can tend to be located in mountain meadows where it is easier to build roads and trails. Such meadows are largely structured by fire history and insect outbreaks which are generally independent of travel management.
<i>Lesquerella fremontii</i>	Fremont bladderpod	Meadows, slopes, ridges, and benches in cushion plant communities on rocky, mesic, limestone derived soils. Occurs primarily arid foothills and desert ridges, but may also occasionally occur in cushion plant communities near timberline	All 3 alternatives – MII – Each alternative has travel infrastructure that may impact individuals. More than half of the total occurrences on the SHF are within 50 feet of a travel element since this species’ habitat is where travel elements tend to be located. Some of the occurrences have coexisted with travel elements since at least the 70s and 80s. there are still around 50 occurrences

Scientific Name	Common Name	Habitat Description and distribution on the SHF	Determination of effect and rationale
		109 total EO on SHF – approximately 60 are within 50 feet of a travel element	that are independent of travel – so the species will remain viable regardless of the impacts of travel management. The exposed ridges and foothills are generally where travel elements are located due to ease of construction. NFSRs and NFSTs can add additional disturbance in the form of physical impacts and the introduction and spread of invasive plants.
<i>Parnassia kotzebuei</i>	Kotzebue's grass-of-parnassus	On wet cliffs and alpine slopes at 8,100-12,000 feet. Plants usually occur on very barren, steep slopes with little competition from other vegetation 16 Total EO on SHF – 4 within 50 feet of a travel element or are within areas open to OSV use	All 3 alternatives – MII – Each alternative has travel infrastructure that may impact individuals, but most occurrences on the SHF are independent of travel management and will remain viable.
<i>Penstemon absarokensis</i>	Absaroka beardtongue	On loose, volcanic, rocky soils and scree along sparsely vegetated slopes, rocky ridges, and creek bottoms at 5920-10000 feet. Plants usually occur on very barren, steep slopes with little competition from other vegetation. 151 EO Total on SHF – approximately 100 EO are within 50 feet of a travel element and the majority are within areas open to OSV use	All 3 alternatives – MII – Each alternative has travel infrastructure that may impact individuals, but most occurrences on the SHF are independent of travel management and will thus remain viable. The EO that are in the OSV areas may be impacted, but their habitat is not ideal winter travel areas so impacts, while possible, are unlikely and will not result in a loss of viability.
<i>Pinus albicaulis</i>	Whitebark pine	In the GYE whitebark pine grows in pure stands and mixed with other conifers. Pure stands tend to occur in cooler wetter areas. 74,000 acres summer and 39,000 winter mapped acres (many of which are the same acres) of pure and mixed whitebark pine forests are within 50 feet of a travel element	All 3 alternatives – MII - Travel elements will remain within 50 feet so cannot discount direct impacts in all 3 alternatives. Characteristics that structure WBP habitat are largely independent of travel management, except for indirect impacts from the ability to suppress naturally occurring wildfires or conversely allow them to run their natural course. Viability remains because drivers of WBP viability (bark beetles, whitepine blister rust, and competitive displacement) are largely independent of travel management.
<i>Primula egaliksensis</i>	Greenland primrose	Wet meadows along waterways and in montane fens, often on hummocky terrain that is locally drier than its wet, marshy surroundings. 20 EO total on SHF – 1 within 50 feet of a travel element	All 3 alternatives – No Impact – Closed NFSRs that overlaps with occurrence remains closed in all alternatives
<i>Pyrrocoma carthamoide s var. subsquarrosa</i>	Absaroka goldenweed	Open meadows, slopes and ridges on sandstone, limestone or volcanic substrates at 6000-10600 feet. 92 EO total on SHF – 38 are within 50 feet of a travel element; 26 of those EOs are within an area open to OSV use	All 3 alternatives – MII – Each alternative has travel infrastructure that may impact individuals. Occurrences that currently are within 50 feet of travel elements have coexisted with them since at least the 80s and 90s. Travel infrastructure can tend to be located in meadows where it is easier to

Scientific Name	Common Name	Habitat Description and distribution on the SHF	Determination of effect and rationale
			build roads and trails. Such meadows are largely structured by fire history and insect outbreaks which are largely independent of travel management. Similarly, ridges and slopes are topographic features that provide for ease of construction. The open areas where Absoroka goldenweed is found can be impacted by physical damage from travel or from the introduction and spread of invasive species; however, no instances were identified here. Most occurrences on the SHF are independent of travel management and will remain viable.
<i>Pyrrocoma integrifolia</i>	Entire-leaf goldenweed	Populations in Wyoming occur in montane meadows and three-tip sagebrush grasslands at 6330-8900 feet. 2 EO total on SHF – 1 within 50 feet of Deer Park Road	All 3 alternatives – MII – This species occurs in dry meadows and rocky sagebrush habitat. Each alternative has travel infrastructure that may impact individuals. There are only two known occurrences on the SHF and one is within 50 feet of the Deer Park Road. Populations are expected to remain viable under continued use proposed under the alternatives.
<i>Ranunculus gelidus</i>	Timberline buttercup	Moist alpine tundra and talus slopes at 10000-11000 feet 12 total EO on SHF – 6 are within 50 feet of a travel element; 4 of those are within an area open to OSV use	All 3 alternatives – MII – Each alternative has travel infrastructure that may impact individuals. While half of the known occurrences are within 50 feet of a travel element, the habitat is tundra and talus slopes which are unlikely to have actual travel elements. Even if there are impacts to individuals there are still 6 occurrences that are independent of travel management.
<i>Salix candida</i>	Hoary willow	Floating mats, bogs, fens, and willow thickets around ponds on wet to saturated, histic soils, sometimes influenced by limestone. 48 total EO on SHF – 8 within 50 feet of a travel element or are within an area open to OSV use	All 3 alternatives – MII – Each alternative has travel infrastructure that may impact individuals, but most of the occurrences on the SHF are independent of travel management and will remain viable.
<i>Salix myrtillifolia</i>	Myrtleleaf Willow	Lake and stream banks, floodplain thickets, muskegs, bogs, and moist white spruce forests. 9 Total EO on SHF – 2 within 50 feet of a travel element	All 3 alternatives – No Impact – Closed road that overlaps with occurrence remains closed in all alternatives
<i>Shoshonea pulvinata</i>	Shoshonea	Shallow, stony, calcareous soils of exposed limestone outcrops, ridge tops, and talus slopes. 42 total EO on the SHF – 28 within 50 feet of a travel element or within an area open to OSV use	All 3 alternatives – MII – Each alternative has travel infrastructure that may impact individuals. While the majority of occurrences on the SHF are within 50 feet of a travel element, the current occurrences that are proximate to roads tend to be well above them (topography-wise) and are not actually where travel elements would occur. Even if

Scientific Name	Common Name	Habitat Description and distribution on the SHF	Determination of effect and rationale
			there are impacts to the occurrences that are within 50 feet, there are still nearly 20 occurrences that are independent of travel management.
<i>Sphagnum angustifolium</i>	Fine bogmoss	Swales in subalpine meadows and in marshy areas – typically associated with fens elsewhere. 6 Total EO on the SHF – 2 within 50 feet of a travel element (and within an area open to OSV use)	All 3 alternatives – No Impact – while there are travel elements within 50 feet of this occurrence, no travel elements are proposed in the actual habitat (submerged meadows and swales).
<i>Townsendia condensata</i> var. <i>anomala</i>	North Fork Easter-daisy	Open sparsely vegetated, montane forests, meadows, rocky slopes, and ridges. Often on sandy volcanic soil or talus. 152 Total EO on SHF – 4 within 50 feet a travel element; 126 are within an area open to OSV use	All 3 alternatives – MII – Each alternative has travel infrastructure that may impact individuals, but the majority of occurrences on the SHF are independent of travel management and will thus remain viable. The EO that are within OSV areas may experience direct or indirect damage to individuals but that damage will not result in a loss of viability since the species lives in areas where OSV use is unlikely.
<i>Utricularia minor</i>	Lesser bladderwort	Submerged in shallow ponds, lakes, and slow-moving streams 18 total EO on the SHF – 2 within 50 feet of a travel element	All 3 alternatives – MII – Each alternative has travel infrastructure that may impact individuals, but the majority of occurrences on the SHF are independent of travel management and will thus remain viable.

Table 143 provides a similar summary of the effects to SOLC. The determination of effect shifts for SOLC to focus on whether and how Forest plan components are met under the alternatives. The primary guidelines for SOLC advise that:

- Where alpine plant species of local concern are present, management activities that lead to increased ground disturbance or trampling should be avoided. (SPLC-GUIDE-01), and
- Where riparian and fen plant species of local concern are present, management activities are conducted in a manner that maintains riparian and fen habitats in a properly functioning condition. (SPLC-GUIDE-02).

All alternatives are expected to be consistent with these plan components for SOLC.

Table 143: SOLC Assessment

Scientific Name	Common Name	Habitat Description and distribution on the SHF	Determination of effect and rationale
<i>Adoxa moschatellina</i>	Moschatel	Subalpine forest All 4 EOs on the SHF are within areas closed to OSV use near Buffalo Bill Camp	No effect expected due to restriction on OSV use within area.

Scientific Name	Common Name	Habitat Description and distribution on the SHF	Determination of effect and rationale
<i>Agoseris lackschewitzii</i>	Pink false-dandelion	Fen and Riparian <i>Wheeled</i> 1 EO within 50 feet of NFSR 142 on Clarks Fork; 1 EO within 50 feet of NFSR 544 on Wind River; EOs also located within areas on Clarks Fork (adjacent to proposed ungroomed OSV trails in all 3 alternatives)	No change from current conditions is expected due to wheeled vehicle use when compared with current conditions. OSV groomed and ungroomed trails are proposed, but OSV use will not cause a loss in proper functioning condition. 4 EO are within OSV areas open to use but no change in proper functioning condition expected.
<i>Androsace chamaejasme var. carinata</i>	Sweet-flowered rock jasmine	Calcareous rocky slopes and ridges Near / Along FR 100 and 100 1D on Bald Ridge on Clarks Fork RD – no proposed change	Location of EO that is within 50 feet of a travel element has no change so would not increase the disturbance from what is already there. There are 7 EO within an area open to OSV use
<i>Botrychium simplex</i>	Least Grape-fern	Riparian In middle part of sunlight basin, proximate to Ranger Station. Large polygon with lots of uncertainty. One change in Alt 2 and 3 is a new admin road, with proximity to NFSR 182. Additionally, 3 segments of 105 complex will have seasonal restrictions applied	A single EO with a massive error buffer from 1985 is within 50 feet of a travel element, but the buffer reflects uncertainty regarding plant populations. No change to the PFC is anticipated.
<i>Carex leptalea</i>	Bristly-stalk sedge	Riparian 3 EO within 50 feet of a travel element (Beartooth Highway); 5 other EO in areas open to OSV use	There is no change in travel management for the elements that are within 50 feet of this species. There is no change in any of the alternatives and it's presumable already at PFC.
<i>Cymopterus evertii</i>	Evert's waferparsnip	Calcareous rocky slopes and ridges 3 EO within 50 feet of NFSR 207 on Greybull RD; this NFSR will have a seasonal restriction. No change with respect to other EOs in proximity to North Meeteetse creek	There is no plan component for this type of SOLC – the travel elements that are within 50 feet of this species are going from year-long to seasonal or have no change. Two are in areas open to OSV use.
<i>Eriophorum callitrix</i>	Sheathed cottongrass	Alpine Majority of EO is in Popo Agie Wilderness with large error polygon	Majority of EO is in Popo Agie Wilderness with large error polygon. Eastern portion of the polygon hits MT 01 (an NFST) along Shoshone Lake. A seasonal restriction will be applied. No increase in disturbance is expected related to areas open to OSV use.
<i>Koenigia islandica</i>	Koenigia	Alpine 1 EO within 50 feet of a travel element (Beartooth Pass – there is a spur road that will be a new admin road); 19 additional EOs in areas open to OSV use	Alpine – but the habitat of the species is wet, open, gravelly soil in seepage areas in the alpine zone. The EO is large and barely hits a new administrative road under alternative 2 and a closure under Alt 3 (with a seasonal restriction applicable). Analysis of satellite imagery reveals that the proposed new road will not impact species habitat is. No increase in disturbance expected.

Scientific Name	Common Name	Habitat Description and distribution on the SHF	Determination of effect and rationale
<i>Oxytropis podocarpa</i>	Gray's Point-vetch	Alpine EO on Needle Mountain near Boulder basin	EO from 1910 very large error polygon. Changes under alternatives not expected to impact EO at Cabin Creek Trailhead. No increase in disturbance or trampling.
<i>Papaver kluanense</i>	Alpine poppy	Alpine 4 EO within areas closed to OSV use	All EO in areas closed to OSV use and will meet plan components
<i>Parrya nudicaulis</i>	Naked-stemmed parrya	There are 4 EO that are within an area closed to OSV use	All EO in areas closed to OSV use and will meet plan components
<i>Phippisia algida</i>	Ice grass	There are 7 EO that are within an area closed to OSV use	All EO in areas closed to OSV use and will meet plan components
<i>Potentilla nivea</i>	Snow cinquefoil	There is 1 EO that is within an area closed to OSV use	All EO in areas closed to OSV use and will meet plan components

3.18.3.2 Cumulative Effects of the Proposed Action

This analysis determines that no species directly or indirectly impacted will lose viability or have a trend towards federal listing from cumulative effects. The no action alternative which represents travel as it is now has not resulted in a loss of viability or trend towards listing for any of the species taking all past, present, and reasonably foreseeable future actions into account. Species that are impacted by any of the alternatives will remain viable on the Shoshone NF even with the addition of the impacts from projects listed in Table 26.

3.18.4 Consistency with Relevant Laws, Regulations, and Policy

3.18.4.1 Land and Resource Management Plan

The Shoshone National Forest Land and Resource Management Plan (2015) provides standards and guidelines for Sensitive Species and Species of Local Concern. All alternatives will meet all relevant plan components as is shown in Table 144.

Table 144: Forest Plan Components Applied to Plant Sensitive Species and Species of Local Concern

Relevant Plan Components	All Alternatives
Provide habitat capable of contributing to conservation and viability of sensitive species, which will keep sensitive species from being listed under the Endangered Species Act. (SENS-GOAL-01)	Meets – Even though there may be impacts to individual RFSS and their habitat those impacts do not rise to the level of a trend towards federal listing for any species because most occurrences of RFSS are independent of travel management.
Biodiversity for sensitive plant species is protected in the face of a changing climate by safeguarding habitats, preserving genetic diversity, and cooperating with seed banking efforts that provide secure, long term storage of plant genetic resources. (SENS-GOAL-11)	Meets – Even though there may be impacts to individual RFSS and their habitat the majority of habitat of RFSS are independent of travel management, so habitat is safeguarded on balance.
Design and implement management actions in occupied sensitive species habitat to avoid actions that contribute to	Meets – Even though there may be impacts to individual RFSS and their habitat those impacts do not rise to the

a trend towards Federal listing for these species. (SENS-STAND-07)	level of a trend towards federal listing for any species because most occurrences of RFSS are independent of travel management.
Habitat for Yellowstone checkerspot and alpine plant species is being maintained and/or restored. (SPLC-GOAL-04)	Meets – Even though there may be impacts to individual alpine RFSS and SOLC and their habitat the majority of habitat of those species is independent of travel management, so habitat is maintained.
Whitebark pine stands are protected, maintained, and restored throughout their range. (SPLC-GOAL-06)	Meets – The factors that structure whitebark pine communities (native beetles, non-native slime mold, competitive displacement, and climate change) are largely independent of travel management.
Where alpine plant species of local concern are present, management activities that lead to increased ground disturbance or trampling should be avoided. (SPLC-GUIDE-01)	Meets – No alternative results in an increase in disturbance. All Alpine SOLC analyzed will have either no change in travel elements or will have a reduction. Thus there is no increase in disturbance.
Where riparian and fen plant species of local concern are present, management activities are conducted in a manner that maintains riparian and fen habitats in a properly functioning condition. (SPLC-GUIDE-02)	Meets – All alternatives maintain riparian and fen plant habitat in properly functioning condition.

3.18.5 Conclusion

None of the 23 plant Regional Forester’s Sensitive Species experience a loss of viability or a trend towards listing for any of the alternatives. There may be impacts to individual RFSS or their habitat, however most species have the majority of their known occurrences on the Shoshone more than 50 feet from a travel element and as such all species will remain viable. The plan components for all 8 of the plant Species of Local Concern will be followed in all alternatives. To avoid, compensate, or mitigate adverse effects travel should be maintained and enforced as analyzed.

4 Chapter 4 – Coordination and Consultation, References, & Glossary

4.1 Prepares and Contributors

The Forest Service consulted the individuals, federal, state agencies, and tribes listed below during the development of this Preliminary EA.

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Tyler Johnson	Regional Botanist	Wildlife: Sensitive Plant Species
Kerry Murphy	Wildlife Biologist	Wildlife: Management Indicator Species and Region 2 Sensitive Species
Ken Ostrom	Forest Resource Information Manager, GeoSpatial Program Manager	Geospatial Analysis
Andy Pils	Wildlife Biologist	Wildlife: Grizzly Bear, Lynx, Wolverine, and Species of Local Concern
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4.1.3 Federal, State, and Local Agencies:

Key federal, state, and local agencies previously consulted on this project include:

- US Fish & Wildlife Service
- US Environmental Protection Agency
- US Bureau of Land Management
- Wyoming Business Council
- Wyoming Department of Agriculture
- Wyoming Department of Environmental Quality
- Wyoming Department of Transportation

Wyoming Game and Fish Department
Wyoming State Forestry
Wyoming State Historical Preservation Office
Wyoming State Planning Office
Wyoming State Trails Program
Big Horn County Board of County Commissioners
Fremont County Board of County Commissioners
Hot Springs County Board of County Commissioners
Park County Board of County Commissioners
Dubois-Crowheart Conservation District
Hot Springs Conservation District
Lower Wind River Natural Resources District
Meeteetse Conservation District
Popo Agie Conservation District
Shoshone Conservation District
Teton Conservation District

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http://www.uwyo.edu/wyndd/_files/docs/Reports/SpeciesAbstracts/Amerorchis_rotundifolia.pdf

Botrychium ascendens -

http://www.uwyo.edu/wyndd/_files/docs/Reports/SpeciesAbstracts/Botrychium_ascendens.pdf

Carex diandra -

http://www.uwyo.edu/wyndd/_files/docs/Reports/SpeciesAbstracts/Carex_diandra.pdf

Carex livida - http://www.uwyo.edu/wyndd/_files/docs/Reports/SpeciesAbstracts/Carex_livida.pdf

Descurainia torulosa -

http://www.uwyo.edu/wyndd/_files/docs/Reports/SpeciesAbstracts/Descurainia_torulosa.pdf

Drosera anglica -

http://www.uwyo.edu/wyndd/_files/docs/Reports/SpeciesAbstracts/Drosera_anglica.pdf

Eriophorum chamissonis -

http://www.uwyo.edu/wyndd/_files/docs/Reports/SpeciesAbstracts/Eriophorum_chamissonis.pdf

Eriophorum gracile -

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Festuca hallii -

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Lesquerella fremontii -

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- Parnassia kotzebuei -
http://www.uwyo.edu/wyndd/_files/docs/Reports/SpeciesAbstracts/Parnassia_kotzebuei.pdf
- Penstemon absarokensis -
http://www.uwyo.edu/wyndd/_files/docs/Reports/SpeciesAbstracts/Penstemon_absarokensis.pdf
- Primula egaliksensis -
http://www.uwyo.edu/wyndd/_files/docs/Reports/SpeciesAbstracts/Primula_egaliksensis.pdf
- Pyrrocoma carthamoides var. subsquarrosa -
http://www.uwyo.edu/wyndd/_files/docs/Reports/SpeciesAbstracts/Pyrrocoma_carthamoides_subsquarrosa.pdf
- Pyrrocoma integrifolia -
http://www.uwyo.edu/wyndd/_files/docs/Reports/SpeciesAbstracts/Pyrrocoma_integrifolia.pdf
- Ranunculus gelidus -
http://www.uwyo.edu/wyndd/_files/docs/Reports/SpeciesAbstracts/Ranunculus_gelidus.pdf
- Salix candida -
http://www.uwyo.edu/wyndd/_files/docs/Reports/SpeciesAbstracts/Salix_candida.pdf
- Salix myrtillifolia -
http://www.uwyo.edu/wyndd/_files/docs/Reports/SpeciesAbstracts/Salix_myrtillifolia_myrtillifolia.pdf
- Shoshonea pulvinate -
http://www.uwyo.edu/wyndd/_files/docs/Reports/SpeciesAbstracts/Shoshonea_pulvinata.pdf
- Townsendia condensata var. anomala -
http://www.uwyo.edu/wyndd/_files/docs/Reports/SpeciesAbstracts/Townsendia_condensata_anomala.pdf
- Utricularia minor -
http://www.uwyo.edu/wyndd/_files/docs/Reports/SpeciesAbstracts/Utricularia_minor.pdf
- Androsace chamaejasme var. carinata -
http://www.uwyo.edu/wyndd/_files/docs/Reports/SpeciesAbstracts/Androsace_chamaejasme_carinata.pdf
- Cymopterus evertii -
http://www.uwyo.edu/wyndd/_files/docs/Reports/SpeciesAbstracts/Cymopterus_evertii.pdf

Eriophorum callitrix -

http://www.uwyo.edu/wyndd/_files/docs/Reports/SpeciesAbstracts/Eriophorum_callitrix_callitrix.pdf

Koenigia islandica -

http://www.uwyo.edu/wyndd/_files/docs/Reports/SpeciesAbstracts/Koenigia_islandica.pdf

Wyoming Natural Diversity Database. 2019. GIS Database of Species Element Occurrences.

4.3 Glossary

All-terrain vehicle (ATV)—A type of off-highway vehicle that travels on three or more low-pressure tires, has handle-bar steering, is less than or equal to 50 inches wide, and has a seat designed to be straddled by the operator.

Alternative 1—Alternative 1 is the no-action alternative and consists of the wheeled vehicle routes published on the latest MVUMs as well as the current road system for administrative and ML 1 roads.

Alternative 2—Alternative 2 is an action alternative for wheeled vehicle use and over-snow vehicle use. This alternative would propose a minimum road system consistent with the Travel Management Rule. The alternative would also designate roads and trails open for public wheeled vehicle use and trails and areas open for public over-snow vehicle use. Designated roads and trails would be published on an MVUM; designated over-snow vehicle trails and areas would be published on an OSVUM.

Alternative 3—Alternative 3 is a modified action alternative for wheeled vehicle use and over-snow vehicle use developed in response to public scoping in 2017. This alternative would propose a minimum road system consistent with the Travel Management Rule. The alternative would also designate roads and trails open for public wheeled vehicle use and trails and areas open for public over-snow vehicle use. Designated roads and trails would be published on an MVUM; designated over-snow vehicle trails and areas would be published on an OSVUM.

Area—A discrete, specifically delineated space that is smaller, and in most cases much smaller, than a Ranger District (36 C.F.R. § 212.1).

Change in NFS Route Classification—This includes such changes as the following: converting roads open to wheeled vehicle use to trails open to wheeled vehicle use or converting an ML1 road to a road open to administrative use only or special use permit use only.

Closed to Public Wheeled Vehicle Use—Routes closed to public wheeled vehicle use includes the following: maintenance level 1, administrative use only, and special use permit only roads, and administrative use only trails.

Decommissioning—Decommissioning routes could allow them to return to conditions similar to the surrounding areas over time. Blocking the entrance to a route is the minimum requirement for decommissioning. Decommissioning can also refer to potential activities that result in the stabilization and restoration of unneeded roads to a more natural state.

Designated road, trail, or area—An NFS road, an NFS trail, or an area on NFS lands that is designated for motor vehicle use pursuant to 36 C.F.R. § 212.51 and identified on an vehicle use map (i.e., MVUM or OSVUM).

Forest road or trail—A road or trail wholly or partly within or adjacent to and serving the National Forest System that the Forest Service determines is necessary for the protection, administration, and use of the National Forest System and the use and development of its resources.

Forest transportation atlas—A display of the system of roads, trails, and airfields of an administrative unit.

Forest transportation system—The system of NFS roads, NFS trails, and airfields on NFS lands.

Motor vehicle use map—A map reflecting designated roads and trails on an administrative unit or a ranger district of the National Forest System (the Shoshone National Forest does not have areas open to cross-country wheeled vehicle use).

National Best Management Practices—This program was developed to improve management of water quality consistently with the federal Clean Water Act and state water quality programs. Best management practices are used to reduce or control impacts on water bodies from nonpoint sources of pollution.

National Forest System road—A forest road other than one that has been authorized by a legally documented right-of-way held by a state, county, or other local public road authority (abbreviated to NFSR).

National Forest System trail—A forest trail other than a trail that has been authorized by a legally documented right-of-way held by a state, county, or other local public road authority that is used by wheeled vehicles in the context of this Travel Management Planning Project (abbreviated to NFST).

Off-highway vehicle (OHV)—Any motor vehicle designed for or capable of cross-country travel on or immediately over land, water, sand, snow, ice, marsh, swampland, or other natural terrain.

Off-road vehicle (ORV)—Any motorized vehicle designated for or capable of cross-country travel on or immediately over land, water, sand, ice, marsh, swampland, or other natural terrain; except that such term excludes (A) any registered motorboat, (B) any fire, military, emergency or law enforcement vehicle when used for emergency purposes, and any combat or combat support vehicle when used for national defense purposes, and (C) any vehicle whose use is expressly authorized by the respective agency head under a permit, lease, license, or contract. This definition from Executive Order 11644 is consistent with the definition of OHV found in the final TMR.

Over-snow vehicle—A motor vehicle that is designed for use over snow and that runs on a track or tracks and/or a ski or skis, while in use over snow (abbreviated OSV).

Over-snow vehicle use area—An area proposed to be designated as open to OSV use.

Over-snow vehicle, Class 1—Over-snow vehicles that exert a ground pressure of 1.5 pounds per square inch (psi) or less. Class 1 vehicles correspond to “snowmobile” as that term is used in the Forest Plan.

Over-snow vehicle, Class 2—Over-snow vehicles that exert a ground pressure of 1.5 pounds per square inch (psi) or greater. Class 2 vehicles correspond to “tracked ATVs” as that term is used in the Forest Plan.

Over-snow vehicle use map—A map reflecting roads, trails, and areas designated for over-snow vehicle use on an administrative unit or a Ranger District of the National Forest System.

Over-snow vehicle use trail—A trail area proposed to be designated as open to OSV use. OSV trails will incorporate OSV class specifications where appropriate.

Open to Public Wheeled Vehicle Use—Routes open to public wheeled vehicle use includes roads open to highway legal vehicles only, roads open to all vehicles, roads open to wheeled vehicles 64 inches wide or less trails open to all vehicles, trails open to wheeled vehicles 50 inches wide or less, trails open to wheeled vehicles 64 inches wide or less, and trails open to single-track (motorcycles).

Road—A motor vehicle route (in the context of this document, used by wheeled vehicles) over 50 inches wide, unless identified and managed as a trail.

Roads, Administrative Use Only—The Forest Service designates certain roads as open to administrative use only for activities such as: construction and maintenance of forest facilities; management of forest land, including fire management, wildlife habitat improvement, and watershed and fisheries improvement, scientific study; private land improvements; law enforcement; administrative of contracts, including those for special uses, outfitter guides, mineral extraction, timber harvest, and grazing. Roads open to administrative use only are closed to public motor wheeled use.

Roads, Maintenance Level—Maintenance Level (ML) refers to the five MLs used by the Forest Service that define the level of service and maintenance requirements for specific roads, including administrative roads (FSH 7709.58). The factors in determining maintenance costs, as described in, are MLs and who is the primary maintainer of a road (Forest Service or other entity). These MLs indicate suitable vehicle class type for operation and use and are used to depict the current road system, changes proposed under the action alternatives, funding projects, and other relevant information in this Travel Management Planning Project.

Roads, Maintenance Level 1—ML 1 roads are intermittent service roads closed to all vehicular traffic for at least 1 year. ML 1 roads are typically closed because of some type of impact to resources that could occur if the road were open to traffic. Planned road deterioration may occur at this level. While closed to vehicular traffic, they are only open to nonmotorized uses, and maintenance is done only to minimize resource impacts. ML 1 roads are closed to all motor vehicle use.

Roads, Maintenance Level 2—ML 2 roads are open for use by high clearance vehicles. Passenger car traffic, user comfort, and user convenience are not considerations. Warning signs and traffic control devices are not provided with the exception that some signing, such as W-18-1 “No Traffic

Signs," may be posted at intersections. Motorists should have no expectations of being alerted to potential hazards while driving these roads. Traffic is normally minor, usually consisting of one or a combination of administrative, permitted, dispersed recreation, or other specialized uses.

Roads, Maintenance Level 3—ML 3 roads are open and maintained for travel by a prudent driver in a standard passenger car. User comfort and convenience are not considered priorities. The Manual on Uniform Traffic Control Devices (MUTCD) is applicable. Warning signs and traffic control devices are provided to alert motorists of situations that may violate expectations.

Roads, Maintenance Level 4—ML 4 roads provide a moderate degree of user comfort and convenience at moderate travel speeds. Most roads are double lane and aggregate surfaced. However, some roads may be single lane. Some roads may be paved and/or dust abated. Manual on Uniform Traffic Control Devices is applicable.

Roads, Maintenance Level 5—ML 5 roads provide a high degree of user comfort and convenience. These roads are normally double lane, paved facilities. Some may be aggregate surfaced and dust abated. Manual on Uniform Traffic Control Devices is applicable.

Route—A road or trail.

Seasonal Restriction—Seasonal restrictions are proposed across all the action alternatives for various reasons, such as protecting breeding wildlife, nesting birds, and winter big game habitat or taking into consideration road surfaces where travel in wet spring conditions could damage routes.

Trails, Open to All Wheeled Vehicles—Trail designated by the Forest Service on a MVUM as open to use by the public with any class of motor vehicle. Vehicle classes can range from highway-legal vehicles to OHVs such as motorcycles, ATVs, and UTVs.

Trails, Open to Wheeled Vehicles 64 Inches Wide or Less— Trail designated by the Forest Service on a MVUM as open to use by the public with motor vehicles 64 inches wide or less. Wheeled vehicles can include OHVs such as motorcycles, ATVs, UTVs, and other vehicles of a suitable width.

Trails, Open to Wheeled Vehicles 50 Inches Wide or Less—Trail designated by the Forest Service on a MVUM as open to use by the public with motor vehicles 50 inches wide or less. Wheeled vehicles can include OHVs such as motorcycles, ATVs, UTVs, and other vehicles of a suitable width.

Trails, Open to Single-Track—Trail designated by the Forest Service on a MVUM as open to use by the public with motorcycles.

Unauthorized road or trail—A road or trail that is not a forest road or trail or a temporary road or trail and that is not included in a forest transportation atlas.

Wheeled vehicle—In the context of this Travel Management Planning Project, any motor vehicle which is self-propelled, other than a vehicle operated on rails and any wheelchair or mobility device, including one that is battery powered, that is designed solely for use by a mobility-impaired person for locomotion and that is suitable for use in an indoor pedestrian area.

Appendix A: Alternative Maps

Included separately.

Appendix B: Proposals under Alternatives 2 & 3, 2017 Travel Analysis Report Crosswalk

Included separately.

Appendix C: Minimization Criteria, Screening Questions, and Mitigation Measures

Included separately.

Appendix D: Supplemental Materials from Effects Analysis

Included separately.