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# Supplemental Draft Environmental Impact Statement

## Scriver Creek Integrated Restoration Project

## Volume 2: Chapters 3 and 4 and Appendices

Forestland restoration within the Scriver drainage is essential to both improving forest resiliency and restoring wildlife habitat in low- to mid-elevation forests that historically were dominated by large ponderosa pine.

Road management activities within the Scriver drainage are needed to improve water quality and fish habitat. Activities include improving existing road conditions, decommissioning unneeded roads and replacing culverts that are barriers to fish passage

Boise National Forest

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## 3.6 HYDROLOGY RESOURCES

This section incorporates by reference the Hydrology and Fisheries Specialist's Report (Project Record), which contains data, methodologies, analyses, conclusions, maps, references, and technical documentation. This section discusses the effects of each Alternative on hydrology.

### 3.6.1 Scale of Analysis

The hydrologic resources assessment utilized the Scriver Creek subwatershed as the analysis area for depicting existing hydrologic resource conditions and potential direct, indirect and cumulative effects from implementing the Project. The Scriver Creek subwatershed is the relevant spatial scale at which effects indicators may be measured concerning water quality, stream channel conditions and dynamics, streamflow hydrology, and overall watershed conditions.

This scale was selected because the project boundary lies completely within the Scriver Creek subwatershed and constitutes approximately 60 percent of the land within the subwatershed. Furthermore, two Total Maximum Daily Load (TMDL) are in place on the Middle Fork Payette River Subbasin ($4^{th}$ HUC). While watershed assessment units within the Scriver Creek subwatershed are all listed as Fully Supporting Beneficial Uses, certain assessment units within the main stem of the Middle Fork Payette River subbasin ($4^{th}$ HUC) have two approved TMDLs. These two TMDLs provide guidance and goals that directly relate to the Scriver Creek subwatershed. One is a sediment-based TMDL and the other is a stream temperature-based TMDL. To improve water quality in the main stem of the Middle Fork Payette River, the IDEQ and EPA have identified the importance for the contributing subwatersheds, such as Scriver Creek, to improve their respective water quality where there are restoration opportunities. This scale of analysis allows for assessing compliance using these two TMDLs.

### 3.6.2 Hydrology Resource Indicators

The indicators identified below were used to evaluate the measure of change between alternatives for hydrology resources in the analysis area.

#### *3.6.2.1 Indicator: Water Quality*

This Indicator was used to evaluate impacts of each alternative on water quality within the analysis area. The following measures and analyses methodologies were used for this indicator:

- **Road Density—**Changes in percent road density and RCA[46] road density were evaluated. Road system data and professional judgment were used to describe the effects of the action alternatives on this measure.
- **Sediment and Turbidity (other fishes) WCI**—Estimated changes in sediment yield from existing and proposed activities in Scriver Creek subwatershed were analyzed using the following three sediment models:
  - BOISED (Forest Service 1991, 1995)—Used to estimate the current and predicted changes in percent over natural sediment yield associated with harvest, landings, prescribed fire, and road activities for each alternative. Timing of activity implementation for BOISED modeling was assumed to occur as follows:

    Timber harvest—during 2013
    Prescribed fire activities—during 2015
    Road building and reconstruction—during 2012
    Road decommissioning—during 2017, with the exception of temporary roads only used for harvest, which would be decommissioned immediately after harvest in 2013

  MK Sediment Delivery Model (Ketcheson and Megahan1996; Megahan and Ketcheson 1996; Forest Service 1995)—Used to predict sediment delivery distances for various activities based on sediment storage obstructions, contributing area, and hillside gradients.

  Geomorphic Road Analysis and Inventory Package (GRAIP) (Prasad 2007)—Provided site-specific estimates of sediment production and sediment delivery based on a field evaluation of road segments and road drain points and whether a road drainage feature is hydrologically connected to a stream channel. The results from the GRAIP model were used to display the existing condition and target locations where road maintenance, reconstruction, or decommissioning may reduce road sediment delivery to streams. GRAIP sediment delivery amounts were modified based on road management activities described in the action alternatives (such as decommissioning, aggregate placement and maintenance, and stabilization) to provide estimates of sediment delivery by alternative.

  The following assumptions were made regarding this process: decommissioning resulted in a 100 percent reduction in sediment delivery, aggregate placement resulted in an 80 percent reduction in sediment delivery, and stabilization resulted in a 70 percent reduction in sediment delivery.

  This report evaluates the potential for increased sedimentation from the installation of AOPs on culverts (which are barriers to fish migration) and

[46] RCA delineation Option 2 in Appendix B of the Forest Plan was used to define RCA widths, specifically two site potential tree heights (or 260 feet on each side of perennial streams) and one site potential tree height (or 130 feet on each side of intermittent streams) (USDA Forest Service 2010a). Refer to design feature SW-1, section 2.4.5.8.

discusses harvest and road construction/realignment that occurs on moderate and high landslide prone areas. Modeling data, surveys, and professional judgment are used to describe the effects of the action alternatives on this measure.

- **Temperature (other fishes) WCI—**Change in percent of stream shading canopy and the area of streams affected was evaluated. Data and professional judgment were used to describe the effects of the action alternatives on this measure.

#### *3.6.2.2 Indicator: Stream Channel Conditions and Dynamics*

This Indicator was used to evaluate impacts of each alternative on stream channel conditions and dynamics within the analysis area. The following measures and analyses methodologies were used for this indicator:

- **Average Wetted Width/Maximum Depth Ratio WCI and the Streambank Condition WCI—**Estimated changes in sediment delivery to streams and changes in LWD recruitment were used to discuss the potential changes in stream channel conditions and dynamics in streams within the Scriver Creek subwatershed. Data and professional judgment were used to describe the effects of the action alternatives on this measure.
- **Road Density—**Changes in percent road density and RCA road density were evaluated. Road system data and professional judgment were used to describe the effects of the action alternatives on this measure.

#### *3.6.2.3 Indicator: Streamflow Hydrology*

This Indicator was used to evaluate impacts of each alternative on streamflow hydrology within the analysis area. The following measures and analyses methodologies were used for this indicator:

- **Change in Peak/Base Flow WCI and the Change in Drainage Network WCI—**Changes in streamflow hydrology were evaluated based on changes in the four WCIs included in the Watershed Condition Pathway (Road Density and Location, Disturbance History, RCAs, and Disturbance Regime). Data and professional judgment were used to describe the effects of the action alternatives on this measure.
- **Road Density—**Changes in percent road density and RCA road density were evaluated. Road system data and professional judgment were used to describe the effects of the action alternatives on this measure.

#### *3.6.2.4 Indicator: Watershed Condition*

This Indicator was used to evaluate impacts of each alternative on watershed condition within the analysis area. The following measures and analyses methodologies were used for this indicator:

- **Road Density and Location WCI, Disturbance History WCI**, **RCAs WCI**, **and the Disturbance Regime WCI—**Changes in watershed conditions were evaluated based on changes in the four WCIs included in the Watershed Condition Pathway (Road Density and Location, Disturbance History, RCAs, and Disturbance Regime). Data and professional judgment were used to describe the effects of the action alternatives on this measure.

### 3.6.3 Water Quality

#### *3.6.3.1 Affected Environment*

Water quality within the analysis area over the past 50 years demonstrates little evidence of increased fine sediment associated with natural events, such as landslides and/or wildfires. Management-induced sediment is generally associated with the existing transportation system, past timber harvest, recreation activities, and historical livestock grazing (see Appendix B for a map and list of past activities). Forest roads are significant sources of sediment (Megahan and Kidd 1972, Megahan 1983, Megahan and Bohn 1989, Ketcheson and Megahan 1996, Madej 2001). Roads may directly affect natural sediment and hydrologic regimes by altering streamflow, sediment loading, sediment transport and deposition, hillslope stability, channel morphology, channel stability, substrate composition, stream temperatures, water quality, and riparian conditions within a watershed (Quigley and Arbelbide 1997, p. 1103). Roads alter surface and subsurface water flow, concentrate water, expose and alter soil, increase the slope angle on cuts/fills, and decrease infiltration. Increases in fine sediment delivery can negatively affect fish habitat by filling the interstitial spaces in spawning gravels, resulting in decreased water flow through the gravels that is imperative for oxygen delivery to incubating eggs and for waste removal. Filling of interstitial spaces can also displace macroinvertebrates, thereby reducing an important food source for fishes. High amounts of sediment can fill in pools and reduce rearing habitat for juvenile fishes.

Stream temperature is affected when riparian vegetation canopy shading is reduced from natural and anthropogenic impacts such as landslides and/or wildfires, roads, and timber harvest (commercial harvest and precommercial thinning).

There are approximately 145.8 mi of road and two existing helicopter landings in the analysis area[47]. The existing total road density in the analysis area is about 4.9 mi/mi$^2$. Of the existing roads in the analysis area, about 37.8 miles are located near or adjacent to streams and are often hydrologically connected to channels. Consequently, these roads and landings can deliver substantial sediment to analysis area streams. RCA road density in the analysis area is currently 5.4 mi/mi$^2$, which is classified as extremely high road density (Quigley and Arbelbide 1997). In addition, an estimated 3.9 miles of roads is located on areas identified as moderate and high landslide prone (LSP) based the forest-wide SINMAP coverage (section 3.8.3). Road building, timber harvest, and other management activities on these types of terrain have the potential to contribute sediment to stream channels via road and/or hillslope failures.

In 2001, as part of a Clean Water Act 319 project, some of the road-related sediment sources on NFS lands within the Scriver Creek subwatershed were addressed and restoration actions implemented. The objective of these road improvement activities was to reduce sediment contributions. The main road improvement activities included placing aggregate on NFS road 693 (from the forest boundary and continuing north for approximately 5.8 miles) and on NFS

[47] Road miles for the subwatershed includes roads on lands administered by the Forest Serve, Bureau of Reclamation and Bureau of Land Management, as well as the State of Idaho and private landowners.

road 695 (from the NFS road 695/NFS road 693 junction and south for about 3.9 miles to the forest boundary). A total of 9.7 miles of road in the analysis area have aggregate road surfacing (section 3.10.1). Although these treatments were implemented approximately 9 years ago, the portions of NFS roads 693 and 695 that received road aggregate generally show lower sediment production than roads without aggregate road surfacing based on GRAIP road data. During summer 2012, road maintenance with emphasis on sediment reduction, including blading, ditch armoring, spot aggregate placement, and drainage structure replacement, was funded for implementation along several portions of NFS road 693. This work is not yet complete but is considered reasonably foreseeable and is addressed in the effects accordingly.

While all streams within Scriver Creek are designated as fully supporting beneficial uses in the 2010 State of Idaho Integrated Water Quality Report, the downstream receiving water body (i.e., the Middle Fork Payette River) has two TMDLs in place, one for temperature and one for sediment. These TMDLs call for a 76 percent reduction in instream fine sediment and a 16 percent reduction in stream temperature from solar loading in the Scriver Creek subwatershed to assist in achieving their goals.

Three sediment models were employed in analysis of the Sediment/Turbidity (other fishes) WCI (see the Hydrology and Fisheries technical reports, available in the Project Record, for model results). All three sediment models provide relative estimates that are best used as comparisons among alternatives. The GRAIP sediment model indicated existing sediment delivery from roads (authorized and unauthorized, NFS lands and non-NFS lands) totals 528 tons per year, which is 34 percent over natural (Table 3-49). GRAIP was also used to identify the magnitude of road sediment delivery by road segment, as shown in Figure 3-45 (GRAIP sediment model results available in the Project Record). For the existing condition, the BOISED sediment model indicated road-related sedimentation is elevated by 23 percent over natural background conditions (Figure 3-46) and is eroding 359 tons of material per year (Table 3-49) (BOISED model results available in the Project Record). No sedimentation was modeled for past timber harvest, wildfire, or prescribed fire, as the effects have been reduced to zero because of the length of time since these events occurred. The MK sediment delivery model estimated sediment travel distances for the proposed activities. Modeled sediment delivery lengths for the Project area ranged from 6 to 83 feet for the diffuse equation (harvest and burning activities) and 29 to 130 feet for the concentrated equation (roads, skid trails, and landings) (MK field data sheets, MK sediment model results available in the Project record). Roads and road construction/restoration/decommissioning activities, based on the MK model, would only contribute sediment to streams on road segments within 67 feet of stream channels (Table 3-49).

Red band trout are present and native within the Scriver Creek subwatershed. The desired condition for Sediment/Turbidity (other fishes) WCI was not developed in the Forest Plan (Forest Service 2010a, Appendix B). The desired condition for red band trout developed for the Project was based on the Natural Conditions Database (Overton et al. 1995) and research by Muhlfeld (2002). Overton et al. (1995) evaluated substrate composition of natural stream conditions in wilderness and minimally managed stream systems with a sample size comprised of over 4,400 data points. The result of this work indicated that for B type plutonic streams, mean surface fines (particles ≤6 millimeters) comprise 23 percent of all substrate

with a standard deviation of 21. Furthermore, 76 percent of the time, the preferred spawning substrate size for red band trout in Montana ranges from 2 to 6 millimeters (Muhlfeld 2002).

The desired condition and functionality classifications for Sediment/Turbidity (other fishes) WCI is as follows:

- Functioning Appropriately: <23 percent mean surface fines (≤6 millimeters) with a standard deviation of 21, ranging from 2 to 44 percent for plutonic 'B' type streams
- Functioning at Risk: 23 to 30 percent mean surface fines (≤6 millimeters) with a standard deviation of 21 for plutonic 'B' type streams
- Functioning at Unacceptable Risk: >30 percent mean surface fines (≤6 millimeters) with a standard deviation of 21, for plutonic 'B' type streams

The Sediment/Turbidity (other fishes) WCI baseline condition is currently functioning at risk (FR). The FR rating is based on 12 sediment measurements; 8 of the 12 measurements were <23 percent surface fines. The four measurements that were in excess of 23 percent surface fines had values of 26, 28, 53.2, and 56.7 percent surface fines. Surface fine sediment values ranged from 2 to 56.7 percent.

The desired condition for Temperature (other fishes) was not developed in the Forest Plan (Forest Service 2010a, Appendix B). The desired condition was developed for the Scriver Creek subwatershed using the Idaho State Water Quality Standards for cold water biota, which is defined as <22 °C with a maximum daily average <19 °C (IDEQ 2003).The Temperature (other fishes) WCI baseline condition is currently functioning appropriately (FA). The FA rating is based on 5 separate sites that measured the highest 7-day mean maximum water temperatures based on constant water temperature monitoring data. Four of the sites were within the temperature criteria and one was above the temperature criteria. The one site above the temperature criteria was 24.5 °C and was taken at an elevation of 3,953 feet and during the 2007 drought.

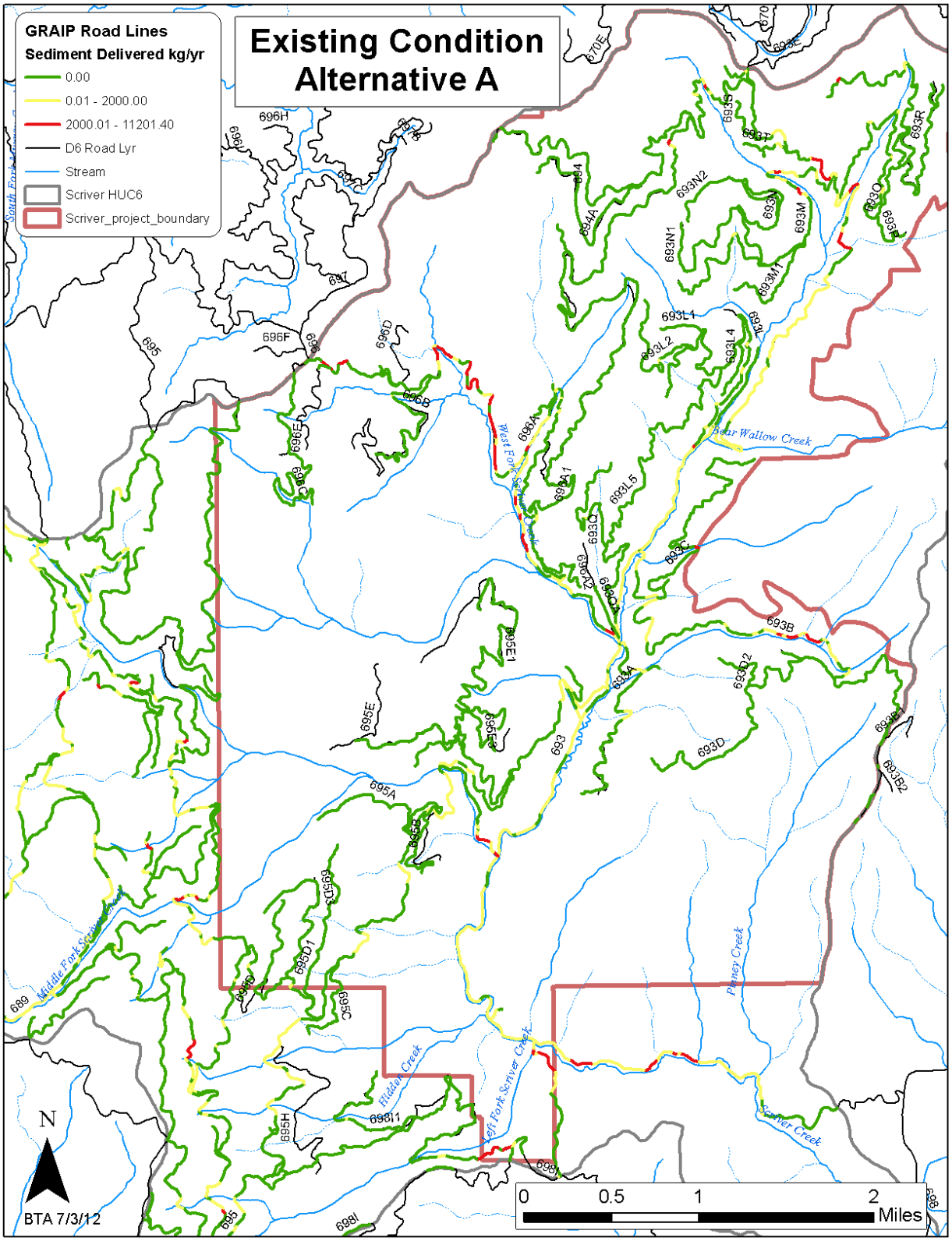


**Figure 3-45. Existing Condition, Alternative A—No Action, GRAIP Model Sediment Delivery Road Segments**

**Table 3-49. Natural BOISED and GRAIP Sediment Yield, Road Induced Sediment, and percent Over Natural (% ON) MK Sediment Delivery Lengths**

| Subwatershed | BOISED Natural Sediment Yield | BOISED Current Condition (Roads Only) | | GRAIP[a] Current Condition (Roads Only) | | MK Sediment Delivery Distances (Roads/Harvest) | |
|---|---|---|---|---|---|---|---|
| | | | | | | Diffuse | Concentrated |
| Scriver Creek | 1,542 tons/year | 359 tons/year | 23% ON[2] | 528 tons/year | 34% ON | 6–10 feet | 67 feet |

[a]The GRAIP roads set is not identical to the road set used in BOISED and MK. The GRAIP road set has the addition of a number of unauthorized roads from other ownerships.

### *3.6.3.2 Environmental Consequences of Alternative A—No Action*

#### 3.6.3.2.1 Direct and Indirect Effects

Alternative A does not propose any new management activities; ongoing uses, including dispersed camping, road and trail use, road and trail maintenance, livestock grazing, and fire suppression (as necessary), are expected to continue. Implementing Alternative A would perpetuate the existing condition for the Temperature (other fishes) WCI (Table 3-50) which is currently functioning appropriately (FA). Alternative A would perpetuate the existing condition for the Sediment and Turbidity (Other Fishes) WCI (Table 3-50) found to be FR. Sediment would be expected to maintain its FR rating due to the extensive road network. Road density would remain at the current level of 4.9 mi/mi$^2$, and RCA road density would remain at 5.4 mi/mi$^2$. Figure 3-45 displays the GRAIP sediment model existing condition data showing several red colored road segments that are classified as high sediment delivery (>2,000 kilograms [~2 Tons] per year). Some road segments within the subwatershed, specifically NFS road 696 and upper portions of NFS road 693, are delivering accelerated amounts of fine sediment. Under Alternative A, these road segments would continue to deliver accelerated amounts of fine sediment into the future. The perpetuation of this sediment condition could impact other watershed conditions related to fine sediment including the Pool Frequency and Quality and Large Pool/Pool Quality WCIs (see section 3.7). These WCIs would be negatively impacted by accelerated sedimentation related to the condition of the road system. Uncharacteristic vegetation conditions and the potential for uncharacteristic wildfire may also negatively affect in-stream fine sediment and stream temperature conditions in the future (see section 3.2.6).

Implementing Alternative A would not reduce sediment or temperature loads within the Scriver Creek subwatershed as directed in the TMDL for the Middle Fork Payette River and as needed for meeting Purpose and Need #2 (section 1.5) and addressing Issue #2 (section 1.12.1).

#### 3.6.3.2.2 Cumulative Effects

#### 3.6.3.2.3 Past Activities

Table B.1 in Appendix B identifies which past activities were considered for this cumulative effects analysis. The impacts of past activities have contributed to the existing conditions for water quality in the analysis area and therefore are included in the affected environment discussion in section 3.6.3.1.

#### 3.6.3.2.4 Present/Ongoing Activities

Table B.1 in Appendix B identifies which present/ongoing activities were considered for the cumulative effects analysis. Ongoing activities, such as NFS road and trail maintenance; irrigation diversions; vegetation management; livestock grazing; noxious weed treatment; fuelwood gathering; recreation; activities occurring in association with private residences, cabins, and ranches; and ongoing fire suppression (as needed) would be expected to continue within the analysis area.

It is expected that present and ongoing road and trail maintenance would immeasurably improve the Sediment/Turbidity (other fishes) WCI in all timeframes[48].

Present and ongoing activities occurring within the subwatershed on adjacent non-NFS lands include the Middle Fork Scriver and Murray Creek Timber Harvest Projects. Approximately 500 acres of ongoing timber harvest and an unknown amount (estimated to be nearly 2 miles) of access road related to these projects was assumed to be harvested and constructed. It is not known if these roads would be constructed within RCAs. Non-Forest Service timber harvest would be subject to the conditions set forth in the Idaho Forest Practices Act (IFPA), including applicable Best Management Practices (Idaho Department of Lands et al. 2000), to maintain forest soil, air, water, vegetation, wildlife, and aquatic habitat. IFPA requires using stream buffers, known as Streamside Protection Zones (SPZs), to mitigate negative impacts to watershed elements. SPZs distances are defined as 75 feet for class 1 streams (used by fish and for domestic water supplies) and 30 feet for class 2 streams (not used by fish). In order to reduce sediment delivery and maintain water temperature and stream habitat elements, no harvest activities may occur within SPZs. SPZs would likely mitigate most negative effects to the Sediment/Turbidity (other fishes) WCI and the Temperature (other fishes) WCI.

Other present and ongoing activities considered for cumulative effects (see Appendix B) are not expected to result in effects to the Sediment/Turbidity (other fishes) WCI, Temperature (other fishes) WCI, or road density. These activities are subject to conditions set forth by the Forest Plan (Forest Service 2010a) standards and guides, where occurring on NFS lands, and by State of Idaho water quality standards (IDPA 58.01.02) requiring Best Management Practices (BMPs) on all lands. These requirements are expected to maintain current levels of fine sediment and stream temperature conditions within the analysis area with regard to these present/ongoing activities.

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[48] Temporary time frame = 0–3 years; Short-term time frame = 3–15 years; long-term time frame = >15 years (USDA Forest Service 2010a, Chapter III, page III-4).

#### 3.6.3.2.5 Reasonably Foreseeable Activities

Table B.1 in Appendix B identifies which reasonably foreseeable activities were considered for the cumulative effects analysis. Reasonably foreseeable projects and activities in the analysis area that could cumulatively impact water quality include Scriver Creek Trails Project, Scriver Creek Snowmobile Bridge, and non-Forest Service timber harvest activities. Cumulative impacts of the Scriver Creek Trails Project and Snowmobile Bridge project are expected to improve water quality through improved off-road vehicle management, which may reduce sedimentation and may improve riparian shading (resulting in a benefit to the Sediment/Turbidity [other fishes] WCI and the Temperature [other fishes] WCI).

Reasonably foreseeable activities occurring within the analysis area include approximately 800 acres of timber harvest and an unknown amount (estimated to be 2 miles) of access road (IDL, Hidden Creek Timber Sale Project) occurring on adjacent non-NFS lands within the subwatershed. Non-Forest Service timber harvest would be subject to the conditions set forth in the IFPA, including applicable BMPs (Idaho Department of Lands et al. 2000), to maintain forest soil, air, water, vegetation, wildlife, and aquatic habitat. IFPA requires using SPZs to mitigate negative impacts to watershed elements. SPZs distances are defined as 75 feet for class 1 streams (used by fish and for domestic water supplies) and 30 feet for class 2 streams (not used by fish). In order to reduce sediment delivery and maintain water temperature and stream habitat elements, no harvest activities may occur within SPZs. SPZs would likely mitigate most negative effects to the Sediment/Turbidity (other fishes) WCI and Temperature (other fishes) WCI.

Other reasonably foreseeable activities considered for cumulative effects (refer to Appendix B) are not expected to result in effects to the Sediment/Turbidity (other fishes) WCI, Temperature (other fishes) WCI, or road density. Where occurring on NFS lands, these activities are subject to conditions set forth by the Forest Plan (Forest Service 2010a) standards and guides and by State of Idaho water quality standards (IDPA 58.01.02) that require BMPs on all lands. These requirements are expected to maintain fine sediment and stream temperature conditions within the analysis area with regard to these reasonably foreseeable activities.

In summary, under Alternative A, no actions are proposed that would directly or indirectly affect fine sediment delivery or stream temperature. Present, ongoing, and reasonably foreseeable activities are expected to maintain water quality conditions through the application of BMPs, but no measurable improvements would occur. As a result, should Alternative A be selected, there would likely be a short- and long-term immeasurable change in water quality associated with fine sediment delivery and stream temperature associated with stream shading within the Scriver Creek subwatershed.

### *3.6.3.3 Environmental Consequences of Alternative B—Proposed Action*

#### 3.6.3.3.1 Direct and Indirect Effects

Implementing Alternative B would not temporarily change the Temperature (other fishes) WCI, however, a short- and long-term immeasurable improvement would occur. The short- and long-term improvement is from 6.6 miles of road decommissioning within RCAs, which is a reduction of about 17 percent of the RCA road density (Table 3-50). This reduction in RCA roads would allow for additional growth of shrubs and trees that could provide

additional long-term shade. Additional long-term improvement in stream temperature would result from the noncommercial thinning of even-aged stands of planted ponderosa pine. Roughly 839 acres would be noncommercially thinned and, of those acres, 163 acres occur in RCAs. Thinning provides the trees that are retained onsite (leave trees) with increased access to water, sunlight, and nutrients. Attaining larger trees more quickly in RCAs provides improved shade and trees available to provide long-term CWD and LWD recruitment.

**Table 3-50. Management Activities and Conditions by Alternative at the Subwatershed Scale**

| Attribute | Alternative A | Alternative B | Alternative C | Alternative D |
|---|---|---|---|---|
| Total Road miles | 145.8 | 133 | 127.8 | 126.7 |
| Total Road Density (mi/mi$^2$) | 4.9 | 4.5 | 4.3 | 4.3 |
| Total RCA Road miles | 37.8 | 31.2 | 31.2 | 31.0 |
| Total Road Density RCAs (mi/mi$^2$) | 5.4 | 4.5 | 4.5 | 4.5 |
| Perennial Road-Stream Crossings | 58 | 49[a] | 49[a] | 49[a] |
| Known Culvert Fish Migration Barriers | 5 | 2 | 0 | 0 |
| New Construction | 0 | 2.7 | 1.1 | 0 |
| Temporary Road | 0 | 1.0 | 4.2 | 4.2 |
| Reconstruction | 0 | 11.1 | 13.6 | 13.6 |
| Road Maintenance | 0 | 39.3 | 36.8 | 36.8 |
| Realignment—New Construction | 0 | 0.1 | 0.1 | 0.1 |
| Aggregate Placement (miles) | 0 | 2.8 | 5.3 | 5.3 |
| Stabilize Existing Unauthorized | 0 | 0 | 0.25 | 0.25 |
| Decommission of Existing | 0 | 12.8 | 16.4 | 16.4 |
| Decommission of Unauthorized | 0 | 3.3 | 3.3 | 3.3 |
| Decommission—Realignment | 0 | 3.8 | 3.8 | 3.8 |
| Total Decommission | 0 | 19.8 | 23.5 | 23.5 |
| Commercial Treatment Area (acres) | 0 | 3,265 | 3,575 | 3,575 |
| Noncommercial Treatment Area (acres) | 0 | 839 | 839 | 839 |
| Area within Noncommercial Thinning Treatment of RCA | 0 | 163 | 163 | 163 |
| Underburn Area (acres) | 0 | 962 | 949 | 949 |
| Off-road Tractor/Jammer (acres) | 0 | 1,212 | 1,582 | 1,472 |
| Skyline (acres) | 0 | 969 | 1,238 | 1,238 |
| Helicopter (acres) | 0 | 1,084 | 755 | 865 |
| Helicopter Landings (existing and constructed) | 1 | 15 | 12 | 13 |

[a]There are 9 perennial stream crossings that would be removed by Alternatives B, C, and D. There are 3 additional perennial road stream crossings installed in Alternative B, C, and D (smaller streams) and these would be designed for fish passage, where appropriate.

Implementing Alternative B would result a temporary negative trend to the Sediment/Turbidity (other fishes) WCI by increasing fine sediment delivery to Scriver Creek associated with the new road construction and road realignment. In the short and long term, Alternative B would result in a measureable improvement to the Sediment/Turbidity (other fishes) WCI by reducing fine sediment delivery to Scriver Creek. Sediment reductions are associated with the 19.8 miles of road decommissioning, NFS road 696 realignment, 39.3 miles of general road maintenance, and placement of aggregate on 2.8 miles of NFS road. The total road density in the analysis area would be reduced from 4.9 mi/mi$^2$ to 4.5 mi/mi$^2$. RCA road density in the analysis area would decrease to 4.5 mi/mi$^2$ from the existing condition of 5.4 mi/mi$^2$. Sediment modeling confirms the reductions in sediment delivery associated with implementing Alternative B, with increases in sediment expected only in the temporary timeframe (i.e., during implementation),

BOISED modeled sedimentation would be reduced from 23.3 percent over natural background conditions (359 tons per year) to 17.5 percent over natural background conditions (269.4 tons per year) by 2030 (Figure 3-46).

GRAIP[49] modeled sediment reduction associated with implementing Alternative B is estimated to be 178 tons per year (from 528 tons to 350 tons) based on road management activities. Road decommissioning, NFS road 696 realignment, and road aggregate placement would likely reduce sediment delivery at several locations identified by GRAIP in the existing condition (Figure 3-47). Figure 3-47 shows a change of several road segments from red (high sediment delivery), under the existing condition (Figure 3-45), to green or yellow (zero to moderate sediment delivery) under Alternative B (Figure 3-47). Furthermore, GRAIP provides information to engineers, hydrologists, and road maintenance crews about where to target road drainage improvements for sediment reductions throughout the Project area.

The MK sediment delivery model simulated sediment transport distances for various activities associated with the proposed action. Sediment travel distances ranged from 6 to 67 feet for prescribed fire, helicopter, skyline, and tractor yarding, and road construction and reconstruction. Using BOISED to model only those activities that occur within 67 feet of streams (roads) results in a reduction of estimated sedimentation from 1.8 percent over natural (27.8 tons per year) to 1.6 percent over natural (24.1 tons per year) (Table 3-51). Based on MK sediment modeling and the exclusion of commercial harvest activities within the RCA, no sediment delivery would be expected from timber harvest, yarding, tractor skid roads, or prescribed fire. No sediment delivery would be expected from road maintenance, construction, and reconstruction in locations farther than 67 feet from streams.

The amount of sediment that would enter the stream as a result of replacing culverts that are barriers to fish movement is determined to be immeasurable. Removing culverts and replacing them with aquatic organism structures has shown only very small increases in turbidity and sediment, which lasts only a few days (Foltz et al. 2008, Yenko 2007).

[49] Note: GRAIP is not used to describe sediment delivery associated with proposed road construction, realignment, or temporary road.

Based on modeled estimates of sediment reduction, site-specific information about the magnitude of sediment delivery using GRAIP, and professional judgment, it is expected that short- and long-term instream fine sediment would be reduced after implementation. The Sediment/Turbidity (other fishes) WCI would have measureable improvement within the FR category. Based on the analysis of the measures presented above, it is expected that implementing Alternative B would reduce sediment and temperature loads within the Scriver Creek subwatershed as directed in the TMDL for the Middle Fork Payette River and would contribute to the accomplishment of Purpose and Need #2 (section 1.5) and address Issue #2 (section 1.12.1).

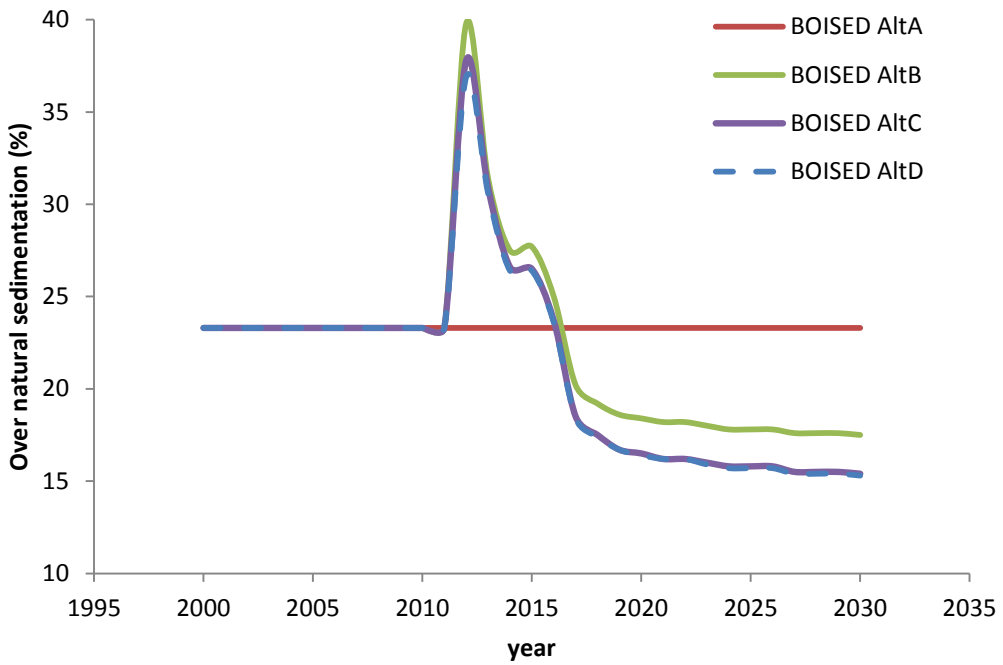


**Figure 3-46. BOISED Modeled percent Over Natural Sedimentation Conditions by Alternative**

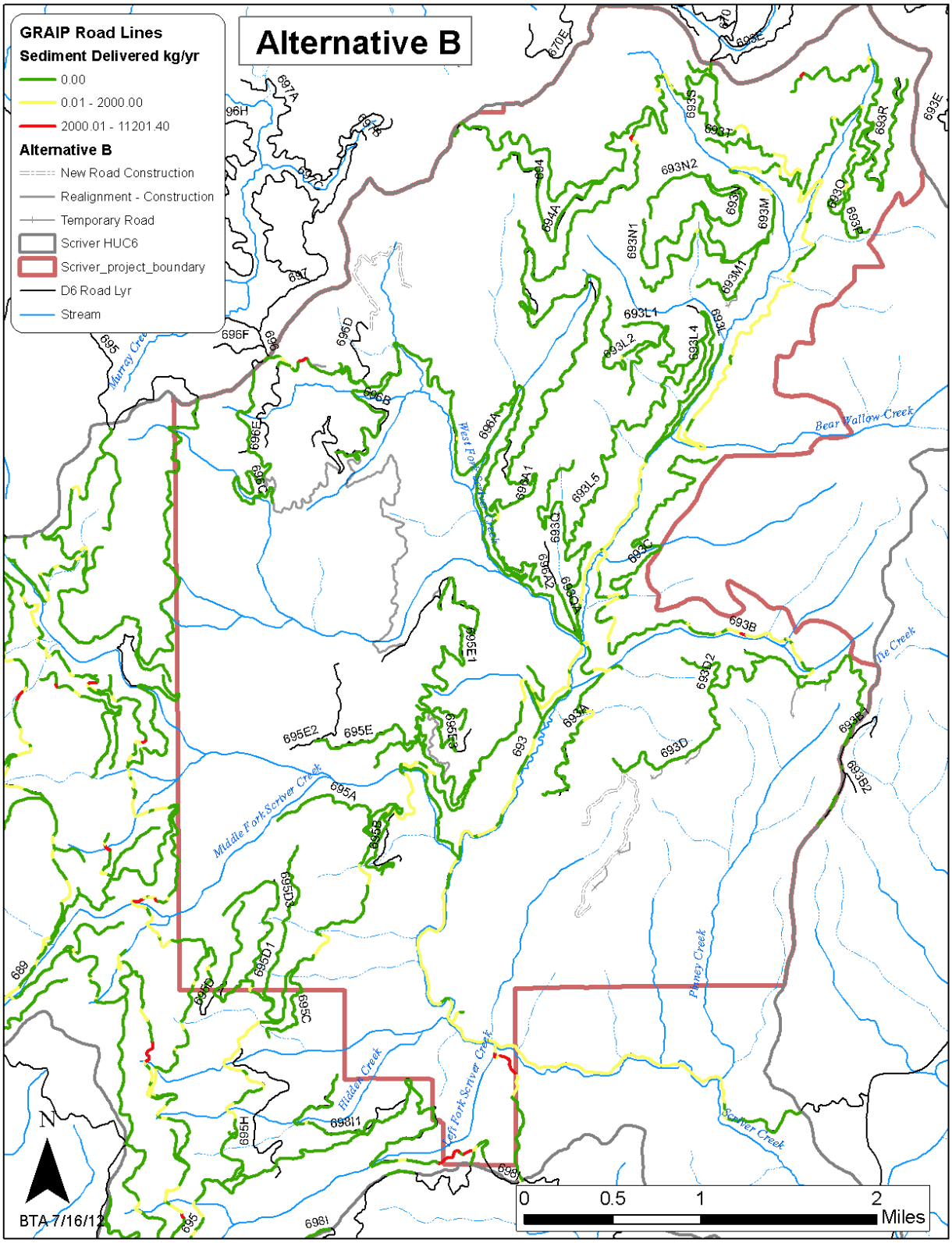


**Figure 3-47. Alternative B GRAIP Model Sediment Delivery Road Segments**

**Table 3-51 BOISED Modeled percent Over Natural Sedimentation**

| Year | BOISED percent over Natural Sedimentation | | | | MK percent of Natural Sedimentation | | | |
|---|---|---|---|---|---|---|---|---|
| | Alt A | Alt B | Alt C | Alt D | Alt A | Alt B | Alt C | Alt D |
| 2011 | 23.3 | 23.3 | 23.3 | 23.3 | 1.8 | 1.8 | 1.8 | 1.8 |
| 2012 | 23.3 | 39.8 | 37.8 | 36.9 | 1.8 | 2.8 | 2.7 | 2.7 |
| 2013 | 23.3 | 31.4 | 30.9 | 30.6 | 1.8 | 2.0 | 2.0 | 2.0 |
| 2014 | 23.3 | 27.5 | 26.6 | 26.4 | 1.8 | 2.0 | 2.0 | 2.0 |
| 2015 | 23.3 | 27.7 | 26.5 | 26.4 | 1.8 | 1.9 | 1.9 | 1.9 |
| 2016 | 23.3 | 25.0 | 23.7 | 23.6 | 1.8 | 1.9 | 1.9 | 1.9 |
| 2017 | 23.3 | 20.2 | 18.5 | 18.4 | 1.8 | 1.7 | 1.7 | 1.6 |
| 2018 | 23.3 | 19.2 | 17.5 | 17.4 | 1.8 | 1.6 | 1.6 | 1.6 |
| 2019 | 23.3 | 18.6 | 16.7 | 16.7 | 1.8 | 1.6 | 1.6 | 1.6 |
| 2020 | 23.3 | 18.4 | 16.5 | 16.4 | 1.8 | 1.6 | 1.6 | 1.6 |

### 3.6.3.3.2 Cumulative Effects

#### 3.6.3.3.2.1 Past Activities

Table B.1 in Appendix B identifies which past activities were considered for this cumulative effects analysis. Past activities have contributed to the existing conditions for water quality in the analysis area and are therefore included in the affected environment discussion in section 3.6.3.1.

#### 3.6.3.3.2.2 Present/Ongoing Activities

Table B.1 in Appendix B identifies which present/ongoing activities were considered for the cumulative effects analysis. Ongoing activities, such as NFS road and trail maintenance; irrigation diversions; vegetation management; livestock grazing; noxious weed treatment; fuel wood gathering; recreation; activities occurring in association with private residences, cabins, and ranches; and ongoing fire suppression (as needed), would be expected to continue within the analysis area.

It is expected that present and ongoing road and trail maintenance would provide improvement to the Sediment/Turbidity (other fishes) WCI in all timeframes.

Present and ongoing activities occurring within the subwatershed on adjacent non-NFS lands include the Middle Fork Scriver and Murray Creek Timber Harvest Projects. Approximately 500 acres of ongoing timber harvest and an unknown amount (estimated to be nearly 2 miles) of access road related to these projects was assumed to be harvested and constructed. It is not known if these roads would be constructed within RCAs. Non-Forest Service timber harvest would be subject to the conditions set forth in the IFPA including applicable BMPs (Idaho Department of Lands et al. 2000) to maintain forest soil, air, water, vegetation, wildlife, and aquatic habitat.

IFPA requires using SPZs to mitigate negative impacts to watershed elements. SPZs distances are defined as 75 feet for class 1 streams (used by fish and for domestic water supplies) and 30 feet for class 2 streams (not used by fish). In order to reduce sediment delivery and maintain water temperature and stream habitat elements, no harvest activities may occur within SPZs. SPZs would mitigate most negative effects to the Sediment/Turbidity (other fishes) WCI and the Temperature (other fishes) WCI. Other present and ongoing activities considered for cumulative effects are not expected to result in effects to the Sediment/Turbidity (other fishes) WCI, the Temperature (other fishes) WCI, or road density. When occurring on NFS lands, these activities are subject to conditions set forth by the Forest Plan (Forest Service 2010a) standards and guides and by State of Idaho water quality standards (IDPA 58.01.02), which requires BMPs on all lands. These requirements are expected to maintain fine sediment and stream temperature conditions within the analysis area with regard to other present/ongoing activities.

#### 3.6.3.3.2.3 Reasonably Foreseeable Activities

Table B.1 in Appendix B identifies which reasonably foreseeable activities were considered for the cumulative effects analysis. Reasonably foreseeable projects and activities in the analysis area that could cumulatively impact water quality include Scriver Creek Trails Project, Scriver Creek Snowmobile Bridge and non-Forest Service timber harvest activities occurring within the analysis area. Cumulative impacts of the Scriver Creek Trails Project and Snowmobile Bridge project are expected to improve water quality through improved off-road vehicle management, which may reduce sedimentation and may improve riparian shading. These improvements would also benefit the Sediment/Turbidity (other fishes) WCI and the Temperature (other fishes) WCI.

Reasonably foreseeable activities within the analysis area include approximately 800 acres of timber harvest and an unknown amount (estimated to be 2 miles) of access road (IDL, Hidden Creek Timber Sale Project) occurring on adjacent non-NFS lands within the subwatershed. Non-Forest Service timber harvest would be subject to the conditions set forth in the IFPA including applicable BMPs (Idaho Department of Lands et al. 2000) to maintain forest soil, air, water, vegetation, wildlife, and aquatic habitat.

IFPA requires using SPZs to mitigate negative impacts to watershed elements. SPZs distances are defined as 75 feet for class 1 streams (used by fish and for domestic water supplies) and 30 feet for class 2 streams (not used by fish). In order to reduce sediment delivery, maintain water temperature and stream habitat elements, no harvest activities may occur within SPZs. SPZs would mitigate most negative effects to the Sediment/Turbidity (other fishes) WCI and the Temperature (other fishes) WCI. Other reasonably foreseeable activities considered for cumulative effects are not expected to result in effects to the Sediment/Turbidity (other fishes) WCI, the Temperature (other fishes) WCI, or road density. When occurring on NFS lands, these activities are subject to conditions set forth by the Forest Plan (Forest Service 2010a) standards and guides and by State of Idaho water quality standards (IDPA 58.01.02), which require BMPs on all lands. These requirements are expected to maintain fine sediment and stream temperature conditions within the analysis area with regard to these reasonably foreseeable activities.

In summary, Alternative B is similar to Alternative A in that present, ongoing, and reasonably foreseeable activities are expected to maintain instream fine sediment conditions

and stream temperature conditions through the application of BMPs. As disclosed above under section 1.4.4.1, implementing Alternative B would result in direct and indirect improvements to water quality conditions through measureable reductions in sediment delivery and immeasurable reductions in stream temperature. While restoration activities implemented under Alternative B would result in measureable improvements to water quality in the Scriver Creek subwatershed; other past, present and foreseeable future actions would not be expected to measurably add incremental or cumulative effects (i.e., improvements or impacts) to those implemented under Alternative B for reasons disclosed above.

## 3.6.3.4 Environmental Consequences of Alternative C

### 3.6.3.4.1 Direct and Indirect Effects

This section discusses the direct and indirect effects of implementing Alternative C on water quality and the relevant differences in effects for water quality indicators between Alternative B and Alternative C for hydrologic resources.

Implementing Alternative C would result in a temporary immeasurable negative trend regarding the Sediment/Turbidity (other fishes) WCI by increasing fine sediment delivery to Scriver Creek through new road construction and road realignment. In the short and long term, Alternative C would result in a measureable improvement to the Sediment/Turbidity (other fishes) WCI by reducing fine sediment delivery to Scriver Creek. Sediment reductions are associated with the 23.5 miles of road decommissioning, NFS road 696 realignment, 36.8 miles of general road maintenance, stabilization of 0.25 miles of an unauthorized snowmobile access route, and placement of aggregate on 5.3 miles of NFS road (Table 3-50). The total road density in the analysis area would be reduced from 4.9 mi/mi$^2$ to 4.3 mi/mi$^2$. RCA road density in the analysis area would decrease to 4.5 mi/mi$^2$ from the existing condition of 5.4 mi/mi$^2$ (Table 3-50).

Unlike Alternative B, Alternative C proposes stabilization of 0.25 miles of unauthorized snowmobile access route that is in a degraded condition and is contributing significant sediment to streams based on GRAIP sediment model data and field reviews by the district hydrologist. Alternative C also proposes to place and additional 2.5 miles of road surface aggregate on the NFS road 693B to further reduce road sediment delivery.

BOISED modeled percent over natural sedimentation for Alternative C is reduced from 23.3 percent over natural (359 tons per year) to 15.4 percent over natural (237 tons per year) by 2030 (Figure 3-46). The temporary increase in sediment associated with implementation would not peak quite as high under Alternative C (37.8 %ON) as it would under Alternative B (39.8%ON). Also under Alternative C, percent over natural annual sedimentation would stabilize at lower rate (15.4 %ON) than under Alternative B (17.5 %ON) (Figure 3-46). The differences between Alternatives B and C are derived from the amount of aggregate placed, roads decommissioned, and amount of temporary road constructed.

GRAIP modeled sediment reduction associated with implementing Alternative C is estimated to be 187.5 tons per year (from 528 tons to 340.5 tons) based on road management activities. Road decommissioning, NFS road 696 realignment, snowmobile access route stabilization, and road aggregate placement would likely reduce sediment delivery at several locations identified by GRAIP in the existing condition (Figure 3-45 and Figure 3-48). Figure 3-48 shows a change of several road segments from red (high sediment delivery), under the

existing condition (Figure 3-45), to green or yellow (zero to moderate sediment delivery) under Alternative C (Figure 3-48). Furthermore, GRAIP provides information to engineers and road maintenance crews about where to target road drainage improvements for sediment reductions throughout the Project area.

Based on modeled estimates of sediment reduction, site-specific information about the magnitude of sediment delivery using GRAIP, and professional judgment, it is expected that short- and long-term instream fine sediment would be substantially reduced after implementation. Reductions in sediment delivery under Alternative C would be greater (based on sediment modeling results) than those expected under Alternative B. The result is that the Sediment/Turbidity (other fishes) WCI would have a measureable improvement and move within the FR category closer to the FA category. Based on the analysis of the measures presented above, it is expected that implementing Alternative C would assist in reducing sediment and temperature loads within the Scriver Creek subwatershed as directed in the TMDL for the Middle Fork Payette River, and would contribute to the accomplishment of Purpose and Need #2 (section 1.5) and address Issue #2 (section 1.12.1).

#### 3.6.3.4.2 Cumulative Effects

##### 3.6.3.4.2.1 Past Activities

Table B.1 identifies which past activities were considered for this cumulative effects analysis. Past activities have contributed to the existing conditions for water quality in the analysis area and are included in the affected environment discussion in section 3.6.3.1.

##### 3.6.3.4.2.2 Present/Ongoing Activities

Table B.1 in Appendix B identifies which present/ongoing activities were considered for the cumulative effects analysis. Ongoing activities such as NFS road and trail maintenance; irrigation diversions; vegetation management; livestock grazing; noxious weed treatment; fuelwood gathering; recreation; activities occurring in association with private residences, cabins, and ranches; and ongoing fire suppression would be expected to continue within the analysis area. It is expected that present and ongoing road and trail maintenance would provide improvement to the Sediment/Turbidity (other fishes) WCI in all timeframes.

Present and ongoing activities occurring within the subwatershed on adjacent non-NFS lands include the Middle Fork Scriver and Murray Creek Timber Harvest Projects. Approximately 500 acres of ongoing timber harvest and an unknown amount (estimated to be nearly 2 miles) of access road related to these projects was assumed to be harvested and constructed. It is not known if these roads would be constructed within RCAs. Non-Forest Service timber harvest would be subject to the conditions set forth in the IFPA, including applicable BMPs (IDL et al. 2000), to maintain forest soil, air, water, vegetation, wildlife, and aquatic habitat.

IFPA requires using SPZs to mitigate negative impacts to watershed elements. SPZs distances are defined as 75 feet for class 1 streams (used by fish and for domestic water supplies) and 30 feet for class 2 streams (not used by fish). In order to reduce sediment delivery and maintain water temperature and stream habitat elements, no harvest activities may occur within SPZs. SPZs would mitigate most negative effects to the Sediment/Turbidity (other fishes) WCI and the Temperature (other fishes) WCI. Other present and ongoing activities considered for cumulative effects are not expected to result in

effects to the Sediment/Turbidity (other fishes) WCI, the Temperature (other fishes) WCI, or road density. When occurring on NFS lands, these activities are subject to conditions set forth by the Forest Plan (Forest Service 2010a) standards and guides and by State of Idaho water quality standards (IDPA 58.01.02), which require BMPs on all lands. These requirements are expected to maintain fine sediment and stream temperature conditions within the analysis area with regard to these present/ongoing activities.

#### 3.6.3.4.2.3 Reasonably Foreseeable Activities

Table B.1 in Appendix B identifies which reasonably foreseeable activities were considered for the cumulative effects analysis. Reasonably foreseeable projects and activities in the analysis area that could cumulatively impact water quality include Scriver Creek Trails Project, Scriver Creek Snowmobile Bridge and non-Forest Service timber harvest activities. Cumulative impacts of the Scriver Creek Trails Project and Snowmobile Bridge project are expected to improve water quality through improved off-road vehicle management, which may reduce sedimentation and improve riparian shading. These improvements would also benefit the Sediment/Turbidity (other fishes) WCI and the Temperature (other fishes) WCI.

Reasonably foreseeable activities include approximately 800 acres of timber harvest and an unknown amount (estimated to be 2 miles) of access road (IDL, Hidden Creek Timber Sale Project) occurring on adjacent non-NFS lands within the subwatershed. Non-Forest Service timber harvest would be subject to the conditions set forth in the IFPA, including applicable BMPs (Idaho Department of Lands et al. 2000), to maintain forest soil, air, water, vegetation, wildlife, and aquatic habitat.

IFPA requires using SPZs to mitigate negative impacts to watershed elements. SPZs distances are defined as 75 feet for class 1 streams (used by fish and for domestic water supplies) and 30 feet for class 2 streams (not used by fish). In order to reduce sediment delivery and maintain water temperature and stream habitat elements, no harvest activities may occur within SPZs. SPZs would mitigate most negative effects to the Sediment/Turbidity (other fishes) WCI and the Temperature (other fishes) WCI. Other reasonably foreseeable activities considered for cumulative effects are not expected to result in effects to the Sediment/Turbidity (other fishes) WCI, the Temperature (other fishes) WCI, or road density. When occurring on NFS lands, these activities are subject to conditions set forth by the Forest Plan (Forest Service 2010a) standards and guides, and by State of Idaho water quality standards (IDPA 58.01.02), which require BMPs on all lands. These requirements are expected to maintain fine sediment and stream temperature conditions within the analysis area with regard to these reasonably foreseeable activities.

In summary, Alternative C is similar to Alternatives A and B in that present, ongoing, and reasonably foreseeable activities are expected to maintain instream fine sediment conditions and stream temperature conditions through the application of BMPs. As disclosed above under section 1.4.6.1, implementing Alternative C would result in direct and indirect improvements to water quality conditions through measureable reductions in sediment delivery and immeasurable reductions in stream temperature. Reductions in sediment delivery under Alternative C would be greater (based on sediment modeling results) than those expected under Alternative B. Thus, while restoration activities implemented under Alternative C would result in measureable improvements to water quality in the Scriver Creek subwatershed, other past, present, and foreseeable future actions would not be

expected to measurably add incremental or cumulative effects (i.e., improvements or impacts) to those implemented under Alternative C.

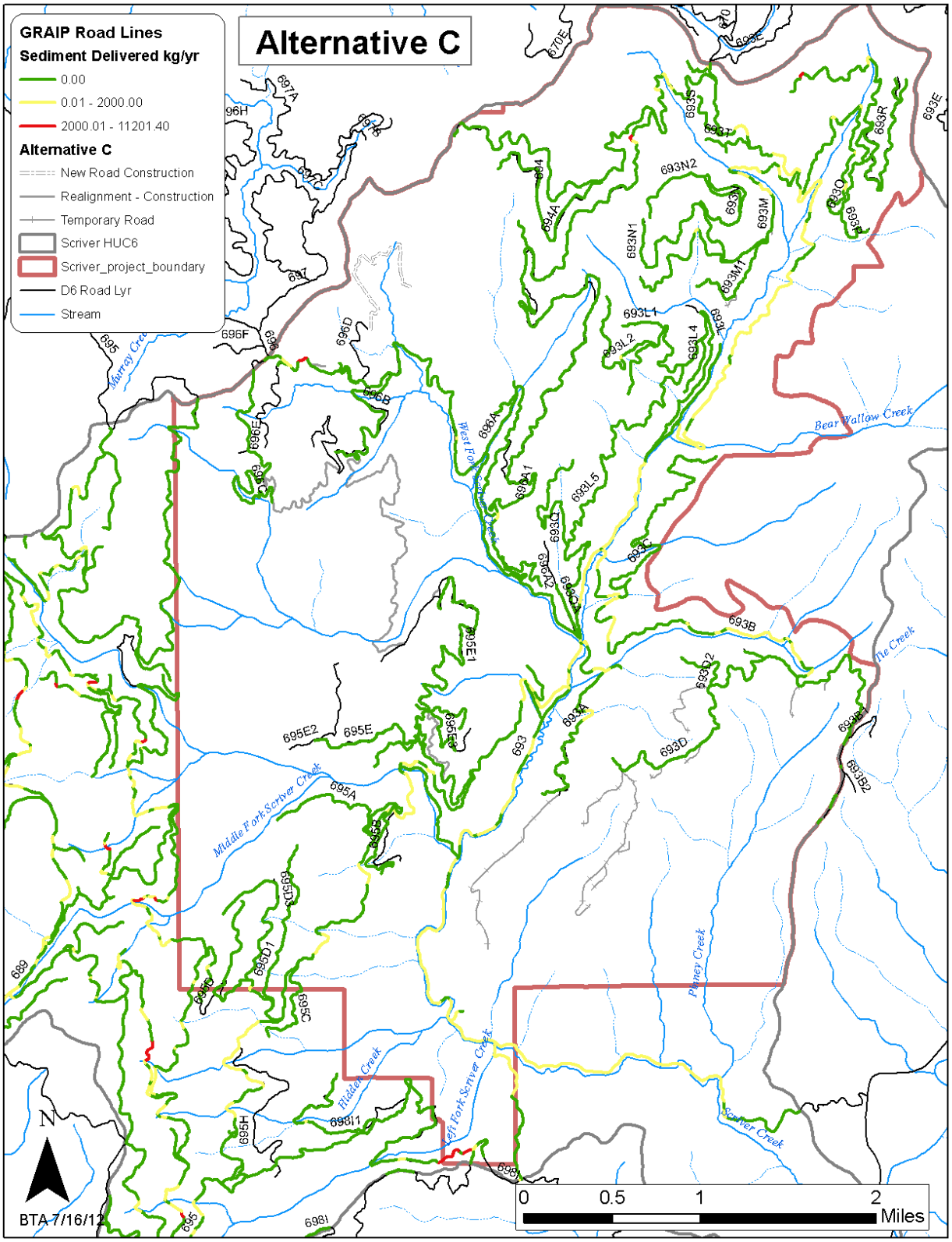


**Figure 3-48. Alternative C GRAIP Model Sediment Delivery Road Segments**

### *3.6.3.5 Environmental Consequences of Alternative D*

#### 3.6.3.5.1 Direct and Indirect Effects

This section discusses the direct and indirect effects of implementing Alternative D on water quality and the relevant differences in effects for water quality indicators between Alternative B and Alternative D for hydrologic resources. Implementing Alternative D would result a temporary immeasurable negative trend to the Sediment/Turbidity (other fishes) WCI by increasing fine sediment delivery to Scriver Creek associated with the new road construction and road realignment. In the short and long term, Alternative D would result in a measureable improvement to the Sediment/Turbidity (other fishes) WCI by reducing fine sediment delivery to Scriver Creek. Sediment reductions are associated with the 23.5 miles of road decommissioning, NFS road 696 realignment, 36.8 miles of general road maintenance, stabilization of 0.25 miles of an unauthorized snowmobile access route, and placement of aggregate on 5.3 miles of NFS road. The total road density in the analysis area would be reduced from 4.9 mi/mi$^2$ to 4.3 mi/mi$^2$. RCA road density in the analysis area would decrease to 4.5 mi/mi$^2$ from the existing condition of 5.4 mi/mi$^2$.

Under Alternative D (as opposed to Alternatives B and C), the proposed amount of new road construction, temporary road, road reconstruction, road maintenance, road aggregate placement, and miles of roads decommissioned may result in small differences in sediment delivery (see table Table 3-50 for detailed description of road work by alternative). Alternatives C and D propose stabilization of 0.25 miles of an unauthorized snowmobile access route that is in a degraded condition and is contributing significant sediment to streams based on GRAIP sediment model data and field reviews by the district hydrologist. Alternatives C and D also place and additional 2.5 miles of road surface aggregate on the NFS road 693B to further reduce road sediment delivery. The relevant difference between Alternative D and Alternative C is that Alternative D proposed no new road construction; Alternative C includes 1.1 miles of new construction, including 0.2 miles of RCA roads (NFS road 696D1).

BOISED modeled percent over natural sedimentation for Alternative D is reduced from 23.3 percent over natural (359 tons per year) to 15.3 percent over natural (236 tons per year) by 2030 (Table 3-51). The temporary increase in sediment associated with implementation would not peak quite as high under Alternative D (36.9 %ON) as it would under Alternative B (39.8%ON), or Alternative C (37.8%ON). Also under Alternative D, percent over natural annual sedimentation would stabilize at lower rate (15.3 %ON) than under Alternative B (17.5 %ON), or Alternative C (15.4%ON). The differences between Alternative B and Alternative D are derived from differences in the amount of aggregate placement, road decommissioning, and temporary road construction. The small differences between Alternative D and Alternative C are only from the new road construction on the NFS road 696D.

GRAIP modeled sediment reduction associated with implementing Alternative D is estimated to be 187.5 tons per year (from 528 tons to 340.5 tons) based on road management activities. Road decommissioning, NFS road 696 realignment, snowmobile access route stabilization, and road aggregate placement would likely reduce sediment delivery at several locations identified by GRAIP in the existing condition (Figure 3-45 and Figure 3-49). Figure 3-49 shows a change of several road segments from red (high sediment delivery), under the existing condition (Figure 3-45), to green or yellow (zero to moderate sediment delivery), under Alternative D (Figure 3-49). Furthermore, GRAIP provides information to engineers and road maintenance crews about where to target road drainage improvements for sediment reductions throughout the Project area. GRAIP was not used, however, to describe sediment delivery associated with proposed road construction, realignment, or temporary road.

Based on modeled estimates of sediment reduction, site-specific information about the magnitude of sediment delivery using GRAIP, and professional judgment, it is expected that short- and long-term instream fine sediment would be substantially reduced after implementation. The result is very similar to Alternative C in that that the Sediment/Turbidity (other fishes) WCI would have measureable improvement and move within the FR category toward the FA category. Based on the analysis of the measures presented above, it is expected that implementing Alternative D would assist in reducing sediment and temperature loads within the Scriver Creek subbasin as directed in the TMDL for the Middle Fork Payette River, contributing to the accomplishment of Purpose and Need #2 (section 1.5), and addressing Issue #2 (section 1.1.2) similar to Alternative C (Figure 3-46, Table 3-49).

#### 3.6.3.5.2 Cumulative Effects

##### 3.6.3.5.2.1 Past Activities

Table B.1 in Appendix B identifies which past activities were considered for this cumulative effects analysis. Past activities have contributed to the existing conditions for water quality in the analysis area and therefore are included in the affected environment discussion in section 3.6.3.1.

##### 3.6.3.5.2.2 Present/Ongoing Activities

Table B.1 in Appendix B identifies which present/ongoing activities were considered for the cumulative effects analysis. Ongoing activities such as NFS road and trail maintenance; irrigation diversions; vegetation management; livestock grazing; noxious weed treatment; fuel wood gathering; recreation; activities occurring in association with private residences, cabins, and ranches; and ongoing fire suppression would be expected to continue within the analysis area.

It is expected that present and ongoing road and trail maintenance would provide improvement to the Sediment/Turbidity (other fishes) WCI in all timeframes.

Present and ongoing activities occurring within the subwatershed on adjacent non-NFS lands include the Middle Fork Scriver and Murray Creek Timber Harvest Projects. Approximately 500 acres of ongoing timber harvest and an unknown amount (estimated to be nearly 2 miles) of access road related to these projects was assumed to be harvested and constructed. It is not known if these roads would be constructed within RCAs. Non-Forest Service timber harvest

would be subject to the conditions set forth in the IFPA, including applicable BMPs (Idaho Department of Lands et al. 2000), to maintain forest soil, air, water, vegetation, wildlife, and aquatic habitat.

IFPA requires using SPZs to mitigate negative impacts to watershed elements. SPZs distances are defined as 75 feet for class 1 streams (used by fish and for domestic water supplies) and 30 feet for class 2 streams (not used by fish). In order to reduce sediment delivery and maintain water temperature and stream habitat elements, no harvest activities may occur within SPZs. SPZs would mitigate most negative effects to the Sediment/Turbidity (other fishes) WCI and the Temperature (other fishes) WCI. Other present and ongoing activities considered for cumulative effects are not expected to result in effects to the Sediment/Turbidity (other fishes) WCI, the Temperature (other fishes) WCI, or road density. When occurring on NFS lands, these activities are subject to conditions set forth by the Forest Plan (Forest Service 2010a) standards and guides, and by State of Idaho water quality standards (IDPA 58.01.02), which require BMPs on all lands. These requirements are expected to maintain fine sediment and stream temperature conditions within the analysis area with regard to these present/ongoing activities.

#### 3.6.3.5.2.3 Reasonably Foreseeable Activities

Table B.1 in Appendix B identifies which reasonably foreseeable activities were considered for the cumulative effects analysis. Reasonably foreseeable projects and activities in the analysis area that could cumulatively impact water quality include Scriver Creek Trails Project, Scriver Creek Snowmobile Bridge and non-Forest Service timber harvest activities occurring within the analysis area. Cumulative impacts of the Scriver Creek Trails Project and Snowmobile Bridge project are expected to improve water quality through improved off-road vehicle management, which may reduce sedimentation and may improve riparian shading. These improvements also benefit the Sediment/Turbidity (other fishes) WCI and the Temperature (other fishes) WCI.

Reasonably foreseeable activities include approximately 800 acres of timber harvest and an unknown amount (estimated to be 2 miles) of access road (IDL, Hidden Creek Timber Sale Project) occurring on adjacent non-NFS lands within the subwatershed. Non-Forest Service timber harvest would be subject to the conditions set forth in the IFPA, including applicable BMPs (Idaho Department of Lands et al. 2000), to maintain forest soil, air, water, vegetation, wildlife, and aquatic habitat.

IFPA requires using SPZs to mitigate negative impacts to watershed elements. SPZs distances are defined as 75 feet for class 1 streams (used by fish and for domestic water supplies) and 30 feet for class 2 streams (not used by fish). In order to reduce sediment delivery and maintain water temperature and stream habitat elements, no harvest activities may occur within SPZs. SPZs would likely mitigate most negative effects to the Sediment/Turbidity (other fishes) WCI and the Temperature (other fishes) WCI. Other reasonably foreseeable activities considered for cumulative effects are not expected to result in effects to the Sediment/Turbidity (other fishes) WCI, the Temperature (other fishes) WCI, or road density. When occurring on NFS lands, these activities are subject to conditions set forth by the Forest Plan (Forest Service 2010a) standards and guides and by State of Idaho water quality standards (IDPA 58.01.02), which require BMPs on all lands. These

requirements are expected to maintain fine sediment and stream temperature conditions within the analysis area with regard to these other reasonably foreseeable activities.

In summary, similar to Alternatives A, B, and C, present and ongoing, and reasonably foreseeable activities under Alternative D are expected to maintain instream fine sediment conditions and stream temperature conditions through the application of BMPs. As disclosed above under section 1.4.7.1, Alternative D would result in direct and indirect improvements to water quality conditions through measureable reductions in sediment delivery and immeasurable reductions in stream temperature. Reductions in sediment delivery under Alternative D would be greater (based on sediment modeling results) than those expected under Alternative B, and only very slightly greater than those expected under Alternative C. While restoration activities implemented under Alternative D would result in measureable improvements to water quality in the Scriver Creek subwatershed, other past, present and foreseeable future actions would not be expected to measurably add incremental or cumulative effects (i.e., improvements or impacts) to those implemented under Alternative D.

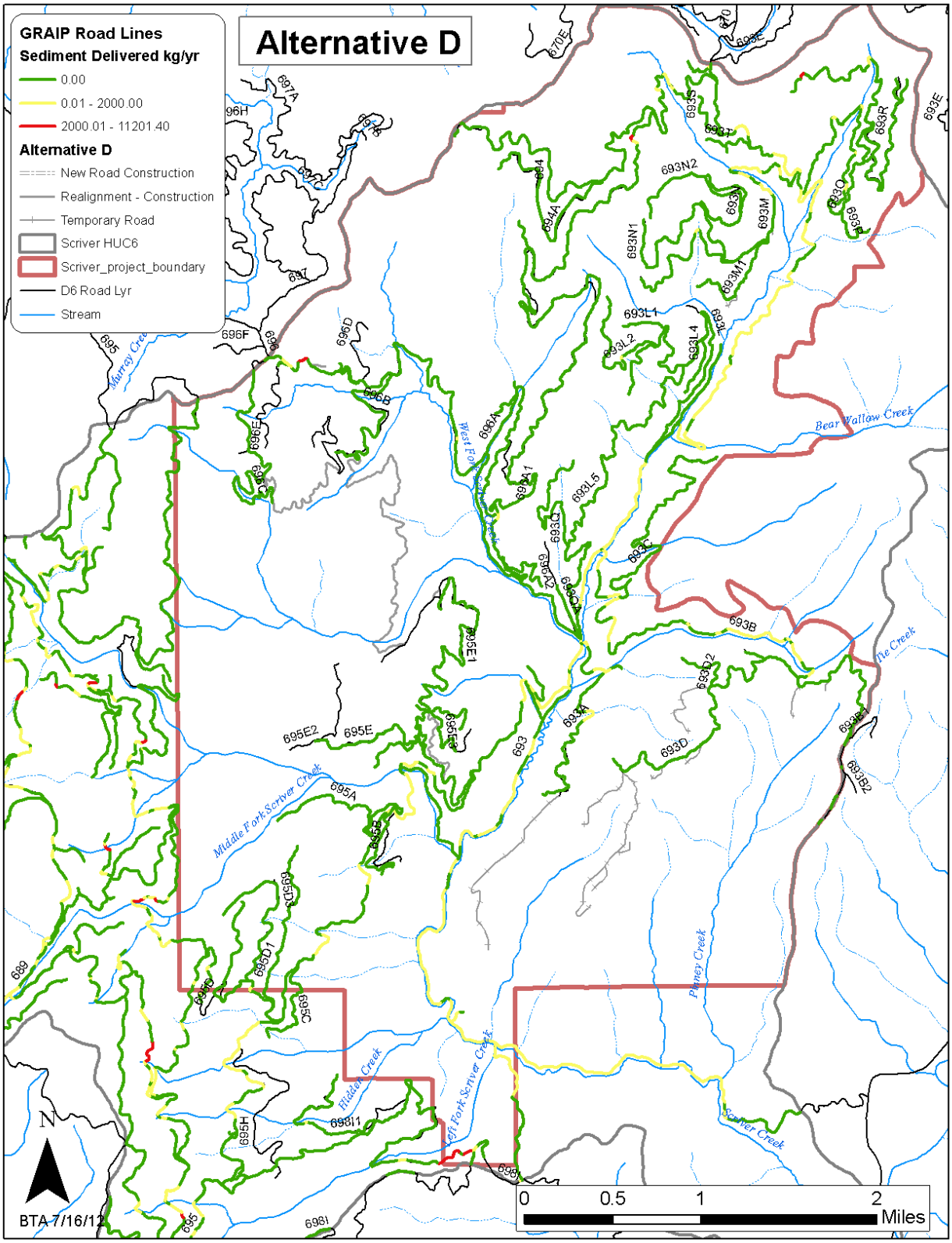


**Figure 3-49. Alternative D GRAIP Model Sediment Delivery Road Segments**

## 3.6.4 Stream Channel Conditions and Dynamics

### *3.6.4.1 Affected Environment*

Streams and stream channel conditions and dynamics within the analysis area include 53.8 miles of perennial streams and 28.5 miles of intermittent streams. Rosgen (1996) classifies natural rivers by their characteristics, including entrenchment ratio, width/depth ratio, sinuosity, slope, and channel material. A-type channels are typically entrenched, have low width-to-depth ratios, low sinuosity, and moderate-to-high stream gradients. B-type channels are typically moderately entrenched, have moderate width-to-depth ratios, moderate sinuosity, and low-to-moderate stream gradients (Rosgen 1996, p. 5-6). C-type channels, with lower gradient, more defined flood plain, and greater sinuosity. Streams in the Project area are predominately A and B channel types, with a smaller number of C-type channels in a small portion of the analysis area along Scriver Creek in the central portion of the subwatershed.

Road and trail use and maintenance, timber harvest, prescribed fire and wildfire, livestock grazing and recreational uses have all impacted stream channel conditions and dynamics by altering the natural fluxes of water flow, sediment transport, riparian vegetation, and LWD recruitment. These alterations in turn may have affected streambank stability and width-to-depth ratio. Sediment accumulation in the stream channel reduces stream depth and, to maintain the same channel capacity, there must be a corresponding increase in stream width (Naiman et al. 1992).

The desired condition for the Average Wetted Width/Maximum Depth Ratio WCI is <10 in a scour pool in a stream reach. This Indicator is FR. The FR rating is based on 3 measurements with an average width-to-depth ratio of 13.2; values ranged from 5.6 to 23.5

The desired condition for the Streambank Condition WCI is where >90 percent of any stream reach has stable banks relative to the percent of inherent stable streambanks associated with a similar unmanaged stream system. This Indicator is FA. The FA rating is based on 19 measurements with an average of 92 percent of stream reaches having stable banks; the values ranged from 71 to 100 percent.

### *3.6.4.2 Environmental Consequences of Alternative A—No Action*

#### 3.6.4.2.1 Direct and Indirect Effects

Although Alternative A does not propose any new management activities, ongoing uses, including dispersed camping, road and trail use, road and trail maintenance, livestock grazing, and fire suppression (as necessary) are expected to continue. Alternative A would perpetuate the existing condition for Stream Channel Conditions and Dynamics. The Average Wetted Width/Maximum Depth Ratio WCI was found to be FR, and the Streambank Condition WCI was found to be FA. Under Alternative A, these WCIs are expected to remain FR and FA, respectively. Sediment delivery from roads would continue to be elevated by approximately 23 percent over natural (Figure 3-45), resulting in negative impacts to stream width-to-depth ratios. Road density and RCA road density would remain high, at 4.9 and 5.4 percent respectively (Table 3-50). These high road densities may result in negative impacts to streambank stability and width-to-depth ratio due to increased fine sediment delivery and reduced LWD recruitment.

#### 3.6.4.2.2 Cumulative Effects

##### 3.6.4.2.2.1 Past Activities

Table B.1 in Appendix B identifies which past activities were considered for this cumulative effects analysis. Past activities have contributed to the existing conditions for water quality in the analysis area and therefore are included in the affected environment discussion in section 3.6.7.1.

##### 3.6.4.2.2.2 Present/Ongoing Activities

Table B.1 in Appendix B identifies which present/ongoing activities were considered for the cumulative effects analysis. Ongoing activities such as NFS road and trail maintenance; irrigation diversions; vegetation management; livestock grazing; noxious weed treatment; fuel wood gathering; recreation; activities occurring in association with private residences, cabins, and ranches; and ongoing fire suppression (as needed) would be expected to continue within the analysis area.

Present and ongoing activities occurring within the subwatershed on adjacent non-NFS lands include the Middle Fork Scriver and Murray Creek Timber Harvest Projects. Approximately 500 acres of ongoing timber harvest and an unknown amount (estimated to be nearly 2 miles) of access road related to these projects was assumed to be harvested and constructed. It is not known if these roads would be constructed within RCAs. Non-Forest Service timber harvest would be subject to the conditions set forth in the IFPA, including applicable BMPs (Idaho Department of Lands et al. 2000), to maintain forest soil, air, water, vegetation, wildlife, and aquatic habitat.

IFPA requires using SPZs to mitigate negative impacts to watershed elements. SPZs distances are defined as 75 feet for class 1 streams (used by fish and for domestic water supplies) and 30 feet for class 2 streams (not used by fish). No effects to the Streambank Condition WCI or the Average Wetted Width/Maximum Depth Ratio WCI from non-Forest Service timber harvest are expected due to the exclusion of timber harvest within SPZs.

Other present and ongoing activities considered for cumulative effects are not expected to result in effects to the Average Wetted Width/Maximum Depth Ratio WCI, Streambank Condition WCI, or road density. When occurring on NFS lands, these activities are subject to conditions set forth by Forest Plan (Forest Service 2010a) standards and guides and by State of Idaho water quality standards (IDPA 58.01.02), which requires BMPs on all lands. These requirements are expected to maintain both Average Wetted Width/Maximum Depth Ratio and Streambank Condition within the analysis area with regard to these present/ongoing activities.

##### 3.6.4.2.2.3 Reasonably Foreseeable Activities

Table B.1 in Appendix B identifies which reasonably foreseeable activities were considered for the cumulative effects analysis. Reasonably foreseeable projects and activities in the analysis area that could cumulatively impact water quality include the Scriver Creek Trails Project, the Scriver Creek Snowmobile Bridge, and non-Forest Service timber harvest activities occurring within the analysis area.

Cumulative impacts of the Scriver Creek Trails Project and Snowmobile Bridge project are expected to improve stream channel conditions and dynamics through improved off-road vehicle management, which may reduce sedimentation and may improve average wetted width-to-depth ratio and streambank condition. The site of the proposed snowmobile bridge exhibits degraded streambanks and a widened channel resulting from unauthorized off-road vehicle use. Addressing this condition may result in a benefit to the Average Wetted Width/Maximum Depth Ratio WCI and the Streambank Condition WCI.

Reasonably foreseeable activities include approximately 800 acres of timber harvest and an unknown amount (estimated to be 2 miles) of access road (IDL, Hidden Creek Timber Sale Project) occurring on adjacent non-NFS lands within the subwatershed. Non-Forest Service timber harvest would be subject to the conditions set forth in the IFPA, including applicable BMPs (Idaho Department of Lands et al. 2000), to maintain forest soil, air, water, vegetation, wildlife, and aquatic habitat.

IFPA requires using SPZs to mitigate negative impacts to watershed elements. SPZs distances are defined as 75 feet for class 1 streams (used by fish and for domestic water supplies) and 30 feet for class 2 streams (not used by fish). No effects to the Streambank Condition WCI or the Average Wetted Width/Maximum Depth Ratio WCI from non-Forest Service timber harvest are expected due to the exclusion of timber harvest within SPZs.

Other reasonably foreseeable activities considered for cumulative effects are not expected to result in effects to the Average Wetted Width/Maximum Depth Ratio WCI and the Streambank Condition WCI or road density. When occurring on NFS lands, these activities are subject to conditions set forth by the Forest Plan (Forest Service 2010a) standards and guides and by State of Idaho water quality standards (IDPA 58.01.02), which requires BMPs on all lands. These requirements are expected to maintain both Average Wetted Width/Maximum Depth Ratio and Streambank Condition within the analysis area with regard to these other reasonably foreseeable activities.

In summary, under Alternative A, no actions are proposed that would directly or indirectly affect the Average Wetted Width/Maximum Depth Ratio WCI or the Streambank Condition WCI. Present and ongoing activities are expected to maintain stream channel conditions through the application of BMPs, while some reasonably foreseeable activities (Scriver Creek Trails Project and Scriver Creek Snowmobile Bridge) are expected to improve stream channel conditions, and other reasonably foreseeable activities (i.e., non-Forest Service Timber Harvest) is expected to maintain stream channel conditions. As a result, should Alternative A (No Action) be selected, there would likely be some short- and long-term immeasurable change in stream channel conditions.

### *3.6.4.3 Environmental Consequences of Alternative B—Proposed Action*

#### 3.6.4.3.1 Direct and Indirect Effects

Implementing Alternative B would have no temporary influence on the Average Wetted Width/Maximum Depth Ratio WCI and the Streambank Condition WCI and would result in a short- and long-term immeasurable improvement.

Temporarily, there would be an increase in fine sediment delivery to Scriver Creek associated with the new road construction and road realignment. Due to the temporary time period of road maintenance and construction, it is estimated that there would not be any

temporary measureable decrease in stream width-to-depth ratio. In the short and long term, there is a measureable improvement in the fine sediment delivery to Scriver Creek, resulting in an immeasurable improvement in the stream width-to-depth ratio.

There would be no temporary influence on the width-to-depth ratio from the replacement of culverts with AOP structures because these replacements would not occur until after the vegetation management activities are complete. In the short term, immeasurable improvement would be expected by the replacement of three aquatic organism passage barrier culverts with AOP structures. The AOP structures would be designed to accommodate bankfull width, stream simulation (i.e., natural streambed), and to accommodate the 100-year flood frequency. The width-to-depth ratio would be expected to be improved based on the AOP's engineering design criteria.

Exclusion of commercial timber harvest in RCAs in all units and design features incorporated to minimize sediment delivery would result in a short- and long-term immeasurable benefit to stream bank condition in the Scriver Creek subwatershed. Removing culverts during road decommissioning activities and replacing three AOP culverts would have a temporary immeasurable effect on minor segments of streambanks, but would enhance streambank stability in the short and long term.

Width-to-depth ratio and streambank condition is also related to the Change in Peak/Base Flow and Change in Drainage Network WCIs. Increases in peak flows and increases in drainage network could erode streambanks and increase the width of a stream. However, since both the Change in Peak/Base Flow and Change in Drainage Network WCIs would be immeasurably improved in both the short and long term, this would concurrently benefit the Average Wetted Width/Maximum Depth Ratio and Streambank Condition WCIs.

The Average Wetted Width/Maximum Depth Ratio WCI and the Streambank Condition WCI functionality would be maintained (FR for Wetted Width-to-Maximum Depth Ratio and FA for Streambank Condition) with a positive future trend.

#### 3.6.4.3.2 Cumulative Effects

##### 3.6.4.3.2.1 Past Activities

Table B.1 in Appendix B identifies which past activities were considered for this cumulative effects analysis. Past activities have contributed to the existing conditions for water quality in the analysis area and therefore are included in the affected environment discussion in section 3.6.7.1.

##### 3.6.4.3.2.2 Present/Ongoing Activities

Table B.1 in Appendix B identifies which present/ongoing activities were considered for the cumulative effects analysis. Ongoing activities such as NFS road and trail maintenance; irrigation diversions; vegetation management; livestock grazing; noxious weed treatment; fuel wood gathering; recreation; activities occurring in association with private residences, cabins, and ranches; and ongoing fire suppression would be expected to continue within the analysis area.

Present and ongoing activities occurring within the subwatershed on adjacent non-NFS lands include the Middle Fork Scriver and Murray Creek Timber Harvest Projects. Approximately

500 acres of ongoing timber harvest and an unknown amount (estimated to be nearly 2 miles) of access road related to these projects was assumed to be harvested and constructed. It is not known if these roads would be constructed within RCAs. Non-Forest Service timber harvest would be subject to the conditions set forth in the IFPA, including applicable BMPs (Idaho Department of Lands et al. 2000), to maintain forest soil, air, water, vegetation, wildlife, and aquatic habitat.

IFPA requires the use SPZs to mitigate negative impacts to watershed elements. SPZs distances are defined as 75 feet for class 1 streams (used by fish and for domestic water supplies) and 30 feet for class 2 streams (not used by fish).No effects to the Average Wetted Width/Maximum Depth Ratio WCI or the Streambank Condition WCI from non-Forest Service timber harvest are expected due to the exclusion of timber harvest within SPZs.

Other present and ongoing activities considered for cumulative effects are not expected to result in effects to the Average Wetted Width/Maximum Depth Ratio WCI, the streambank stability WCI, or road density. When occurring on NFS lands, these activities are subject to conditions set forth by the Forest Plan (Forest Service 2010a) standards and guides and by State of Idaho water quality standards (IDPA 58.01.02), which require BMPs on all lands. These requirements are expected to maintain both Average Wetted Width/Maximum Depth Ratio and Streambank Condition within the analysis area with regard to these present/ongoing activities.

#### 3.6.4.3.2.3 Reasonably Foreseeable Activities

Table B.1 in Appendix B identifies which reasonably foreseeable activities were considered for the cumulative effects analysis. Reasonably foreseeable projects and activities in the analysis area that could cumulatively impact water quality include the Scriver Creek Trails Project, the Scriver Creek Snowmobile Bridge and non-Forest Service timber harvest activities occurring within the analysis area.

Cumulative impacts of the Scriver Creek Trails Project and Snowmobile Bridge project are expected to improve stream channel conditions and dynamics through improved off-road vehicle management, which may reduce sedimentation and may improve average wetted width-to-depth ratio and streambank condtion. The site of the proposed snowmobile bridge exhibits degraded streambanks and a widened channel resulting from unauthorized off-road vehicle use. Addressing this condition may result in a benefit to the Average Wetted Width/Maximum Depth Ratio WCI and the Streambank Condition WCI.

Reasonably foreseeable activities include approximately 800 acres of timber harvest and an unknown amount (estimated to be 2 miles) of access road (IDL, Hidden Creek Timber Sale Project) occurring on adjacent non-NFS lands within the subwatershed. Non-Forest Service timber harvest would be subject to the conditions set forth in the IFPA, including applicable BMPs (Idaho Department of Lands et al. 2000), to maintain forest soil, air, water, vegetation, wildlife, and aquatic habitat.

IFPA requires using SPZs to mitigate negative impacts to watershed elements. SPZs distances are defined as 75 feet for class 1 streams (used by fish and for domestic water supplies) and 30 feet for class 2 streams (not used by fish). No effects to the Average Wetted Width/Maximum Depth Ratio WCI or the Streambank Condition WCI from non-Forest Service timber harvest are expected due to the exclusion of timber harvest within SPZs.

Other reasonably foreseeable activities considered for cumulative effects are not expected to result in effects to the Average Wetted Width/Maximum Depth Ratio WCI and the Streambank Condition WCI, or road density. When occurring on NSF lands, these activities are subject to conditions set forth by the Forest Plan (Forest Service 2010a) standards and guides and by State of Idaho water quality standards (IDPA 58.01.02), which requires BMPs on all lands. These requirements are expected to maintain both average wetted width/maximum depth ratio and streambank condition within the analysis area with regard to these reasonably foreseeable activities.

In summary, Alternative B, like Alternative A, is expected to maintain (through the application of BMPs) or improve (as with the Scriver Creek Trails Project and Scriver Creek Snowmobile Bridge) stream channel conditions and dynamics. As disclosed under section 3.6.9.1, implementing Alternative B would result in immeasurable improvements to the Average Wetted Width/Maximum Depth Ratio WCI and the Streambank Condition WCI through measureable reductions in sediment delivery and AOP culvert replacements. Restoration activities implemented under Alternative B would result in immeasurable improvements to stream channel conditions and dynamics in the Scriver Creek subwatershed. Futhermore, other foreseeable future actions (the Scriver Creek Trails Project and Scriver Creek Snowmobile Bridge) would be expected to measurably add incremental or cumulative positive effects to those implemented under Alternative B.

### *3.6.4.4 Environmental Consequences of Alternative C*

#### 3.6.4.4.1 Direct and Indirect Effects

Direct and indirect effects associated with implementing Alternative C are identical to direct and indirect effects of Alternative B with the exception of the number of AOP structures replaced. Alternative C proposes to replace two additional fish migration barriers with AOP structures for a total of five stream crossings replaced with AOP structures. These additional AOP replacements would further benefit stream channel conditions and dynamics by allowing for higher flows and substrate transport, thereby improving streambank stability and width-to-depth ratios.

Both the Average Wetted Width/Maximum Depth Ratio WCI and the Streambank Condition WCI functionality would be maintained (FR for Average Wetted Width/Maximum Depth Ratio and FA for Streambank Condition) with a positive future trend.

#### 3.6.4.4.2 Cumulative Effects

While there are some differences in direct and indirect effects between Alternatives B, C, and D, the resulting effects from other past, present/ongoing, and reasonably foreseeable activities considered for cumulative effects are the same as those disclosed under Alternative B.

### *3.6.4.5 Environmental Consequences of Alternative D*

#### 3.6.4.5.1 Direct and Indirect Effects

Direct and indirect effects associated with implementing Alternative D are identical to direct and indirect effects of Alternative B with the exception of the number of AOP structures replaced. Alternative D proposes to replace two additional fish migration barriers with AOP

structures for a total of five stream crossings replaced with AOP structures. These additional AOP replacements would further benefit stream channel conditions and dynamics by allowing for higher flows and substrate transport, thereby improving streambank stability and width-to-depth ratios.

Both the Average Wetted Width/Maximum Depth Ratio WCI and the Streambank Condition WCI functionality would be maintained (FR for Average Wetted Width/Maximum Depth Ratio and FA for Streambank Condition) with a future positive trend.

#### 3.6.4.5.2 Cumulative Effects

While there are some differences in direct and indirect effects between Alternatives B, C, and D, the resulting effects from other past, present/ongoing, and reasonably foreseeable activities considered for cumulative effects are the same as those disclosed under Alternative B.

## 3.6.5 Streamflow Hydrology

### *3.6.5.1 Affected Environment*

Properly functioning watersheds exhibit a streamflow hydrograph that indicates peak flow, base flow, and flow timing characteristics comparable to an undisturbed watershed of a similar size, geomorphology, and climatology. Surface water diversions for domestic and agricultural uses can reduce peak and base flows. Drainage network increase describes the amount of change in the active channel length of streams that can be attributed to human caused disturbances, often associated with roads. Drainage network increases (from roads, trails, and ditches) have the ability to reduce infiltration, concentrate flow, and alter hydrograph characteristics. Alterations to vegetation composition have the ability to alter the hydrologic cycle through increasing or decreasing snow accumulation, evapotranspiration, and water yield.

Past management activities, such as transportation and vegetation management, have contributed to the existing condition for water flow and hydrology on NFS lands. Private surface water diversions, transportation, and vegetation management have all affected water flow and hydrology on non-NFS lands.

The desired condition for the Change in Peak/Base Flow WCI is that the watershed hydrograph should indicate peak flow, base flow, and flow timing characteristics comparable to an undisturbed watershed of a similar size, geomorphology, and climatology. This Indicator is FR. The FR rating is based on 4 surface water points of diversion (POD) accumulating to a maximum diversion rate of 7.46 cubic feet per second (cfs) located on private land in the lower reaches of Scriver Creek. Equivalent clearcut area (ECA) is estimated to be at 7 percent. While there has been very limited wildfire disturbance over the last several decades, wildfire hazard, based on crowning and torching index, is rated as predominantly moderate-to-high in all PVGs. Only a small percentage of the Scriver Creek subwatershed has seen wildfires over the past 50 years (refer to the Fuels Specialist Report located in the Project Record). Based on the findings in the Fuels Specialist Report, there is an increased risk for uncharacteristic size and severity of a wildfire based on the current and projected forest vegetation as a result of missed fire cycles.

The desired condition for the Change in Drainage Network WCI is zero or minimum change in active channel length correlated with human caused disturbance. Drainage network increase describes the amount of change in the active channel length of streams that can be attributed to human caused disturbances, often associated with roads. This Indicator is currently FUR. The FUR rating is based on a 270 percent increase in drainage network due to roading. There are approximately 145.8 miles of total roads within the Scriver Creek subwatershed. Total road density is approximately 4.9 mi/mi$^2$. There are approximately 37.8 miles of roads within RCAs, resulting in an RCA road density of 5.4 mi/mi$^2$ in the Scriver Creek subwatershed (Table 3-50).

### *3.6.5.2 Environmental Consequences of Alternative A—No Action*

#### 3.6.5.2.1 Direct and Indirect Effects

Although Alternative A does not propose any new management activities, ongoing uses, including dispersed camping, road and trail use, road and trail maintenance, livestock grazing, and fire suppression (as necessary), are expected to continue. The Change in Peak/Base Flow WCI is currently FR. The FR rating is based on 4 surface water diversions on private lands in lower Scriver Creek and the current wildfire hazard. This WCI would have a negative trend under Alternative A due to the increasing stand densities and vegetation growth that would result in a higher potential for increased fire severity and size over time. Increased fire severity and fire size (section 3.3) would result in higher ECAs based on wildfire occurrence, which would ultimately increase peak flows and decrease base flows in the subwatershed. An increase in sediment may also occur following a high severity fire. The Change in Drainage Network WCI is currently FUR and is expected to maintain this functionality into the future. This FUR rating is based on a 270 percent increase in drainage network due to roads. Implementing Alternative A would perpetuate the current condition with respect to water flow, hydrology, and the associated measures.

#### 3.6.5.2.2 Cumulative Effects

##### 3.6.5.2.2.1 Past Activities

Table B.1 in Appendix B identifies which past activities were considered for this cumulative effects analysis. Past activities have contributed to the existing conditions for water quality in the analysis area and are therefore included in the affected environment discussion in section 3.6.12.1.

##### 3.6.5.2.2.2 Present/Ongoing Activities

Table B.1 in Appendix B identifies which present/ongoing activities were considered for the cumulative effects analysis. Ongoing activities, such as NFS road and trail maintenance; irrigation diversions; vegetation management; livestock grazing; noxious weed treatment; fuel wood gathering; recreation; activities occurring in association with private residences, cabins, and ranches; and ongoing fire suppression (as needed), would be expected to continue within the analysis area.

Water diversions (totaling 7.64 cfs) occurring on adjacent private lands are currently negatively affecting the Change in Peak/Base Flow WCI and are contributing to its FR status.

Present and ongoing activities include approximately 500 acres of ongoing timber harvest (Middle Fork Scriver and Murray Creek Timber Harvest Project) and an unknown amount (estimated to be approximately 2 miles) of associated access road building occurring on adjacent non-NFS lands within the subwatershed. These activities may result in some increase in ECA within the subwatershed, which may increase peak/base flow. This increase in ECA is not expected to be large enough to alter the condition class of the Change in Peak/Base Flow WCI, which is currently FR, because of the small size of the harvest units. The associated road construction increases the overall road density within the subwatershed. It is not known whether these roads are located within the RCAs. No effects to the Change in Drainage Network WCI associated with this road construction are expected to occur because these activities would be subject to the conditions set forth in the IFPA, including applicable BMPs (Idaho Department of Lands et al. 2000), to maintain forest soil, air, water, vegetation, wildlife, and aquatic habitat.

Other present and ongoing activities considered for cumulative effects are not expected to alter the Change in Peak/Base Flow WCI, the Change in Drainage Network WCI, or road density. When occurring on NSF lands, these activities do not propose substantial road building or vegetation manipulation and are subject to conditions set forth by the Forest Plan (Forest Service 2010a) standards and guides and by State of Idaho water quality standards (IDPA 58.01.02), which requires BMPs on all lands. The nature of these reasonably foreseeable activities and the aforementioned legal requirements are expected to maintain both average wetted width/maximum depth ratio and streambank condition within the analysis area with regard to these present/ongoing activities.

#### 3.6.5.2.2.3 Reasonably Foreseeable Activities

Table B.1 in Appendix B identifies which reasonably foreseeable activities were considered for the cumulative effects analysis. Reasonably foreseeable projects and activities in the analysis area that could cumulatively impact water quality include the Scriver Creek Trails Project, the Scriver Creek Snowmobile Bridge and non-Forest Service timber harvest activities occurring within the analysis area.

Reasonably foreseeable activities include approximately 800 acres of timber harvest (IDL, Hidden Creek Timber Sale Project) occurring on adjacent non-NFS lands within the subwatershed and an unknown amount (estimated to be approximately 2 miles) of associated access road building. These activities may increase in ECA within the subwatershed, which may result in some immeasurable change in peak/base flows. This increase in ECA is not expected to be large enough to alter the condition class of the Change in Peak/Base Flow WCI, which is currently FR.

The associated road construction increases the overall road density within the subwatershed. It is not known whether these roads are located within the RCAs. No effects to the Change in Drainage Network WCI associated with this road construction are expected to occur because these activities would be subject to the conditions set forth in the IFPA, including applicable BMPs (Idaho Department of Lands et al. 2000), to maintain forest soil, air, water, vegetation, wildlife, and aquatic habitat.

Other reasonably foreseeable activities considered for cumulative effects are not expected to result in effects to the change in peak/base flow WCI, the Change in Drainage Network WCI,

or road density. When occurring on NFS lands, these activities do not propose significant road building or vegetation manipulation and are subject to conditions set forth by the Forest Plan (Forest Service 2010a) standards and guides and by State of Idaho water quality standards (IDPA 58.01.02), which requires BMPs on all lands. The nature of these other reasonably foreseeable activities and the aforementioned legal requirements are expected to maintain both the change in peak/base flow WCI and the Change in Drainage Network WCI within the analysis area with regard to these reasonably foreseeable activities.

In summary, under Alternative A, no actions are proposed that would directly affect the Change in Peak/Base Flow WCI or the Change in Drainage Network WCI. Indirectly, the current vegetation condition and potential for uncharacteristic wildfire may negatively affect the Change in Peak/Base Flow WCI if a large wildfire were to occur. Present, ongoing, and reasonably foreseeable activities are expected to maintain current water flow and hydrological conditions through the application of BMPs. As a result, should Alternative A be selected, there may be an immeasurable Change in Peak/Base Flow WCI associated with potential wildfire, and no effects to the Change in Drainage Network WCI.

### *3.6.5.3 Environmental Consequences of Alternative B—Proposed Action*

#### 3.6.5.3.1 Direct and Indirect Effects

Implementing Alternative B would result in a temporary immeasurable negative trend in the Peak/Base Flow WCI and a short- and long-term immeasurable improvement. Alternative B would result in a temporary immeasurable negative trend in the Change in Drainage Network WCI and a short- and long-term measurable improvement.

Temporarily, an increase in road density is associated with the new road construction and road realignment. It is estimated that there would be a temporary immeasurable negative trend in the Change in Peak/Base Flow WCI. In the short and long term, total road density and RCA road density would be reduced. It is estimated that this reduction would result in an immeasurable improvement in the Change in Peak/Base Flow WCI. A very slight temporary increase in ECA would occur from the road construction and road realignment. In the short and long term, a small decrease in the ECA would occur from road decommissioning. This decommissioning would result in a short- and long-term immeasurable improvement for the Change in Peak/Base Flow WCI. The harvest, noncommercial thinning and prescribed fire under burning is all targeted to maintain desired vegetation conditions or move degraded vegetation conditions towards the desired conditions. The desired conditions are based on the PVG's historical range of vegetative conditions in which the streams evolved (refer to section 3.2 and Fuels specialist reports located in the Project Record). The vegetative management activities are intended to imitate natural conditions and processes. The change in vegetation may have a slight immeasurable improvement in the summer base flows. The Change in Peak/Base Flow WCI is currently FR and would be maintained with a positive trend into the future.

The temporary immeasurable negative trend in the Change in Drainage Network WCI is associated with the new road construction and road realignment. The temporary road construction is not estimated to have any effect on the change in drainage network during any time frame due to being constructed a great distance from RCAs and in place for only one year. The short- and long-term measureable improvement in the Change in Drainage

Network WCI is associated with the 19.8 miles of road decommissioning, 8 miles of which are within the RCA. Total road density would be reduced from 4.9 miles to 4.5 mi/mi$^2$ and total RCA road density would be reduced from 5.4 miles to 4.5 mi/mi$^2$ (Table 3-50). In addition, there would also benefits to the Change in Drainage Network WCI resulting from the general road maintenance on 39.3 miles of road with an emphasis for reducing road drainage delivery to the streams. Placing 2.8 miles of road surfacing (aggregate) reduces the amount of fine particles that erode from the road surface, and also prevents wheel ruts from routing water down the road surface or into streams (Foltz and Truebe 1994). The vegetative management activities (harvest, thinning, and prescribed fire under burning) associated with the action alternatives do not result in a measureable effect in the Change in Peak/Base Flow WCI and are not expected to have any effect to the Change in Drainage Network WCI.

Existing functionality for the Change in Drainage Network WCI is FUR (greater than moderate change in active channel length correlated with human caused disturbance). It is estimated that the reduction in RCA road miles, together with all of the other road-related activities and project design features intended to reduce sediment (see section 3.7.4.3), would result in a measurable improvement and move closer towards a shift from “greater than moderate” to “low-to-moderate” change in active channel length correlated with human caused disturbance. However, the Change in Drainage Network WCI function, while improving, would remain at FUR.

#### 3.6.5.3.2 Cumulative Effects

##### 3.6.5.3.2.1 Past Activities

Table B.1 in Appendix B identifies which past activities were considered for this cumulative effects analysis. Past activities have contributed to the existing conditions for water quality in the analysis area and are therefore included in the affected environment discussion in section 2.6.12.1.

##### 3.6.5.3.2.2 Present/Ongoing Activities

Table B.1 in Appendix B identifies which present/ongoing activities were considered for the cumulative effects analysis. Ongoing activities such as NFS road and trail maintenance; irrigation diversions; vegetation management; livestock grazing; noxious weed treatment; fuel wood gathering; recreation; activities occurring in association with private residences, cabins, and ranches; and ongoing fire suppression would be expected to continue within the analysis area.

Water diversions (totaling 7.64 cfs) occurring on adjacent private lands are negatively affecting the Change in Peak/Base Flow WCI and are contributing to its FR status. Present and ongoing activities include approximately 500 acres of ongoing timber harvest (the Middle Fork Scriver and Murray Creek Timber Harvest Project) and an unknown amount (estimated to be approximately 2 miles) of associated access road building occurring on adjacent non-NFS lands within the subwatershed. These activities may result is some increase in ECA within the subwatershed, which may result in some change to peak and base flows. This increase in ECA is not expected to be large enough to alter the condition class of the Change in Peak/Base Flow WCI, which is currently FR, because of the small size of the harvest units. The associated road construction increases the overall road density within the

subwatershed. It is not known whether these roads are located within the RCAs. No effects to the Change in Drainage Network WCI associated with this road construction are expected to occur because these activities would be subject to the conditions set forth in the IFPA including applicable BMPs (Idaho Department of Lands et al. 2000) to maintain forest soil, air, water, vegetation, wildlife, and aquatic habitat.

Other present and ongoing activities considered for cumulative effects are not expected to result in effects to the Change in Peak/Base Flow WCI, the Change in Drainage network WCI, or road density. When occurring on NFS lands, these activities do not propose significant road building or vegetation manipulation and are subject to conditions set forth by the Forest Plan (Forest Service 2010a) standards and guides and by State of Idaho water quality standards (IDPA 58.01.02), which require BMPs on all lands. The nature of these other reasonably foreseeable activities and the aforementioned legal requirements are expected to maintain both the Change in Peak/Base Flow WCI, the Change in Drainage network WCI within the analysis area with regard to these other present/ongoing activities.

#### 3.6.5.3.2.3 Reasonably Foreseeable Activities

Table B.1 in Appendix B identifies which reasonably foreseeable activities were considered for the cumulative effects analysis. Reasonably foreseeable projects and activities in the analysis area that could cumulatively impact water quality include the Scriver Creek Trails Project, the Scriver Creek Snowmobile Bridge and non-Forest Service timber harvest activities occurring within the analysis area.

Reasonably foreseeable activities include approximately 800 acres of timber harvest (IDL, Hidden Creek Timber Sale Project) occurring on adjacent non-NFS lands within the subwatershed and an unknown amount (estimated to be approximately 2 miles) of associated access road building. These activities may increase the ECA within the subwatershed, which may result in some immeasurable change in peak and base flows. This increase in ECA is not expected to be large enough to alter the condition class of the Change in Peak/Base Flow WCI, which is currently FR.

The associated road construction increases the overall road density within the subwatershed. It is not known whether these roads are located within the RCAs. No effects to the Change in Drainage Network WCI associated with this road construction are expected to occur because these activities would be subject to the conditions set forth in the IFPA, including applicable BMPs (Idaho Department of Lands et al. 2000), to maintain forest soil, air, water, vegetation, wildlife, and aquatic habitat.

Other reasonably foreseeable activities considered for cumulative effects are not expected to result in effects to the Change in Peak/Base Flow WCI, the Change in Drainage Network WCI, or road density. When occurring on NFS lands, these activities do not propose significant road building or vegetation manipulation and are subject to conditions set forth by Forest Plan (Forest Service 2010a) standards and guides and by State of Idaho water quality standards (IDPA 58.01.02), which requires BMPs on all lands. The nature of these other reasonably foreseeable activities and the aforementioned legal requirements are expected to maintain both the Change in Peak/Base Flow WCI and the Change in Drainage Network WCI within the analysis area with regard to these reasonably foreseeable activities.

In summary, similar to that disclosed under Alternative A, present, ongoing, and reasonably foreseeable activities are expected to maintain water flow and hydrology conditions, including the Change in Drainage Network WCI and the Change in Peak/Base Flow WCI through the application of BMPs. As disclosed under section 3.6.14.1, implementing Alternative B would result in direct and indirect improvements to water flow and hydrology conditions through reduction in road miles (thereby reducing drainage network length) and through improved vegetation conditions benefiting the Peak/Base Flow WCI. Thus, while other past, present, and foreseeable future actions would not be expected to measurably add incremental or cumulative effects (i.e., improvements or impacts), the direct, indirect, and cumulative effects for Alternative B would result in immeasurable improvement to the Change in Peak/Base Flow WCI and some measureable improvements to the Change in Drainage Network WCI.

### *3.6.5.4 Environmental Consequences of Alternative C*

#### 3.6.5.4.1 Direct and Indirect Effects

Direct and indirect effects associated with implementing Alternative C are similar to those of Alternative B. There are some small mileage differences in proposed road system changes between Alternative B and Alternative C (see Table 3-50 for a detailed description of road conditions by alternative). RCA road density does not significantly change under Alternatives B and C. Overall road density is 4.5 mi/mi$^2$ under Alternative B and 4.3 mi/mi$^2$ under Alternative C. This reduction in road density represents a benefit to the Peak/Base Flow WCI and the Change in Drainage Network WCI under Alternative C as compared to Alternative B.

#### 3.6.5.4.2 Cumulative Effects

While there are some differences in direct and indirect effects between Alternatives B, C, and D, the resulting effects from other past, present, ongoing, and reasonably foreseeable activities considered for cumulative effects are the same as those disclosed under Alternative B.

### *3.6.5.5 Environmental Consequences of Alternative D*

#### 3.6.5.5.1 Direct and Indirect Effects

Direct and indirect effects associated with implementing Alternative D are similar to those of Alternative B. There are some small mileage differences in proposed road system changes between Alternative B and Alternative D (see Table 3-50 for a detailed description of road conditions by alternative). RCA road density is reduced by 0.2 mi/mi$^2$ under Alternative D as compared with Alternatives B and C. Overall road density is 4.5 mi/mi$^2$ under Alternative B and 4.3 mi/mi$^2$ under Alternative D. This reduction in road density represents a benefit to the Peak/Base Flow WCI and the Change in Drainage Network WCI under Alternative D as compared to Alternative B.

#### 3.6.5.5.2 Cumulative Effects

While there are some differences in direct and indirect effects between Alternatives B, C, and D, the resulting effects from other past, present, ongoing, and reasonably foreseeable

activities considered for cumulative effects are the same as those disclosed under Alternative B.

### 3.6.6 Watershed Conditions

#### *3.6.6.1 Affected Environment*

The Watershed Conditions Indicator describes broad aquatic and biophysical conditions critical to proper watershed function. These measures include Road Density and Location WCI, Disturbance History WCI, RCAs WCI, and Disturbance Regime WCI. Past transportation and vegetation management activities within the subwatershed (listed in Appendix B) have influenced the existing conditions of the Watershed Conditions indicator.

The desired condition for the Road Density and Location WCI is a total road density of <0.7 mi/mi$^2$ of subwatershed with no roads within RCAs. This Indicator is FUR. The FUR rating is based on a 270 percent increase in drainage network due to roading. There are approximately 145.8 miles of total roads within the Scriver Creek subwatershed. Total road density is 4.9 mi/mi$^2$. There are approximately 37.8 miles of roads within RCAs, for an RCA road density of 5.4 mi/mi$^2$ in the Scriver Creek subwatershed (Table 3-50).

The desired condition for the Disturbance History WCI is <15 percent ECA (entire subwatershed) with no concentration of disturbances in areas with landslides or LSPs, and/or refugia, and/or RCAs. The Disturbance History WCI ratings are based at the subwatershed scale to compare historic range of variability conditions to existing soil-hydrologic conditions (based on the resilience of streams and wetland/riparian areas) and the ability of the watershed/stream system to absorb and regulate water runoff. This Indicator is FR.

The FR rating is based on the current vegetation condition and existing road conditions. The ECA is estimated to be at 7 percent. While there has been very limited wildfire disturbance over the last several decades, wildfire hazard, based on crowning and torching index, is rated as predominantly moderate-to-high in all PVGs. Only a small percentage of the Scriver Creek subwatershed has seen wildfires over the past 50 years (refer to the Fuels Specialist Report located in the Project Record). Based on the findings in the Fuels Specialist Report, there is a risk for wildfire of uncharacteristic size and severity based on the current and projected forest vegetation as a result of missed fire cycles. There is also a 270 percent increase in drainage network due to roading; approximately 145.8 miles of total roads are within the Scriver Creek subwatershed for a total road density of 4.9 mi/mi$^2$. Of the 145.8 miles of road, approximately 3.9 miles are located on moderate-to-high LSPs, and approximately 37.8 miles of roads are within RCAs, resulting in an RCA road density of 5.4 mi/mi$^2$ (Table 3-50).

The desired condition for the RCAs WCI is RCAs within the subwatershed have historic and occupied refugia for listed, sensitive, or native/desired non-native fish species. These refugia provide adequate shade, LWD recruitment, sediment buffering, connectivity, and habitat protection/connectivity to adequately minimize adverse effects from land management activities (>80 percent intact). In addition, all vegetative components are within desired conditions identified in Appendix A of the Forest Plan (Forest Service 2010a). RCA functions and processes are intact, providing resiliency from adverse effects associated with land management activities, and conditions fully support habitat for aquatic species.

This Indicator is FUR. The FUR rating is based on the approximate 37.8 miles of roads within RCAs, which equates to a RCA road density of 5.4 mi/mi$^2$ (Table 3-50). High RCA road density has likely degraded some RCA functions in the subwatershed. Additionally, the Sediment/Turbidity (other fishes), LWD, and Change in Peak/Base Flow WCIs are all FR. Large Pools/Pool Quality, Physical Barriers, Change in Drainage Network WCI, and Road Density and Location WCIs are all FUR.

The desired condition for the Disturbance Regime WCI is that disturbance resulting from land management activities is negligible or temporary. Streamflow regimes are appropriate to the local geomorphology, potential vegetation, and climatology, resulting in appropriate, high quality habitat and watershed complexity that provides refugia and rearing space for all life stages or multiple life-history forms. Ecological processes are within historical ranges. Resiliency of habitat to recover from land management disturbances is high.

This Indicator is FR. The FR rating is based on moderate-to-high wildfire hazard, based on the crowning and torching index, in all PVGs. Only a small percentage of the Scriver Creek subwatershed has seen wildfires over the past 50 years (refer to the Fuels Specialist Report located in the project record). Based on the findings in the Fuels Specialist Report, there is a risk for wildfire of uncharacteristic size and severity based on the current and projected forest vegetation as a result of missed fire cycles. Within the Scriver Project area, increased stand densities and ladder fuels increase the potential for stand-replacement type fires that would burn at a higher intensity and severity over a larger area for longer periods of time. Based on these conditions, there is an increased potential for accelerated soil erosion and sediment delivery from larger and more severe wildfires within the Scriver Creek subwatershed. The FR rating is also based on a 270 percent increase in drainage network due to roading. Approximately 145.8 miles of total roads are within the Scriver Creek subwatershed for a total road density of 4.9 mi/mi$^2$. In addition, approximately 37.8 miles of roads are within RCAs, for a RCA road density of 5.4 mi/mi$^2$ in the Scriver Creek subwatershed (Table 3-50).

### *3.6.6.2 Environmental Consequences of Alternative A—No Action*

#### 3.6.6.2.1 Direct and Indirect Effects

Although Alternative A does not propose any new management activities, ongoing uses, including dispersed camping, road and trail use, road and trail maintenance, livestock grazing, and fire suppression (as necessary), are expected to continue. The Road Density and Location WCI and the RCAs WCI are both FUR. These ratings are based on a 270 percent increase in drainage network due to roads. The Disturbance Regime and Disturbance History WCIs are both FR. These ratings are based on a high wildfire hazard and the potential for large, uncharacteristic wildfire within the subwatershed. The CI is rated as moderate-to-high in all PVGs. Based on these conditions, there is an increased potential for accelerated soil erosion and sediment delivery from larger and more severe wildfires within the subwatershed. ECA is currently estimated at 7 percent, which is within desired conditions. If a large uncharacteristic wildfire were to occur, however, this value would be affected. Implementing Alternative A would perpetuate the existing condition with respect to watershed conditions and the associated measures. The Disturbance History WCI, RCAs WCI, and Disturbance Regime WCI functionality ratings are all maintained under this Alternative with an immeasureable negative trend into the future. The Road Density and Location WCI is maintained with no change in trend into the future.

#### 3.6.6.2.2 Cumulative Effects

##### 3.6.6.2.2.1 Past Activities

Table B.1 in Appendix B identifies which past activities were considered for this cumulative effects analysis. Past activities have contributed to the existing conditions for the Watershed Conditions Indicator in the analysis area and are, therefore, included in the affected environment discussion in section 3.6.17.1.

##### 3.6.6.2.2.2 Present/Ongoing Activities

Table B.1 in Appendix B identifies which present/ongoing activities were considered for the cumulative effects analysis. Ongoing activities such as NFS road and trail maintenance; irrigation diversions; vegetation management; livestock grazing; noxious weed treatment; recreation; activities occurring in association with private residences, cabins, and ranches; and ongoing fire suppression (as needed) would be expected to continue within the analysis area.

It is expected that present and ongoing road and trail maintenance would improve the Watershed Conditions Indicator through improved road drainage, benefiting the RCAs WCI.

Present and ongoing activities occurring within the subwatershed on adjacent non-NFS lands include the Middle Fork Scriver and Murray Creek Timber Harvest Projects. Approximately 500 acres of ongoing timber harvest and an unknown amount (estimated to be nearly 2 miles) of access road related to these projects was assumed to be harvested and constructed. It is not known if these roads would be constructed within RCAs. Timber harvest may increase ECA, resulting in a slight negative effect to the Disturbance History WCI. Non-Forest Service timber harvest would be subject to the conditions set forth in the IFPA, including applicable BMPs (Idaho Department of Lands et al. 2000), to maintain forest soil, air, water, vegetation, wildlife, and aquatic habitat.

IFPA requires using SPZs to mitigate negative impacts to watershed elements. SPZs distances are defined as 75 feet for class 1 streams (used by fish and for domestic water supplies) and 30 feet for class 2 streams (not used by fish). These effects are not expected to alter the condition class of the Disturbance History WCI, RCAs WCI, and Disturbance Regime WCI. Road construction increases the overall road density within the subwatershed and negatively affects the Road Density and Location WCI. It is not known whether these roads are located within the RCAs.

Other present and ongoing activities considered for cumulative effects are not expected to result in effects to the Disturbance History WCI, RCAs WCI, Disturbance Regime WCI, and the Road Density and Location WCI. When occurring on NFS lands, these activities are subject to conditions set forth by the Forest Plan (Forest Service 2010a) standards and guides and by State of Idaho water quality standards (IDPA 58.01.02), which requires BMPs on all lands. These requirements are expected to maintain watershed conditions and associated measures within the analysis area with regard to these other present/ongoing activities.

##### 3.6.6.2.2.3 Reasonably Foreseeable Activities

Table B.1 in Appendix B identifies which reasonably foreseeable activities were considered for the cumulative effects analysis. Reasonably foreseeable projects and activities in the

analysis area that could cumulatively impact watershed condition include the Scriver Creek Trails Project, the Scriver Creek Snowmobile Bridge, and non-Forest Service timber harvest activities occurring within the analysis area.

Cumulative impacts of the Scriver Creek Trails Project and Snowmobile Bridge project are expected to improve watershed conditions through improved off-road vehicle management, which may reduce sedimentation and may improve the condition of the RCAs WCI and the Road Density and Location WCI.

Reasonably foreseeable activities include approximately 800 acres of timber harvest and an unknown amount (estimated to be 2 miles) of access road (IDL, Hidden Creek Timber Sale Project) occurring on adjacent non-NFS lands within the subwatershed. Timber harvest may increase ECA, resulting in a slight negative effect to the Disturbance History WCI. Non-Forest Service timber harvest would be subject to the conditions set forth in the IFPA, including applicable BMPs (Idaho Department of Lands et al. 2000), to maintain forest soil, air, water, vegetation, wildlife, and aquatic habitat.

IFPA requires using SPZs to mitigate negative impacts to watershed elements. SPZs distances are defined as 75 feet for class 1 streams (used by fish and for domestic water supplies) and 30 feet for class 2 streams (not used by fish). These effects are not expected to alter the condition class of the Disturbance History WCI, RCAs WCI, and Disturbance Regime WCI. Road construction increases the overall road density within the subwatershed and negatively affects the Road Density and Location WCI. It is not known whether these roads are located within the RCAs.

Other present and ongoing activities considered for cumulative effects are not expected to result in changes to the Disturbance History WCI, RCAs WCI, Disturbance Regime WCI, and the Road Density and Location WCI. When occurring on NFS lands, these activities are subject to conditions set forth by Forest Plan (Forest Service 2010a) standards and guides and by State of Idaho water quality standards (IDPA 58.01.02), which requires BMPs on all lands. Road density may be increased by the unknown amount of road construction associated with non-Forest Service timber harvest.

Direct and indirect effects of implementing Alternative A (No Action) would maintain the current condition with regard to the Road Density and Location WCI, Disturbance History WCI, Riparian Conservation WCI, and the Disturbance Regime WCI with an immeasurable negative trend into the future (as discussed above) due to the threat for uncharacteristic wildfire. While other past, present, and foreseeable future actions would not be expected to measurably add incremental or cumulative effects (i.e., improvements or impacts), the direct, indirect, and cumulative effects for Alternative A (No Action) would result in an immeasurable negative trend to the Road Density and Location WCI, Disturbance History WCI, Riparian Conservation WCI, and the Disturbance Regime WCI.

### *3.6.6.3 Environmental Consequences of Alternative B—Proposed Action*

#### 3.6.6.3.1 Direct and Indirect Effects

Implementing Alternative B would result in a temporary immeasurable degradation in both the Road Density and Location WCI and the RCAs WCI and a short- and long-term measurable improvement for these two WCIs. There would be a temporary immeasurable

negative trend in the Disturbance History WCI and the Disturbance Regime WCI and a short- and long-term immeasurable improvement for these two WCIs.

Temporarily, an immeasurable negative trend to the Road Density and Location WCI would occur from the new road construction, road realignment, and temporary road construction. The short- and long-term measureable improvement to this WCI would occur from road decommissioning. Alternative B results in an overall reduction in road miles from 145.9 to 133. Road density is reduced from 4.9 mi/mi$^2$ to 4.5 mi/mi$^2$ and RCA road density is reduced from 5.4 mi/mi$^2$ to 4.5 mi/mi$^2$ (Table 3-50). This WCI is maintained as FUR under this alternative with a positive future trend.

The Disturbance Regime and Disturbance History WCIs are similar in their intent. The Disturbance Regime and Disturbance History WCIs are both FR. These ratings are based on a high wildfire hazard and the potential for large, uncharacteristic wildfire within the subwatershed. The CI is rated as moderate-to-high in all PVGs (See Fire and Fuels section 3.3). Based on these conditions, there is an increased potential for accelerated soil erosion and sediment delivery from larger and more severe wildfires within the subwatershed. Alternative B would immeasurably improve these two WCIs in the short- and long-term through reductions in road sediment delivery (see section 3.6.4.1, Direct and Indirect Effects of Alternative B on Water Quality); reductions in road density; improvements to the vegetation conditions through 4,104 acres of commercial and noncommercial thinning with the goal of returning vegetation to desired conditions; and reductions in overall wildfire hazard resulting from silvicultural treatments (see section 3.3). Alternative B would provide small immeasurable benefits to ECA, estimated at 7 percent, by reducing road density, reducing wildfire hazard, and moving vegetation conditions toward desired conditions. These WCIs are expected to maintain their FR status, but with a positive future trend.

Assessing the change in the RCAs WCI incorporates the collective evaluation of all the indicators and their associated WCIs as identified in Table 3-52 which displays the summary of baseline conditions and effects by alternative. The determination of the direct and indirect effects for the RCAs WCI relied on those individual WCIs that were determined to have the greatest improvement compared to Alternative A: Sediment/Turbidity (Redband Trout); Physical Barriers; Large Woody Debris; Pool Frequency and Quality; Large Pools/Pool Quality; Change in Drainage Network; and Road Density and Location. These improvements are the result of road decommissioning activities within the RCAs, reductions in existing sediment delivery associated with road improvements and replacing fish migration barriers as discussed previously. Implementing Alternative B would result in short- and long-term measureable improvements for the aforementioned WCIs. Therefore, the RCAs WCI would be measurably improved in the short and long term while maintaining its FUR rating.

#### 3.6.6.3.2 Cumulative Effects

##### 3.6.6.3.2.1 Past Activities

Table B.1 in Appendix B identifies which past activities were considered for this cumulative effects analysis. Past activities have contributed to the existing conditions for Watershed Conditions in the analysis area and are therefore included in the affected environment discussion in section 3.6.17.1.

#### 3.6.6.3.2.2 Present/Ongoing Activities

Table B.1 in Appendix B identifies which present/ongoing activities were considered for the cumulative effects analysis. Ongoing activities such as NFS road and trail maintenance; irrigation diversions; vegetation management; livestock grazing; noxious weed treatment; recreation; activities occurring in association with private residences, cabins, and ranches; and ongoing fire suppression would be expected to continue within the analysis area.

It is expected that present and ongoing road and trail maintenance would provide improvement to the Watershed Conditions Indicator through improved road drainage, benefiting the RCAs WCI.

Present and ongoing activities occurring within the subwatershed on adjacent non-NFS lands include the Middle Fork Scriver and Murray Creek Timber Harvest Projects. Approximately 500 acres of ongoing timber harvest and an unknown amount (estimated to be nearly 2 miles) of access road related to these projects was assumed to be harvested and constructed. It is not known if these roads would be constructed within RCAs. Timber harvest may increase ECA, resulting in a slight negative effect to the disturbance history WCI. Non-Forest Service timber harvest would be subject to the conditions set forth in the IFPA, including applicable BMPs (Idaho Department of Lands et al. 2000), to maintain forest soil, air, water, vegetation, wildlife, and aquatic habitat.

IFPA requires using SPZs to mitigate negative impacts to watershed elements. SPZs distances are defined as 75 feet for class 1 streams (used by fish and for domestic water supplies) and 30 feet for class 2 streams (not used by fish). These effects are not expected to change condition class of the Disturbance History WCI, RCAs WCI, and Disturbance Regime WCI.

Other present and ongoing activities considered for cumulative effects are not expected to result in effects to the Disturbance History WCI, RCAs WCI, Disturbance Regime WCI, and the Road Density and Location WCI. When occurring on NFS lands, these activities are subject to conditions set forth by the Forest Plan (Forest Service 2010a) standards and guides and by State of Idaho water quality standards (IDPA 58.01.02), which requires BMPs on all lands. These requirements are expected to maintain watershed conditions and associated measures within the analysis area with regard to these other present/ongoing activities.

#### 3.6.6.3.2.3 Reasonably Foreseeable Activities

Table B.1 in Appendix B identifies which reasonably foreseeable activities were considered for the cumulative effects analysis. Reasonably foreseeable projects and activities in the analysis area that could cumulatively impact watershed condition include the Scriver Creek Trails Project, the Scriver Creek Snowmobile Bridge, and non-Forest Service timber harvest activities occurring within the analysis area.

Cumulative impacts of the Scriver Creek Trails Project and Snowmobile Bridge project are expected to improve watershed conditions through improved off-road vehicle management, which may reduce sedimentation and may improve the condition of the RCAs WCI and the Road Density and Location WCI.

Reasonably foreseeable activities include approximately 800 acres of timber harvest and an unknown amount (estimated to be 2 miles) of access road (IDL, Hidden Creek Timber Sale

Project) occurring on adjacent non-NFS lands within the subwatershed. Timber harvest may increase ECA, resulting in a slight negative effect to the Disturbance History WCI. Non-Forest Service timber harvest would be subject to the conditions set forth in the IFPA, including applicable BMPs (Idaho Department of Lands et al. 2000), to maintain forest soil, air, water, vegetation, wildlife, and aquatic habitat.

IFPA requires using SPZs to mitigate negative impacts to watershed elements. SPZs distances are defined as 75 feet for class 1 streams (used by fish and for domestic water supplies) and 30 feet for class 2 streams (not used by fish). These effects are not expected to alter the condition class of the Disturbance History WCI, RCAs WCI, and Disturbance Regime WCI. Road construction increases the overall road density within the subwatershed and negatively affects the Road Density and Location WCI. It is not known whether these roads are located within the RCAs.

Other present and ongoing activities considered for cumulative effects are not expected to result in changes to the Disturbance History WCI, RCAs WCI, Disturbance Regime WCI, and the Road Density and Location WCI. When occurring on NFS lands, these activities are subject to conditions set forth by Forest Plan (Forest Service 2010a) standards and guides and by State of Idaho water quality standards (IDPA 58.01.02), which requires BMPs on all lands. Road density may be increased by the unknown amount of road construction associated with non-Forest Service timber harvest.

Present, ongoing, and reasonably foreseeable activities are expected to maintain watershed conditions and the associated measures through the application of BMPs. Road density may be slightly increased by the unknown amount of road construction associated with non-Forest Service timber harvest. Direct and indirect effects of implementing Alternative B would result in an immeasurable improvement in the Disturbance Regime WCI and the Disturbance History WCI, and a measureable improvement in the Road Density and Location WCI and the Riparian Conservation WCI. Overall, cumulative effects of past, present, and reasonably foreseeable activities, when combined with the direct and indirect effects of Alternative B, would result in an immeasurable improvement to the Disturbance History WCI and the Disturbance Regime WCI, and a measureable improvement to the Road Density and Location WCI and the RCAs WCI.

### *3.6.6.4 Environmental Consequences of Alternative C*

#### 3.6.6.4.1 Direct and Indirect Effects

Direct and indirect effects of implementing Alternative C are similar to Alternative B. However, there are some differences in the amount of road stream crossings replaced with AOPs, miles of road system changes, and acres of commercial timber harvest between Alternative C and Alternative B (see Table 3-50 for a detailed description of management activities by alternative). Direct and indirect effects associated with these differences include benefits to the Disturbance History and Disturbance Regime WCIs, due to an additional 310 acres of commercial timber harvest directed at restoring desired vegetation conditions and reducing wildfire hazard. Alternative C provides benefits to the Road Density and Location WCI through further reductions in overall road density (4.5 mi/mi$^2$ under Alternative B, 4.3 mi/mi$^2$ under Alternative C). The RCAs WCI is further benefited under Alternative C by further reductions in fine sediment delivery to streams by additional placement of road

surface aggregate and stabilization of an unauthorized snowmobile route that is identified as contributing significant amounts of fine sediment (see Figure 3-48 and Figure 3-49). Alternative C also includes two additional AOP culvert replacements which benefit the RCAs WCI. Therefore, Alternative C would result in similar but slightly more beneficial effects to the Road Density and Location WCI, the RCAs WCI, the Disturbance History WCI and the Disturbance Regime WCI in the short and long term than are expected under Alternative B.

#### 3.6.6.4.2 Cumulative Effects

While there are some differences in direct and indirect effects between Alternatives B and C, the resulting effects from other past, present, ongoing, and reasonably foreseeable activities considered for cumulative effects are the same as those disclosed under Alternative B.

### *3.6.6.5 Environmental Consequences of Alternative D*

#### 3.6.6.5.1 Direct and Indirect Effects

Direct and indirect effects of implementing Alternative D are similar to Alternative B. However, there are some differences in the amount of road stream crossings replaced with AOPs, miles of road system changes, and acres of commercial timber harvest between Alternative D and Alternative B (see Table 3-50 for a detailed description of management activities by alternative). Direct and indirect effects associated with these differences include benefits to the Disturbance History and Disturbance Regime WCIs, due to an additional 310 acres of commercial timber harvest directed at restoring desired vegetation conditions and reducing wildfire hazard. Alternative D provide benefits to the Road Density and Location WCI through further reductions in overall road density (4.5 mi/mi$^2$ under Alternative B, 4.3 mi/mi$^2$ under Alternative D). The RCAs WCI is further benefited under Alternative D by further reductions in fine sediment delivery to streams by additional placement of road surface aggregate and stabilization of an unauthorized snowmobile route that is identified as contributing significant amounts of fine sediment (see Figure 3-48 and Figure 3-49). Alternative D also includes two additional AOP culvert replacements which benefit the RCAs WCI. Therefore, Alternative D would result in similar but slightly more beneficial effects to the Road Density and Location, RCAs, Disturbance History and the Disturbance Regime WCIs in the short and long term than are expected under Alternative B.

The only relevant difference between Alternative C and Alternative D, with respect to the Watershed Conditions indicator, is the proposed 1.1 miles of new road construction under Alternative C (NFS road 696D1) which slightly increases overall road density (<0.1 mi/mi$^2$). This new road construction (NFS road 696D1) includes 0.2 miles of RCA road construction which slightly increases RCA road density (less than 0.1 mi/mi$^2$). Therefore, Alternative D would result in similar but slightly more beneficial effects to the Road Density and Location WCI and RCAs WCI and identical effects to the Disturbance History WCI and the Disturbance Regime WCI in the short and long term than are expected under Alternative C.

#### 3.6.6.5.2 Cumulative Effects

While there are some differences in direct and indirect effects between Alternatives B and D, the resulting effects from other past, present, ongoing, and reasonably foreseeable activities considered for cumulative effects are the same as those disclosed under Alternative B.

**Table 3-52. Summary of the Baseline Conditions and Effects by Alternative**

| Pathway and WCIs | Baseline Conditions[a] | Alternative A Effects[b]: and LongtermTrend[c] | Alternative B Effects[b]: and T/S/L[d] Timeframe | Alternative C Effects[b]: and T/S/L[d] Timeframe | Alternative D Effects[b]: and T/S/L[4] Timeframe |
|---|---|---|---|---|---|
| **Water Quality Pathway** | | | | | |
| Temperature (Other Fishes) | FA | M: N | M: N/+*/+ | M: N/+*/+ | M: N/+*/+ |
| Sediment/Turbidity (Other Fishes) | FR | M: -* | M: -*/+/+ | M: -*/+/+ | M: -*/+/+ |
| Chemical Contaminant/Nutrients | FA | NI: N | NI: N | NI: N | NI: N |
| **Habitat Access Pathway** | | | | | |
| Physical Barriers | FUR | M: N | I: N/+/+ (FUR to FR) | I: N/+/+ (FUR to FR) | I: N/+/+ (FUR to FR) |
| **Habitat Elements Pathway** | | | | | |
| Large Woody Debris | FR | M: N | M: N/+/+ | M: N/+/+ | M: N/+/+ |
| Pool Frequency and Quality | FR | M: -* | M: -*/+/+ | M: -*/+/+ | M: -*/+/+ |
| Large Pools/Pool Quality | FUR | M: -* | M: -*/+/+ | M: -*/+/+ | M: -*/+/+ |
| **Channel Condition and Dynamics Pathway** | | | | | |
| Average Wetted Width/Maximum Depth Ratio | FR | M: N | M: N/+*/+* | M: N/+*/+* | M: N/+*/+* |
| Streambank Condition | FA | M: N | M: N/+*/+* | M: N/+*/+* | M: N/+*/+* |
| Floodplain Connectivity | FA | NI: N | NI: N | NI: N | NI: N |
| Change in Peak/Base Flow | FR | M: -* | M: -*/+*/+* | M: -*/+*/+* | M: -*/+*/+* |
| Change in Drainage Network | FUR | M: N | M: -*/+/+ | M: -*/+/+ | M: -*/+/+ |

| Pathway and WCIs | Baseline Conditions[a] | Alternative A Effects[b]: and LongtermTrend[c] | Alternative B Effects[b]: and T/S/L[d] Timeframe | Alternative C Effects[b]: and T/S/L[d] Timeframe | Alternative D Effects[b]: and T/S/L[4] Timeframe |
|---|---|---|---|---|---|
| **Watershed Conditions Pathway** | | | | | |
| Road Density and Location | FUR | M: N | M: -*/+/+ | M: -*/+/+ | M: -*/+/+ |
| Disturbance History | FR | M: -* | M: -*/+*/+* | M: -*/+*/+* | M: -*/+*/+* |
| Riparian Conservation Areas | FUR | M: -* | M: -*/+/+ | M: -*/+/+ | M: -*/+/+ |
| Disturbance Regime | FR | M: -* | M: -*/+*/+* | M: -*/+*/+* | M: -*/+*/+* |
| **Integration of Species and Habitat Condition Pathway** | | | | | |
| Integration of Pathways and Habitat Conditions (Other Fishes) | FUR | M: -* | M: -*/+/+ | M: -*/+/+ | M: -*/+/+ |

[a]: Functionality for baseline conditions: FA = Functioning Acceptably, FR = Functioning at Risk, FUR = Functioning at Unacceptable Risk.
[b]: Effects to Functionality Class: M = Maintain, NI = No Influence, I = Improve (change Functionality Class).
[c]: Trend effects: N = No trend, - = negative trend, + = positive trend, * indicates immeasurable impact
[d]: Timeframe: T = Temporary (0-3 years). S = Short-term (3-15 years), L = Long-term (15+ years). Effects by Timeframe: N = None, - = negative impact, + = positive effects, * denotes immeasurable impact.

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## 3.6.7 Municipal Watersheds

### *3.6.7.1 Affected Environment*

The Scriver Creek subwatershed is located upstream from both the Rivers Point Home Owners Association and the City of Horseshoe Bend municipal supply sources. Water is not directly diverted from Scriver Creek to these two municipal supply water providers. The water from Scriver Creek, after emptying into the Middle Fork Payette River, does eventually provide water to these two municipal water sources. The definition for Municipal Supply Watershed is one that serves a public water system as defined in Public Law 93-523 (Safe Drinking Water Act). The definition does not include communities served by well or confined groundwater unaffected by Forest Service activities (FSM 2542.05).

### *3.6.7.2 Environmental Consequences of Alternative A—No Action*

Alternative A does not propose any new management activities, but ongoing uses including dispersed camping, road and trail use, road and trail maintenance, livestock grazing, and fire suppression (as necessary) are expected to continue. With continuation of these uses, there is the potential for unforeseen accidental chemical contaminant/nutrient spills into ground and/or surface waters. However, the likelihood of a spill is discountable, and any contaminant spill within a municipal watershed would be reported to the proper authorities. Alternative A would perpetuate the existing sediment conditions in the analysis area currently found to be FR, which may impact the downstream municipal watersheds (Sediment/Turbidity WCI, Table 3-52). No cumulative effects to municipal water supplies are anticipated.

### *3.6.7.3 Environmental Consequences of All Action Alternatives*

Implementing Alternative B is unlikely to affect the identified municipal watershed. In the short term and long term, this alternative would be expected to reduce sediment delivery to analysis area streams (section 3.6.4.3), thereby improving water quality conditions (section 3.6.3). The result of this sediment reduction constitutes an immeasurable benefit to municipal water supply systems. There would be no fuel storage, refueling, equipment storage, or servicing of equipment within RCAs, unless no other option exists (Design Feature SW-8, [section 2.4.5] and Forest Plan Standard SWST11 [Forest Service 2010a, p. III-22]). An emergency spill containment kit would be onsite during implementing ground-disturbing activities that require heavy equipment. Small leaks and drips are likely, but would be assumed to be immeasurable. All machinery would be inspected prior to use to ensure they are free from drips and leaks. An accident could occur that would deliver contaminants to ground and/or surface waters. However, the likelihood of a spill is discountable pertaining to spill prevention/containment. Therefore, no direct or indirect effects to municipal watersheds would be expected. The spill containment plan for this Project is located in the Project Record. Additionally, any contaminant spill within a municipal watershed would be reported to the proper authorities. No cumulative effects to municipal water supplies are anticipated.

## 3.6.8 Federal Clean Water Act and Designated Beneficial Uses

### *3.6.8.1 Affected Environment*

The CWA requires that States and tribes restore and maintain the chemical, physical, and biological integrity of the nation's waters. States and tribes, pursuant to Section 303 of the CWA, are to adopt water quality standards necessary to protect fish, shellfish, and wildlife while providing for recreation in and on the nation's waters whenever possible. Section 303(d) of the CWA establishes requirements for States and tribes to identify and prioritize water bodies that are water quality limited (i.e., water bodies that do not meet water quality standards). States and tribes must periodically publish a priority list (a "§303(d) list") of impaired waters. Currently, this list must be published every 2 years. For waters identified on this list, States and tribes must develop a TMDL for the pollutants, set at a level to achieve water quality standards. The EPA is the agency responsible for reviewing and approving TMDLs.

#### 3.6.8.1.1 Designated Beneficial Uses

Surface water classifications or beneficial uses are designated by the State of Idaho and are intended to protect surface waters. The beneficial uses for a water body are dependent on actual use, the ability of the water body to support a non-existing use and the likelihood of the water being used in a given manner (IDAPA 58.01.02.03.04). In addition, there are several beneficial uses that apply to all surface waters of the State of Idaho: agricultural water supply, industrial water supply, wildlife habitats, and aesthetics (IDAPA 58.01.02.100). Designated beneficial uses for the streams[50] in the analysis area (Scriver Creek subwatershed) include cold water aquatic life, salmonid spawning, and primary contact recreation.

#### 3.6.8.1.2 Status of Beneficial Uses

IDEQ submits an "Integrated Report," a combined §303d/305b list, to the EPA for approval every 2 years as required by the CWA. The EPA approved the State of Idaho's 2010 Integrated Report in September 2011. Table 3-53 summarizes beneficial use status by assessment units in the analysis area based on the 2010 Integrated Report.

[50] Assessment Units in the Scriver Creek Subwatershed with designated beneficial uses include ID17050121SW010_02 (Scriver 1st and 2nd Order Streams) andID17050121SW010_03 (Scriver 3rd Order Streams).

**Table 3-53. Summary of the Beneficial Use Status for Streams in the Analysis Area Based on the 2010 Integrated Report**

| Assessment Unit No. and Stream miles | Pollutant | TMDL(s) Completed | Beneficial Uses Status |
|---|---|---|---|
| Scriver Creek<br>1st and 2nd Order<br>AU-ID17050121SW010_02<br>35.37 miles | None | Yes—Guidance by 2 TMDLs (Sediment and Temperature) | Cold Water Aquatic Life—Full Support<br>Primary Contact Recreation - Full Support<br>Salmonid Spawning - Full Support |
| Scriver Creek<br>3rd Order<br>AU-ID17050121SW010_03<br>6.08 miles | None | Yes—Guidance by 2 TMDLs (Sediment and Temperature) | Cold Water Aquatic Life—Full Support<br>Primary Contact Recreation - Full Support<br>Salmonid Spawning - Full Support |

#### *3.6.8.2 Environmental Consequences of Alternative A—No Action*

Although Alternative A does not propose any new management activities, ongoing uses, including dispersed camping, road and trail use, road and trail maintenance, livestock grazing, and fire suppression (as necessary), are expected to continue. In addition, natural processes, such as tree growth, would continue. Alternative A would perpetuate the existing condition in relation to Temperature (other fishes) WCI (Table 3-52), which is currently FA, and Sediment and Turbidity (other fishes) WCI (Table 3-52), which is currently FR. Alternative A does not assist in attainment of the goals and targets for sediment and temperature reduction in the Scriver Creek subwatershed associated with the two TMDLs on the Middle Fork Payette River.

#### *3.6.8.3 Environmental Consequences of All Action Alternatives*

Beneficial Uses in the Scriver Creek subwatershed, including cold-water biota, salmonid spawning, primary and secondary contact recreation, and beneficial uses that apply to all State of Idaho surface waters (wildlife habitat, industrial, and aesthetics), would not be degraded by implementing any of the action alternatives. Design features and BMPs incorporated into project implementation specifications are intended to mitigate adverse effects to water quality. All action alternatives result in a long-term measureable improvement in the Temperature (other fishes) WCI and the Sediment/Turbidity WCI in the Scriver Creek subwatershed and, thus, are in compliance with the guidance associated with the two TMDLs in place on the Middle Fork Payette River.

### 3.6.9 Applicable Federal and State Water Quality Permits

Under the CWA, the following State and federal permits may be required prior to implementing all action alternatives.

#### *3.6.9.1 Section 404 of the Clean Water Act Permits*

Section 404 of the CWA establishes a program to regulate the discharge of dredged and fill material into waters of the United States. Section 404 permits are issued and enforced by the U.S. Army Corps of Engineers (Corps) and are overseen by EPA. The basic premise of Section 404 is that dredged or fill material cannot be discharged into water if the nation's waters would be significantly degraded or if a feasible alternative exists that is less damaging

to the aquatic environment. A Section 404 permit is required before dredge and fill activities may occur.

A Section 404 permit may be required for constructing new road stream crossings, size upgrades of existing road stream crossings, and installation of AOPs. The district hydrologist will submit 404 permit applications to the Corps within a reasonable timeframe to obtain permits prior to implementation.

### *3.6.9.2 National Pollution Discharge Elimination System Permits*

The National Pollution Discharge Elimination System (NPDES) program requires facilities discharging from a point source into waters of the United States to obtain discharge permits (i.e., a point source is a conveyance such as a pipe or other point). An NPDES permit contains limits on what can be discharged and other provisions to ensure that the discharge does not harm water quality or the public's health.

Stormwater is water from rain or melting snow that does not immediately soak into the ground. Stormwater runs off of land and hard surfaces such as streets, parking lots, and rooftops, and picks up pollutants, such as fertilizers, dirt, pesticides, and oil and grease. Eventually, stormwater soaks into the ground or discharges to surface water (usually through storm drains), bringing the pollutants with it. Most stormwater discharges are considered point sources and require coverage by an NPDES permit.

Regulated businesses and industry must obtain coverage under an NPDES stormwater permit and implement stormwater pollution prevention plans or stormwater management programs that effectively reduce or prevent the discharge of pollutants into receiving waters.

It is uncertain at this time if a NPDES stormwater permit would be required for the following activities proposed under Alternatives B, C, or D:

- Construction activities that disturb one acre or more of land, including clearing, grading, and excavation activities

Refer to section 1.8.2 for a detail discussion as to why it is uncertain at this time whether activities proposed under the action alternatives may require the attainment of an NPDES permit. Should a NPDES permit be required, the district hydrologist will submit an NPDES permit application to EPA to obtain permits prior to implementation.

#### 3.6.9.2.1 Section 401 of the Clean Water Act Certification

Section 401 of the CWA requires State certification for any permit or license issued by a federal agency for an activity that may result in a discharge into waters of the United States. This requirement allows each state to have input into federally approved projects that may affect its waters (rivers, streams, lakes, and wetlands) and to ensure the projects will comply with state water quality standards and any other water quality requirements of state law. Any Section 401 certification in Idaho also ensures that the project will not adversely impact impaired waters (waters that do not meet water quality standards) and that the project complies with applicable water quality improvement plans (TMDLs).

IDEQ is responsible for issuing, or waiving the need for, Section 401 certifications in Idaho for the following types of federal permits or licenses:

- **NPDES Permits:** The NPDES program requires facilities discharging from a point source such as a pipe into waters of the United States to obtain discharge permits. EPA is responsible for permitting and enforcing all NPDES permits in Idaho.
- **Section 404 Dredge and Fill Permits:** The federal Clean Water Act requires a permit to conduct water-related construction activities, such as fills for development, water resource projects, and infrastructure development. The Corps is responsible for issuing dredge and fill permits in Idaho.

## 3.7 FISHERIES RESOURCES

This section incorporates by reference the Hydrology and Fisheries Specialist's Report (available in the Project Record). These documents contain detailed data, methodologies, analyses, conclusions, maps, references, and technical documentation. This section discusses the effects of each alternative on fisheries.

### 3.7.1 Fish Species

The USFWS maintains the Threatened, Endangered, Proposed, and Candidate species list and publishes it in the Federal Register. An Idaho species list for each County is provided to the Forest by the Idaho Fish and Wildlife Office of the USFWS and is updated quarterly. The list used for this document is dated August 17, 2011 (USFWS 2011).

The Project was introduced to the USFWS Level 1 team in a Phase I informational presentation on February 15, 2007. During that meeting, preliminary determinations were "No Effect" for bull trout and designated bull trout critical habitat.

#### *3.7.1.1 Snake River Spring/Summer Chinook Salmon and Steelhead*

Snake River spring/summer Chinook salmon (*Oncorhynchus tshawytscha*) and steelhead (*Oncorhynchus mykiss*) are listed as threatened under the ESA, but both have been extirpated from the Payette River system (Forest Service 2010a, p. III-284). Construction of the Black Canyon Dam on the Payette River near Emmett, Idaho, in the 1920s eliminated all anadromous runs of salmon and steelhead upstream of the dam. No designated or proposed critical habitat or essential fish habitat exists in the Payette River system for either Snake River spring/summer Chinook salmon or steelhead. The proposed project would have "No Effect" on these species or habitats, and they will not be discussed in this document.

#### *3.7.1.2 Bull Trout*

Bull trout are the only known federally listed fish species in the Middle Fork Payette River Subbasin. In 1998, the USFWS listed bull trout as Threatened (USFWS 1998). Bull trout are identified as a management Indicator species (MIS) in the 2010 Forest Plan (Forest Service 2010a, p. IV-15). In September 2010, the USFWS designated critical habitat for bull trout for the coterminous United States, and the Middle Fork Payette River was designated as critical habitat (Figure 3-50).

The Middle Fork Payette River is considered migratory and overwintering (nodal) bull trout habitat to accommodate fluvial life-history expression from populations in the South Fork Payette River. Bull trout have the potential for straying from the Middle Fork Payette and South Fork Payette local populations into the Scriver Creek subwatershed (Burton 2000).

However, genetic analysis by DeHaan and Ardren (2008) indicate that Big Falls has separated the South Fork Payette River populations from the Middle Fork Payette River local populations. Anecdotal accounts of larger bull trout in the lower Middle Fork Payette River have been made as recently as 1998, suggesting recent expression of a fluvial migratory life history (Jimenez and Zaroban 1998). The upper Middle Fork Payette River, Sixteen-to-One Creek, and Bull Creek, serve as spawning and rearing habitat for adult, juvenile, and young of the year bull trout. The South Fork Payette River serves as migratory and overwintering habitat for bull trout (Forest Service 2003a, p. III-219).

Bull trout distribution is strongly influenced by summertime maximum temperatures. On the Forest, resident populations and spawning and rearing habitat is generally restricted to streams above 5,000 feet in elevation (Rieman and McIntyre 1995) with maximum summertime temperatures below 15 degrees Celsius ( °C). Bull trout spawn in cold headwater streams with temperatures between 5 and 9 °C as optimal. Spawning normally occurs from August to November (Rieman and McIntyre 1993). More information on the life history and habitat needs for bull trout can be found in Quigley and Arbelbide (1997).

Bull trout are not known to occupy the Scriver Creek subwatershed. The Scriver Creek subwatershed is not located within a bull trout “patch” nor does it contain spawning and rearing habitat (Riemann and MacIntyre 1995). In Figure 3-50, Strata 1 (green) is an “occupied patch” with a known bull trout population, Strata 2 (purple) is modeled as “suitable, but unoccupied”, and Strata 3 (brown) is modeled as “unsuitable”. In addition, bull trout have not been observed in this subwatershed (Emmet RD unpublished data). Bull trout are considered present in the migratory corridor of the South Fork and Middle Fork Payette Rivers. The nearest known bull trout local populations are located in Bull Creek and Sixteen-to-One Creek, both tributary streams of the Middle Fork Payette River, located about 23 stream miles upstream of the Scriver Creek confluence with the Middle Fork Payette River. The proposed project would have “No Effect” on these species or habitats, and they will not be discussed in this document.

#### *3.7.1.3 West Slope Cutthroat Trout*

Westslope cutthroat trout (*Oncorhynchus clarki lewisi*) are listed as a sensitive species by the Regional Forester (Forest Service 2003b). In 2000, the USFWS determined that the listing of westslope cutthroat trout under the ESA was not warranted. Westslope cutthroat trout are not known to be native to the Payette River drainage (Behnke 1992). Construction of Black Canyon Dam in the 1920s eliminated potential migration by westslope cutthroat trout into and out of the Payette River drainage. Any westslope cutthroat trout found in the area today are believed to be descendents of stocked fish. The proposed project would have “No Effect” on these species or habitats, and they will not be discussed in this document.

#### *3.7.1.4 Other Fishes*

District aquatic data and the State of Idaho stocking records indicate that other fishes known to the analysis area include rainbow/redband trout (*Oncorhynchus mykiss*), whitefish (*Prosopium williamsoni*), sculpin (*Cottu*s spp.), sucker (*Catostomus* spp.), brook trout (*Salvelinus fontinalis*), rainbow-cutthroat hybrids, and dace (*Rhinichthys* spp.).

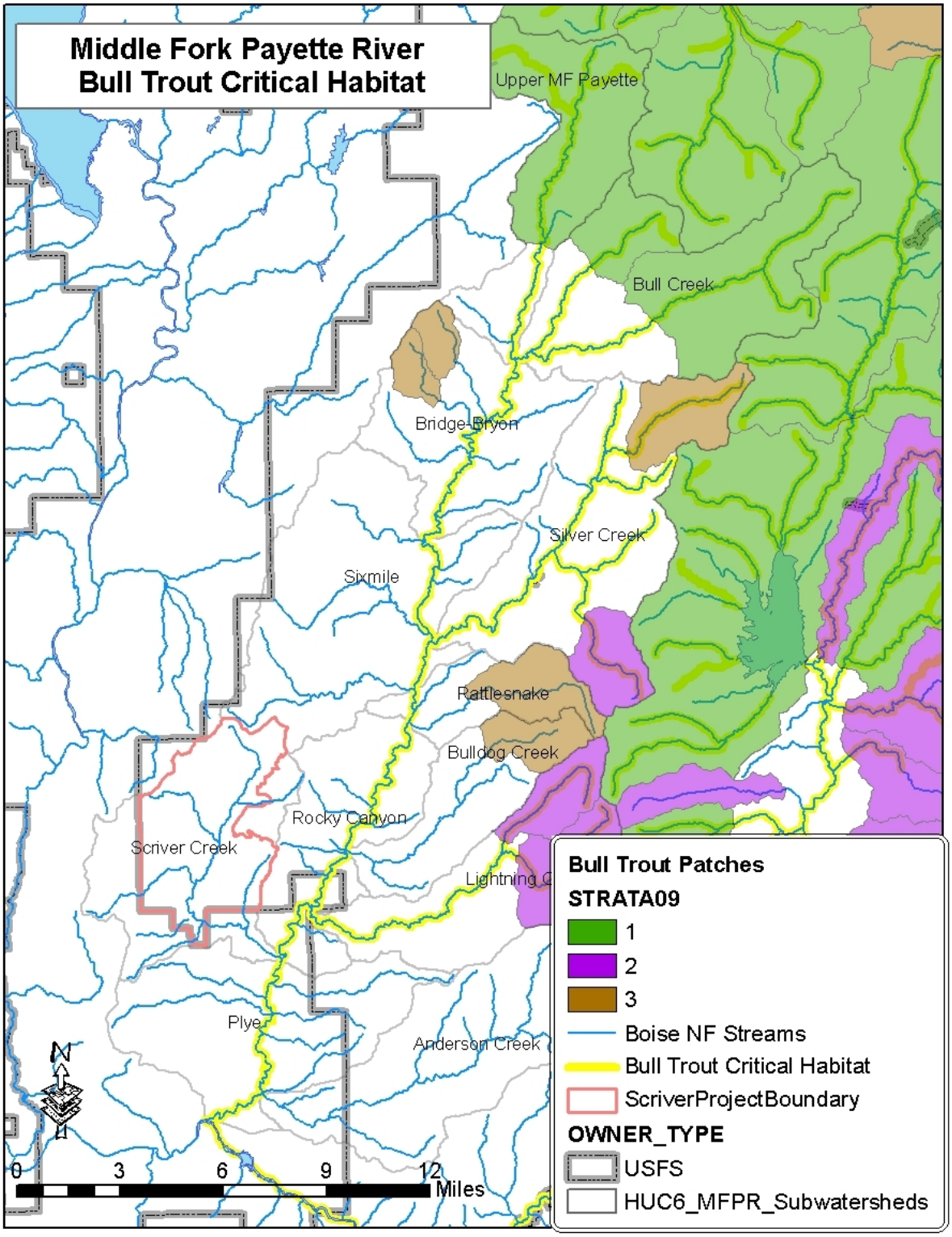


**Figure 3-50. Bull trout Designated Critical Habitat and Bull Trout Patches on the Boise National Forest (NF). Strata 1 is a Known 'Occupied' Patch, Strata 2 is 'Suitable, but Unoccupied', and Strata 3 is Modeled 'Unsuitable'**

### 3.7.2 Scale of Analysis

The fisheries resources assessment utilized the Scriver Creek subwatershed as the analysis area for depicting existing fisheries resource conditions and potential direct and indirect effects from implementing the Project. The Scriver Creek subwatershed is the relevant spatial scale at which effects indicators related to habitat access; habitat elements (LWD, pool frequency and quality, and large pools); and integration of species may be measured. The Project boundary lies completely within the Scriver Creek subwatershed (Hydrologic Unit 170501210401). The analysis area for direct and indirect effects to fisheries resource indicators from proposed activities is the Scriver Creek subwatershed given that this is the largest scale at which direct and indirect impacts from the proposed activities could be measured. The analysis area for cumulative effects to fisheries resources indicators is the Scriver Creek subwatershed given that this area would be the largest extent where fisheries resources would be impacted by proposed activities. Three temporal scales in which the fisheries resource will be assessed are the temporary (0–3 years); short term (3–15 years); and long term (>15 years).

### 3.7.3 Fisheries Resource Indicators

The indicators identified below were used to evaluate the measure of change between alternatives for fisheries resources in the analysis area.

#### *3.7.3.1* Indicator: Habitat Access

This Indicator was used to evaluate impacts of each alternative on habitat access within the analysis area. The following measure and analyses methodology was used for this indicator:

- Physical Barriers Watershed Condition Indicator (WCI)—Estimated increase in the amount of stream miles re-opened for fish movement as a result of the proposed actions. The change in number of road stream crossings will also be evaluated.

#### *3.7.3.2 Indicator: Habitat Elements*

This Indicator was used to evaluate impacts of each alternative on habitat elements within the analysis area. The following measures and analyses methodologies were used for this indicator:

- Large Woody Debris WCI—The amount of RCA acreage that may be affected with a change in LWD recruitment potential. Refer to Forest Large Woody Debris Analysis on the Project Scale_v1.3 (Forest Service 2006).
- Pool Frequency and Quality WCI—The estimates for changes in sediment delivery to streams and changes in LWD recruitment will be used to discuss the potential changes in aquatic habitat associated with pools and streams within the Scriver Creek subwatershed.
- Large Pools/Pool Quality WCI—The estimates for changes in sediment delivery to streams and changes in LWD recruitment will be used to discuss the potential changes in aquatic habitat associated with pools and streams within the Scriver Creek subwatershed.

#### *3.7.3.3 Indicator: Integration of Species and Habitat Conditions*

This Indicator will be used to describe the effects to the integration of the biophysical and aquatic habitat conditions within the Scriver Creek subwatershed. The following measure and analyses methodology was used for this indicator:

- The Integration of Species and Habitat Conditions WCI—While identified as both a Pathway and a WCI, this measure actually serves as an integration of the biophysical and aquatic habitat conditions that may be influenced by implementing the alternatives. Individual WCIs represent a starting point to describe the current and desired conditions for water quality and aquatic habitat. This Pathway/WCI synthesizes the information evaluated for all other indicators and their associated individual WCIs to determine the overall functional status and/or change in status for the analysis area. This Pathway/WCI provides a synthesis of the collective effects of an alternative as well as other past and present actions as they relate to fish habitat and overall water quality beneficial uses and associated aquatic resources. Therefore, this measure will serve as the main Indicator for both the direct and indirect effects and the cumulative effects analysis for the fisheries resources.

### 3.7.4 Habitat Access

#### *3.7.4.1 Affected Environment*

The desired condition for the Physical Barriers WCI is for all man-made barriers present in the watershed to allow upstream and downstream fish passage at all flows. Fragmented habitat leads to decreased gene flow and fitness within fish species present. The presence of migration barriers also prevents existing fish from migrating to more desirable locations as necessary for spawning and rearing. This measure is functioning at unacceptable risk (FUR). Based on the 2004 Forest culvert inventory survey (unpublished data available in the Project Record), three known and surveyed migration barrier culverts fragment approximately 9.5 miles of available aquatic habitat (Figure 3-51). The “Hydrology and Fisheries Technical Report” (Project Record) contains photographs of the barriers that have been proposed for AOP replacements. Two additional migration barriers, for a total of five, fragmenting an additional 3.0 miles of habitat, were identified during the Project data collection but have not been formally surveyed (Figure 3-51). A GIS exercise identified 58 route-perennial stream crossings (not including bridges). The majority of these are springs and small, perennial non-fish-bearing streams. Most, but not all, have been surveyed for fish passage. There are 4 surface water points of diversion (POD) accumulating to a maximum diversion rate of 7.46 cfs within the Scriver Creek subwatershed (unpublished data available in the Project Record). The FUR rating is largely due to the existing and known fish migration barriers and the potential amount of streamflow diverted (7.46 cfs) from the lower reach of Scriver Creek onto private land.

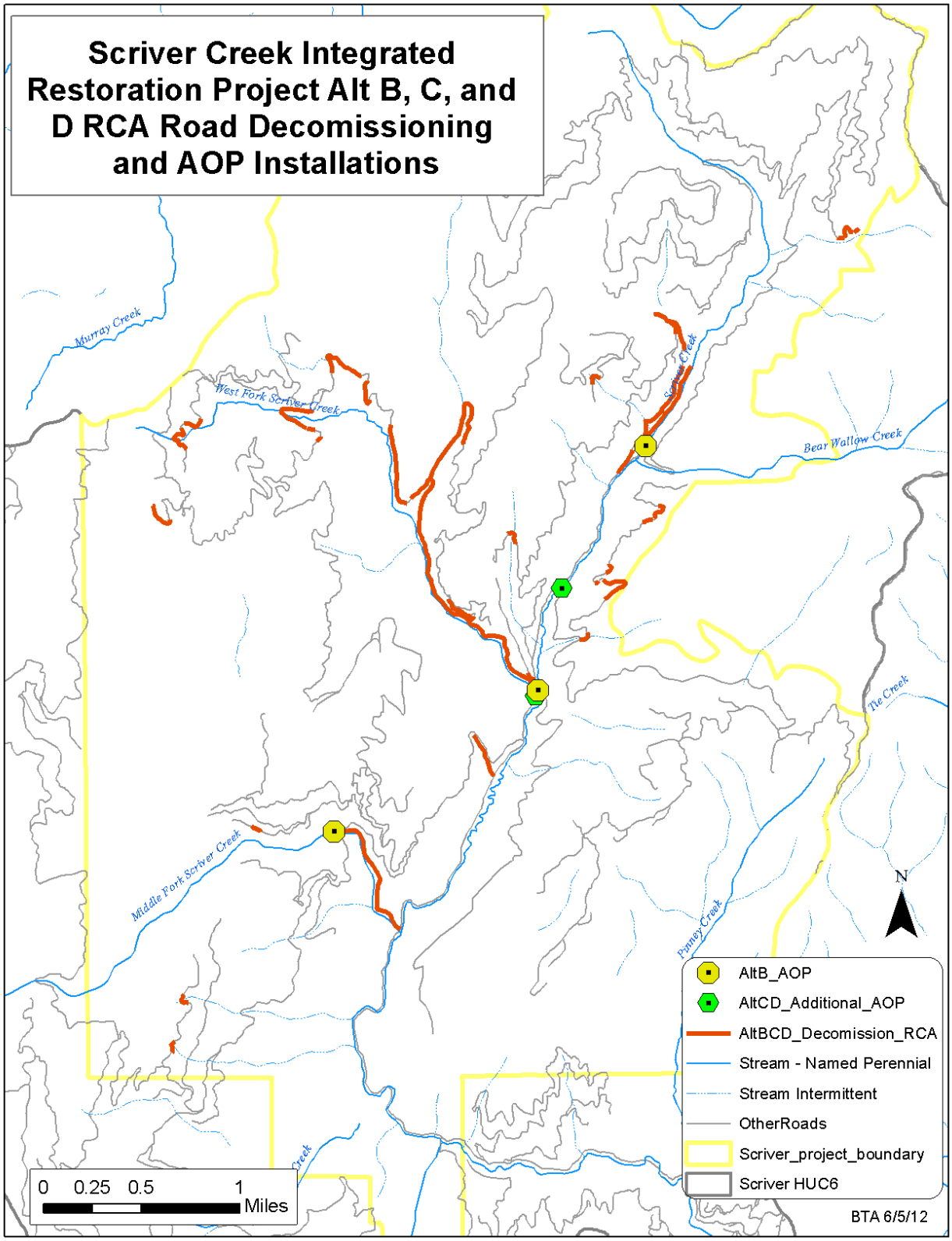


**Figure 3-51. Proposed Riparian Conservation Area (RCA) Road Decommissioning and Aquatic Organism Passage (AOP) for Alternatives B, C, and D**

### *3.7.4.2 Environmental Consequences of Alternative A—No Action*

#### 3.7.4.2.1 Direct and Indirect Effects

No change to the Physical Barriers WCI in any timeframe would occur under this alternative. Based on the 2004 Forest culvert inventory survey, there are three known and surveyed migration barrier culverts that fragment approximately 9.5 miles of available aquatic habitat. Two additional migration barriers were identified during the Project data collection but have not been formally surveyed. These barriers were determined to not allow fish passage at a range of flows, which makes this WCI FUR.

Alternative A (No Action) would have no direct or indirect effects to existing fish populations, as no migration barriers would be upgraded with AOPs under this alternative. Fish habitat would continue to be fragmented at the current level and subpopulations above migration barriers would continue to be isolated from lower populations, therefore decreasing gene flow. Barriers also reduce the diversity and abundance of accessible habitat and change community composition by reducing recolonization opportunities following events such as drought and floods. Instream barriers my also lead to increased risk of disease and predation by birds, other fish species, and anglers along with the genetic isolation mentioned above. The baseline condition of FUR would be maintained with implementation of Alternative A.

#### 3.7.4.2.2 Cumulative Effects

##### 3.7.4.2.2.1 Past Activities

Table B.1 in Appendix B identifies which past activities were considered for this cumulative effects analysis. The impacts of past activities have contributed to the existing conditions for water quality in the analysis area and, therefore, are included in the affected environment discussion in section 3.7.4.1.

##### 3.7.4.2.2.2 Present/Ongoing Activities

Table B.1 in Appendix B identifies which present/ongoing activities were considered for the cumulative effects analysis. Present and ongoing activities considered for cumulative effects (see Appendix B) are not expected to affect the Physical Barriers WCI in any timeframe. These activities are subject to conditions set forth by Forest Plan standards and guides (Forest Service 2010a) where occurring on NFS lands and by State of Idaho water quality standards (IDPA 58.01.02) that require BMPs on all lands. These requirements are expected to maintain current aquatic passage conditions within analysis area streams.

##### 3.7.4.2.2.3 Reasonably Foreseeable Activities

Table B.1 in Appendix B identifies which reasonably foreseeable activities were considered for the cumulative effects analysis. Reasonably foreseeable activities considered for cumulative effects (see Appendix B) are not expected to affect the Physical Barriers WCI in any timeframe. These activities are subject to conditions set forth by Forest Plan standards and guides (Forest Service 2010a) where occurring on NFS lands and by State of Idaho water quality standards (IDPA 58.01.02) that require BMPs on all lands. These requirements are expected to maintain current aquatic passage conditions within analysis area streams.

Present and ongoing and reasonably foreseeable activities are not expected to affect (either positively or negatively) the Physical Barriers WCI under this alternative, while the indirect effects associated with implementing Alternative A (No Action), would perpetuate the current condition of the Physical Barriers WCI, which is FUR. Under Alternative A, aquatic habitat would remain fragmented by road–stream crossings within the analysis area.

### *3.7.4.3 Environmental Consequences of Alternative B—Proposed Action*

#### 3.7.4.3.1 Direct and Indirect Effects

Under Alternative B, no temporary influence to the Physical Barriers WCI would occur since the barriers would likely be upgraded following harvest activities, and a measurable short- and long-term improvement would occur as described below. In the short term, three migration barriers are expected be replaced with AOP structures that would allow fish passage at all life stages to approximately 9.5 miles of stream habitat (Figure 3-51). Alternative B (Proposed Action) would reduce the number of existing perennial road–stream crossings from 58 to 49 within the Scriver Creek subwatershed through road decommissioning and realigning NFS road 696. Three new perennial road–stream crossings (located on smaller streams and determined not to affect fish migration) would occur from the new construction/road realignment. Fish habitat would be partially reconnected although subpopulations above other migration barriers would continue to be isolated from lower populations, therefore decreasing gene flow. The remaining barriers would continue to reduce the diversity and abundance of accessible habitat and change community composition by reducing recolonization opportunities following events such as drought and floods. The Physical Barriers WCI would be improved through road decommissioning activities and the installation of AOP road–stream crossings installations, resulting in a shift of this WCI from FUR to Functioning at Risk (FR).

#### 3.7.4.3.2 Cumulative Effects

##### 3.7.4.3.2.1 Past Activities

Table B.1 in Appendix B identifies which past activities were considered for this cumulative effects analysis. The impacts of past activities have contributed to the existing conditions for water quality in the analysis area and, therefore, are included in the affected environment discussion in section 3.7.4.1.

##### 3.7.4.3.2.2 Present/Ongoing Activities

Table B.1 in Appendix B identifies which present/ongoing activities were considered for the cumulative effects analysis. Present and ongoing activities considered for cumulative effects (see Appendix B) are not expected to affect the Physical Barriers WCI in any timeframe. These activities are subject to conditions set forth by Forest Plan standards and guides (Forest Service 2010a) where occurring on NFS lands and by State of Idaho water quality standards (IDPA 58.01.02) that require BMPs on all lands. These requirements are expected to maintain aquatic passage conditions within analysis area streams.

#### 3.7.4.3.2.3 Reasonably Foreseeable Activities

Table B.1 in Appendix B identifies which reasonably foreseeable activities were considered for the cumulative effects analysis. Reasonably foreseeable activities considered for cumulative effects (see Appendix B) are not expected to affect the Physical Barriers WCI in any timeframe. These activities are subject to conditions set forth by Forest Plan standards and guides (Forest Service 2010a), where occurring on NFS lands, and by State of Idaho water quality standards (IDPA 58.01.02) that require BMPs on all lands. These requirements are expected to maintain aquatic passage conditions within analysis area streams.

Present and ongoing and reasonably foreseeable activities are not expected to affect (either positively or negatively) the Physical Barriers WCI under Alternative B, while the direct and indirect effects associated with implementing Alternative B (Proposed Action), would likely improve the Physical Barriers WCI. This improvement is based on replacing three aquatic species migration barriers and is expected to shift this WCI from FUR to FR.

### *3.7.4.4 Environmental Consequences of Alternative C*

#### 3.7.4.4.1 Direct and Indirect Effects

Under Alternative C, no temporary influence to the Physical Barriers WCI would occur, and a measurable short- and long-term improvement would occur as described below. In the short term, five migration barriers are expected be replaced with AOP structures that would allow fish passage at all life stages to an additional 12.5 miles of stream habitat (Figure 3-51). Alternative C would reduce the number of existing perennial road–stream crossings from 58 to 49 within the Scriver Creek subwatershed through road decommissioning and realigning NFS road 696. Three new perennial road–stream crossings (located on smaller streams and determined not to affect fish migration) would result from the new construction/road realignment. Fish habitat would be reconnected throughout the subwatershed since no known migration barriers would exist following implementation of Alternative C. Subpopulations would no longer be isolated and gene flow would be increased. The diversity and abundance of accessible habitat and community composition by increasing recolonization opportunities following events such as drought and floods would be restored under this alternative. The Physical Barriers WCI would be improved through road decommissioning and the installation of five AOP road-stream crossings, resulting in a shift of this WCI from FUR to FR. Compared to Alternative B, the improvement of this WCI is greater under Alternative C because of the two additional AOP structures that would be installed.

#### 3.7.4.4.2 Cumulative Effects

##### 3.7.4.4.2.1 Past Activities

Table B.1 in Appendix B identifies which past activities were considered for this cumulative effects analysis. The impacts of past activities have contributed to the existing conditions for water quality in the analysis area and therefore are included in the affected environment discussion in section 3.7.4.1.

#### 3.7.4.4.2.2 Present/Ongoing Activities

Table B.1 in Appendix B identifies which present/ongoing activities were considered for the cumulative effects analysis. Present and ongoing activities considered for cumulative effects (see Appendix B) are not expected to affect the Physical Barriers WCI in any timeframe. These activities are subject to conditions set forth by Forest Plan standards and guides (Forest Service 2010a) where occurring on NFS lands and by State of Idaho water quality standards (IDPA 58.01.02) that require BMPs on all lands. These requirements are expected to maintain aquatic passage conditions within analysis area streams.

#### 3.7.4.4.2.3 Reasonably Foreseeable Activities

Table B.1 in Appendix B identifies which reasonably foreseeable activities were considered for the cumulative effects analysis. Reasonably foreseeable activities considered for cumulative effects (see Appendix B) are not expected to affect the Physical Barriers WCI in any timeframe. These activities are subject to conditions set forth by Forest Plan standards and guides (Forest Service 2010a) where occurring on NFS lands and by State of Idaho water quality standards (IDPA 58.01.02) that require BMPs on all lands. These requirements are expected to maintain aquatic passage conditions within analysis area streams.

Present and ongoing and reasonably foreseeable activities are not expected to affect (either positively or negatively) the Physical Barriers WCI under Alternative C, while the direct and indirect effects associated with implementing Alternative C would likely improve the Physical Barriers WCI. This improvement is based on replacing five aquatic species migration barriers and is expected to shift this WCI from FUR to FR. Alternative C would improve the Physical Barriers WCI to a greater extent than Alternative B (Proposed Action).

### *3.7.4.5 Environmental Consequences of Alternative D*

#### 3.7.4.5.1 Direct and Indirect Effects

Direct and indirect effects to the Physical Barriers WCI under Alternative D are identical to Alternative C.

#### 3.7.4.5.2 Cumulative Effects

Cumulative effects to the Physical Barriers WCI under Alternative D are identical to Alternative C.

## 3.7.5 Habitat Elements

### *3.7.5.1 Affected Environment*

The desired conditions for the Large Woody Debris WCI (LWD WCI) have been modified based on the following information. The LWD WCI default reference value has been modified in the Project area because the method of collecting LWD data in the Project area differed from the modified Region 1 / Region 4 inventory protocol and is not comparable to the criteria defined in the Appendix B of the Forest Plan (Forest Service 2010a). Data collected identified only LWD singles >4 inches in diameter and 10 feet long. The default criterion of 12 inches in diameter by 35 feet long was not distinguished in the surveys. The desired condition was modified from the default criteria using the Natural Conditions Database (Overton et al. 1995). The desired condition is adequate sources of LWD in both

the long- and short-term timeframe. The number of pieces of LWD >10 centimeters in diameter and longer than 3 meters per 100 meters of stream is given in Table 3-54 below.

**Table 3-54. Number of Large Woody Debris >10 Centimeters in Diameter and Longer than 3 Meters Required per 100 Meters of Stream**

| Wetted Width (meters) | Number of Large Woody Debris |
|---|---|
| **"A" Channels/Plutonic** | |
| 0–1.5 | 15 |
| 1.5–3 | 14 |
| 3–4.7 | 11 |
| **"B" channels/plutonic** | |
| 0–1.5 | 3 |
| 1.5–3 | 14 |
| 3–4.7 | 17 |
| 4.7–6 | 14 |
| 6–7.6 | 9 |
| 7.6–9.2 | 9 |
| **"C" channels/plutonic** | |
| 1.5–3 | 4 |
| 3–4.7 | 14 |
| 4.7–6 | 8 |
| 6–7.6 | 6 |
| 7.6–9.2 | 9 |

This Indicator is FR. The FR rating is based on 19 surveys conducted by the Forest and IDEQ that show LWD averages are below the desired condition: 13.8 pieces/100 meters in Rosgen C channel and 12.0 pieces/100 meters in Rosgen A channel types. The data ranged from 0 to 23 pieces per 100 meters. Additionally, approximately 37.8 miles of roads are within RCAs for a riparian road density of 5.4 mi/mi$^2$ in the Scriver Creek subwatershed. These roads may be inhibiting the natural recruitment of LWD to streams and also reflect the potential access by firewood cutters that may remove additional LWD. LWD is directly associated with high quality fish habitat, creating overhead cover and pools.

The desired condition for the Pool Frequency and Quality WCI is that pools have good cover and cool water and only a minor reduction in pool volume by fine sediment, LWD recruitment standards for functioning appropriately (FA) are met, and pool frequency in a reach closely approximates the values in Table 3-55.

**Table 3-55. Pool Frequency Criteria**

| Wetted Width (feet) | Number of Pools per mile |
|---|---|
| 0–5 | 39 |
| 5–10 | 60 |
| 10–15 | 48 |
| 15–20 | 39 |
| 20–30 | 23 |
| 30–35 | 18 |
| 35–40 | 10 |
| 40–65 | 9 |
| 65–100 | 4 |

This Indicator is FR. The FR rating is because the LWD WCI is currently FUR. The other criteria for the Pool Frequency and Quality WCI is currently being met based on the Forest Aquatic Survey Database that indicates an average of 76 pools/mile with a stream wetted width of 13 feet was detected during 16 surveys. Data ranged from 0 to 241 pools/mile.

The desired condition for the Large Pools/Pool Quality WCI is each reach has many large pools >1 meter (3.28 feet) deep, and pools have good cover and cool water and only a minor reduction in pool volume by fine sediment. This Indicator is FUR. The FUR rating is based on 0 large pools/mile detected during 8 surveys. Large pools are associated with overwintering for adult and juvenile fish, as well as thermal refugia during higher temperatures during low flows.

### *3.7.5.2 Environmental Consequences of Alternative A—No Action*

#### 3.7.5.2.1 Direct and Indirect Effects

Alternative A (No Action) would perpetuate the existing condition with regard to the LWD WCI (currently FR), Pool Frequency and Quality WCI (currently FR), and the Large Pools/Pool Quality WCI (currently FUR). Under Alternative A, the LWD WCI would be maintained at FR with no future trend. Higher amounts of LWD are generally associated with higher quality fish habitat for overhead cover and pool formative features.

Under Alternative A, instream fine sediment levels would continue to be elevated by approximately 23 percent over natural levels due to continued road surface erosion and sediment delivery (see “Hydrology Resources” section 3.6) and over time, would have immeasurable negative effects to the Pool Frequency and Quality and Large Pools/Pool Quality WCIs.

#### 3.7.5.2.2 Cumulative Effects

##### 3.7.5.2.2.1 Past Activities

Table B.1 in Appendix B identifies which past activities were considered for this cumulative effects analysis. The impacts of past activities have contributed to the existing conditions for water quality in the analysis area and, therefore, are included in the affected environment discussion in section 3.7.5.1.

#### 3.7.5.2.2.2 Present/Ongoing Activities

Table B.1 in Appendix B identifies which present/ongoing activities were considered for the cumulative effects analysis. Present and ongoing activities considered for cumulative effects (see Appendix B) are not expected to affect the Large Woody Debris WCI, Pool Frequency and Quality WCI, or the Large Pools/Pool Quality WCI in any timeframe. These activities are subject to conditions set forth by Forest Plan standards and guides (Forest Plan 2010a) where occurring on NFS lands and by State of Idaho water quality standards (IDPA 58.01.02) that require BMPs on all lands. These requirements are expected to maintain LWD, and pool frequency and quality, and large pools/pool quality conditions within analysis area streams.

#### 3.7.5.2.2.3 Reasonably Foreseeable Activities

Table B.1 in Appendix B identifies which reasonably foreseeable activities were considered for the cumulative effects analysis. Reasonably foreseeable activities considered for cumulative effects (see Appendix B) are not expected to affect the LWD WCI, Pool Frequency and Quality WCI, or the Large Pools/Pool Quality WCI in any timeframe. These activities are subject to conditions set forth by Forest Plan standards and guides (Forest Service 2010a) where occurring on NFS lands and by State of Idaho water quality standards (IDPA 58.01.02) that require BMPs on all lands. These requirements are expected to maintain LWD, and pool frequency and quality, and large pools/pool quality conditions within analysis area streams.

Present and ongoing and reasonably foreseeable activities are not expected to affect (either positively or negatively) the Large Woody Debris WCI, Pool Frequency and Quality WCI, and the Large Pools/Pool Quality WCI under this alternative, while the indirect effects associated with implementing Alternative A would perpetuate the current condition of the Large Woody Debris WCI (currently FR), Pool Frequency and Quality WCI (currently FR), and the Large Pools/Pool Quality WCI (currently FUR). Under Alternative A, aquatic habitat elements would continue to be impacted by road sediment delivery and 37.8 miles of RCA roads the analysis area.

### *3.7.5.3 Environmental Consequences of Alternative B—Proposed Action*

#### 3.7.5.3.1 Direct and Indirect Effects

Under Alternative B (Proposed Action) no temporary influence to the LWD WCI would occur, and a measureable short- and long-term improvement would occur as described below. The improvement in the Large Woody Debris WCI would be from RCA road decommissioning activities in the analysis area. RCA road miles would be reduced by 6.6 miles or about 17 percent in the subwatershed (Figure 3-51). This reduction in RCA roads would allow for additional shrub and tree growth that would provide additional shade. Road decommissioning would eliminate the removal of fallen trees from these roads and limit the amount of fuelwood cutting that prevents the recruitment of LWD. Overtime, the revegetation of these decommissioned roads with sedges, grasses, shrubs and trees would provide additional LWD recruitment. Belt et al. (1992) found that 85 percent of LWD recruitment is contributed from those trees within one site-potential tree height of the stream. Project design features prohibit harvest activities within RCAs. Noncommercial thinning of plantations within the RCAs would enhance future LWD recruitment. The low-to-moderate

fire intensity/severity mosaic burn in conjunction with avoiding fire ignition within RCAs, would result in little large tree mortality and likely have no measureable effect on LWD.

Under Alternative B, there may be an immeasurable temporary negative effect to the Pool Frequency and Quality WCI and the Large Pools/Pool Quality WCI from the increase in fine sediment. The Pool Frequency and Quality and the Large Pools and Pool Quality WCIs are expected to be improved in the short and long term through reductions in sediment resulting from road decommissioning activities and aggregate placement. Additionally, the anticipated increase in LWD over time would benefit both the Pool Frequency and Quality WCI and the Large Pools/Pool Quality WCI. Higher amounts of LWD are generally associated with higher quality fish habitat for overhead cover and pool formative features.

#### 3.7.5.3.2 Cumulative Effects

##### 3.7.5.3.2.1 Past Activities

Table B.1 in Appendix B identifies which past activities were considered for this cumulative effects analysis. The impacts of past activities have contributed to the existing conditions for water quality in the analysis area and therefore are included in the affected environment discussion in section 3.7.5.1.

##### 3.7.5.3.2.2 Present/Ongoing Activities

Table B.1 in Appendix B identifies which present/ongoing activities were considered for the cumulative effects analysis. Present and ongoing activities considered for cumulative effects (see Appendix B) are not expected to affect the LWD WCI, Pool Frequency and Quality WCI, or the Large Pools/Pool Quality WCI in any timeframe. These activities are subject to conditions set forth by Forest Plan standards and guides (Forest Service 2010a) where occurring on NFS lands and by State of Idaho water quality standards (IDPA 58.01.02) that require BMPs on all lands. These requirements are expected to maintain LWD, and pool frequency and quality, and large pools/pool quality conditions within analysis area streams.

##### 3.7.5.3.2.3 Reasonably Foreseeable Activities

Table B.1 in Appendix B identifies which reasonably foreseeable activities were considered for the cumulative effects analysis. Reasonably foreseeable activities considered for cumulative effects (see Appendix B) are not expected to affect the LWD WCI, Pool Frequency and Quality WCI, or the Large Pools/Pool Quality WCI in any timeframe. These activities are subject to conditions set forth by Forest Plan standards and guides (Forest Service 2010a) where occurring on NFS lands and by State of Idaho water quality standards (IDPA 58.01.02) that require BMPs on all lands. These requirements are expected to maintain LWD, and pool frequency and quality, and large pools/pool quality conditions within analysis area streams.

Present and ongoing and reasonably foreseeable activities are not expected to affect (either positively or negatively) the LWD WCI, Pool Frequency and Quality WCI, or the Large Pools/Pool Quality WCI under this alternative, while the direct and indirect effects associated with implementing Alternative B would be expected to provide measurable short- and long-term improvements to the Large Woody Debris WCI, Pool Frequency and Quality WCI, or the Large Pools/Pool Quality WCI for reasons discussed above. While these improvements

would not shift functionality class for these WCIs, implementing Alternative B would improve the condition of these WCIs within the current functionality rating.

### *3.7.5.4 Environmental Consequences of Alternative C*

#### 3.7.5.4.1 Direct and Indirect Effects

Similar to the effects disclosed under Alternative B, implementing Alternative C is not expected to temporarily influence to the LWD WCI and a measureable short- and long-term improvement is expected to occur. Higher amounts of LWD are generally associated with higher quality fish habitat for overhead cover and pool formative features.

A temporary immeasurable negative effect to the Pool Frequency and Quality WCI and Large Pools/Pool Quality WCI from the increase in fine sediment is expected and a short- and long-term measureable improvement to these WCIs is expected through overall reductions in sediment resulting from road decommissioning activities and aggregate placement. The benefits to the LWD WCI are the same under Alternative C as they were under Alternative B, while the benefits to both the Pool Frequency and Quality WCI and the Large Pools/Pool Quality WCI are expected to be greater under Alternative C than under Alternative B due to further reductions in fine sediment under Alternative C.

#### 3.7.5.4.2 Cumulative Effects

##### 3.7.5.4.2.1 Past Activities

Table B.1 in Appendix B identifies which past activities were considered for this cumulative effects analysis. The impacts of past activities have contributed to the existing conditions for water quality in the analysis area and therefore are included in the affected environment discussion in section 3.7.5.1.

##### 3.7.5.4.2.2 Present/Ongoing Activities

Table B.1 in Appendix B identifies which present/ongoing activities were considered for the cumulative effects analysis. Present and ongoing activities considered for cumulative effects (see Appendix B) are not expected to affect the Large Woody Debris WCI, Pool Frequency and Quality WCI, or the Large Pools/Pool Quality WCI in any timeframe. These activities are subject to conditions set forth by Forest Plan standards and guides (Forest Service 2010a) where occurring on NFS lands and by State of Idaho water quality standards (IDPA 58.01.02) that require BMPs on all lands. These requirements are expected to maintain LWD, and pool frequency and quality, and large pools/pool quality conditions within analysis area streams.

##### 3.7.5.4.2.3 Reasonably Foreseeable Activities

Table B.1 in Appendix B identifies which reasonably foreseeable activities were considered for the cumulative effects analysis. Reasonably foreseeable activities considered for cumulative effects (see Appendix B) are not expected to affect the Large Woody Debris WCI, Pool Frequency and Quality WCI, or the Large Pools/Pool Quality WCI in any timeframe. These activities are subject to conditions set forth by Forest Plan standards and guides (Forest Service 2010a) where occurring on NFS lands and by State of Idaho water quality standards (IDPA 58.01.02) that require BMPs on all lands. These requirements are

expected to maintain LWD, and pool frequency and quality, and large pools/pool quality conditions within analysis area streams.

Present and ongoing and reasonably foreseeable activities are not expected to affect (either positively or negatively) the LWD WCI, Pool Frequency and Quality WCI, or the Large Pools/Pool Quality WCI under this alternative, while the direct and indirect effects associated with implementing Alternative C would be expected to provide short- and long-term measurable improvements to the LWD WCI, Pool Frequency and Quality WCI, or the Large Pools/Pool Quality WCI for reasons discussed above. While these improvements would not shift functionality class for these WCIs, implementing Alternative C would improve the condition of these WCIs within the current functionality rating.

#### *3.7.5.5 Environmental Consequences of Alternative D*

##### 3.7.5.5.1 Direct and Indirect Effects

Direct and indirect effects resulting from implementing Alternative D would be the same as under Alternative C.

##### 3.7.5.5.2 Cumulative Effects

Cumulative effects resulting from implementing Alternative D would be the same as under Alternative C.

### 3.7.6 Integration of Species and Habitat Conditions

#### *3.7.6.1 Affected Environment*

The desired condition for the Integration of Species and Habitat Conditions WCI is high habitat quality and connectivity between local populations, disturbance has not altered channel equilibrium, fine sediments and other habitat characteristics influencing survival and growth are consistent with pristine habitat, and the local population has the resilience to recover from short-term disturbance within 1–2 generations (5–10 years).

The Integration of Species and Habitat Conditions WCI is FUR. The FUR rating is based on approximately 37.8 miles of roads within RCAs, for an RCA road density of 5.4 mi/mi$^2$ in the Scriver Creek subwatershed. High RCA road density has likely degraded some RCA functions in the subwatershed.

Sediment/Turbidity (other fishes), LWD, Pool Frequency and Quality, and Change in Peak/Base Flows WCIs are all FR (See Hydrology Resources section 3.6 for discussion of Sediment/Turbidity (other fishes) WCI and Change in Peak/Base Flows WCI). The FR rating is based in the following:

- Surface fine sediment values (2–57 percent surface fines <6mm) reflect high sediment levels in the Scriver Creek subwatershed.
- LWD counts range from 5.7 pieces/100 m to 23/100 m in Rosgen C channel types.
- Change in peak/base flows is affected by 4 surface water PODs, accumulating to a maximum diversion rate of 7.46 cfs onto private land in the lower reaches of Scriver Creek.

- Equivalent clearcut area is estimated to be at 7 percent (WCC database included in the Project Record).

Large Pools/Pool Quality, Physical Barriers, Changes in Drainage Network, Road Density and Location in the RCAs WCIs are all FUR (See Hydrology Resources section 3.6 for discussion of Changes in Drainage Network, Road Density and Location in the RCAs WCIs). This rating is based on the following:

- No large pools and 5 fish migration barriers are present within the analysis area.
- RCA road density is 5.4 miles/mile$^2$, which contributes to a 270 percent increase in drainage network.
- Brook trout are strongly present and represent a continued threat to the local redband/rainbow populations from competition for food and habitat.

### *3.7.6.2 Environmental Consequences of Alternative A—No Action*

#### 3.7.6.2.1 Direct and Indirect Effects

Alternative A (No Action) would likely cause a general indirect negative trend to fish habitat and fish populations in the analysis area. This alternative does not propose any new management activities in the analysis area although natural processes, including tree growth, and ongoing management activities, such as recreation, livestock grazing, public firewood gathering, fire suppression (as needed), road and trail use, and routine road and trail maintenance, are expected to continue.

Alternative A would likely continue to have immeasurable negative impacts in the following WCIs: Sediment/Turbidity (other fishes), Pool Frequency and Quality, Large Pools/Pool Quality, Change in Peak/Base Flows, Disturbance History, RCAs, Disturbance Regime, and Integration of Pathways and Habitat Conditions (other fishes). Under Alternative A, sediment delivery levels would continue to be elevated by approximately 23 percent over natural levels due to continued road-related fine sediment delivery and over time, would negatively impact Pool Frequency and Quality, RCAs, as well as Large Pools/Pool Quality WCIs. Elevated sediment levels are known to degrade fish habitat and fill in pools and can fill in interstitial spaces in gravels, thus suffocating egg masses following spawning. Change in Peak/Base Flows and Disturbance Regime WCIs are expected to have an immeasurable negative trend under Alternative A from the increasing stand densities and vegetation growth that would result in a higher potential for increased fire severity and fire size over time (see Hydrology Resources, Watershed Condition, section 3.6.17). Increased stand densities may also likely result in lower summertime base flows from increased evapotranspiration and winter sublimation. Lower flows result in increased stream temperatures, increased width-to-depth ratios, and poor oxygenation, all of which have negatively impact fisheries resources. Increased fire severity and fire size may result in higher ECAs that would ultimately increase peak flows and decrease base flows in the subwatershed. The Physical Barriers WCI would be maintained at the FUR condition, fragmenting approximately 12.5 miles of fish habitat. Fragmented habitat leads to decreased gene flow and fitness within fish species present. The presence of migration barriers also prevents existing fish from migrating to more desirable locations as necessary for spawning and rearing. The Integration of Species and Habitat Condition WCI is a synthesis of effects associated with all pathways and WCIs to determine

the functional status of the Scriver Creek subwatershed, thus, would likely result in an immeasurable negative trend to fish habitat and fish populations.

#### 3.7.6.2.2 Cumulative Effects

##### 3.7.6.2.2.1 Past Activities

Table B.1 in Appendix B identifies which past activities were considered for this cumulative effects analysis. The impacts of past activities have contributed to the existing conditions for water quality in the analysis area and, therefore, are included in the affected environment discussion in section 3.7.6.1.

##### 3.7.6.2.2.2 Present/Ongoing Activities

Table B.1 in Appendix B identifies which present/ongoing activities were considered for the cumulative effects analysis. Present and ongoing activities considered for cumulative effects (see Appendix B) are not expected to affect the Integration of Species and Habitat Conditions WCI in any timeframe. These activities are subject to conditions set forth by Forest Plan standards and guides (Forest Service 2010a) where occurring on NFS lands and by State of Idaho water quality standards (IDPA 58.01.02) that require BMPs on all lands. These requirements are expected to maintain aquatic species habitat conditions within analysis area streams.

##### 3.7.6.2.2.3 Reasonably Foreseeable Activities

Table B.1 in Appendix B identifies which reasonably foreseeable activities were considered for the cumulative effects analysis. Reasonably foreseeable activities considered for cumulative effects (see Appendix B) are not expected to affect the Integration of Species and Habitat Conditions WCI in any timeframe. These activities are subject to conditions set forth by Forest Plan standards and guides (Forest Service 2010a) where occurring on NFS lands and by State of Idaho water quality standards (IDPA 58.01.02) that require BMPs on all lands. These requirements are expected to maintain aquatic species habitat conditions within analysis area streams.

Present and ongoing and reasonably foreseeable activities are not expected to affect (either positively or negatively) the Integration of Species and Habitat Conditions WCI under this alternative, while the indirect effects associated with implementing Alternative A would result perpetuate the current condition of the Integration of Species and Habitat Conditions WCI (currently FUR with an immeasurable negative future trend). Under this alternative, aquatic species habitat would continue to be impacted by degraded conditions described in the “Affected Environment” section.

### *3.7.6.3 Environmental Consequences of Alternative B—Proposed Action*

#### 3.7.6.3.1 Direct and Indirect Effects

A temporary immeasurable negative trend in the Integration of Species and Habitat Conditions WCI would occur and a short- and long-term measurable improvement would occur. The current functionality rating is FUR. Under Alternative B, the functionality rating is maintained at FUR but with a measureable positive future trend and an incremental move closer to the FR category.

Several activities play a role in the change associated with the Integration of Species and Habitat Conditions WCI for the Scriver Creek subwatershed. The current habitat quality within the Scriver Creek subwatershed is represented by a mixture of functionality calls (from FA to FUR) for the individual WCIs. The stream temperature for redband and rainbow trout is currently functioning appropriately. A reduction of 6.6 miles of RCA road and noncommercial thinning of 163 acres of conifer plantations would not temporarily influence stream temperature but would have a short- and long-term immeasurable improvement on stream temperature. These effects are in compliance with the guidance for the Scriver Creek subwatershed in the Middle Fork Payette River Temperature TMDL. The goals of this TMDL are to reduce solar loading to Scriver Creek with the intent of improving stream temperature. Noncommercial thinning in the RCAs would reduce competition for nutrients and sunlight, therefore leading to a denser canopy in the long term and reducing solar input to streams.

Several activities under Alternative B play a role in the overall improvement in sediment loading within the Scriver Creek subwatershed. The results of sediment modeling (see Hydrology Resources, section 3.6.3) display a temporary measurable increase in fine sediment due mainly to new road construction and road realignment. No sediment was estimated to be delivered from the temporary road construction during any timeframe. The short- and long-term measureable reduction in sediment is associated with road decommissioning and placement of road surface aggregate with an emphasis for sediment reduction. Road surfacing reduces the amount of fine particles that erode from the road surface and also prevents wheel ruts from routing water down the road surface or into streams (Foltz and Truebe 1994). As mentioned above, elevated sediment levels are known to degrade fish habitat and fill in pools and can fill in interstitial spaces in gravels, thus suffocating egg masses following spawning.

Following the harvest, a reduction of 6.6 miles of RCA roads would occur, which is a reduction of 17 percent of the RCA road miles. The estimated sediment reduction associated with road decommissioning (based on the Scriver GRAIP data), is approximately 137 tons/year. The BOISED model estimates an overall future sediment reduction of approximately 90 tons/year. None of the proposed or existing helicopter landings are located within RCAs and therefore would not affect sediment delivery to streams. These sediment estimates are based on implementing all the Project design features. Proper application of incorporated design features would be expected to decrease the likelihood of sediment delivery to streams in quantities sufficient to impact water quality. Temporarily, Alternative B would not contribute additional sediment in amounts that would prevent or retard the attainment or maintenance of instream objectives. There also would not be a measurable negative effect to the identified water quality beneficial uses. In the short and long term, Alternative B would be expected to improve water quality beneficial uses and associated aquatic habitat, therefore benefitting fish species. The amount of sediment that would enter the stream as a result of replacing stream crossings that are barriers to fish movement is determined to be immeasurable. Monitoring of culvert removals and replacing with AOP structures has shown only very small increases in turbidity and sediment that lasts only a few days (Foltz et al. 2008; Foltz et al. 2007; Yenko 2007). Figure 3-51 displays the locations of the road decommissioning and the AOP culverts.

The LWD WCI is FR due to historic timber harvest and the large amounts of roads located within the RCAs within the subwatershed. No temporary influence in the LWD WCI and a measureable short- and long-term improvement would occur. The RCA road decommissioning would likely not occur for 3 years or until after the harvest. In the short term, a reduction of 6.6 miles of RCA roads would occur, which is a reduction of 17 percent of the RCA road miles. This reduction in RCA roads would allow for additional growth of shrubs and trees that provide additional shade. The road decommissioning would eliminate the removal of fallen trees from these roads and limit the amount of firewood cutting that removes the recruitment of LWD. Over time, revegetation of these decommissioned roads with sedges, grasses, shrubs, and trees would provide additional LWD recruitment.

The WCI for Pool Frequency and Quality is currently FR and the WCI for the Large Pools/Pool Quality (deeper pools) is FUR. Stream surveys within Scriver Creek subwatershed did not identify any deep pools. Management-induced sediment may be the primary cause for pool filling and thus the lack of large pools. Large amounts of sediment can fill pools and reduce the number and depth of pools in an area (Quigley and Arbelbide 1997). The number of large deep pools may be partially affected by the current level of LWD, which is below the desired conditions. Quality pool habitat is important to fish populations for thermal refuge, cover, feeding, and spawning at the tailouts.

Under Alternative B, reducing road-induced sediment being routed to the streams and increasing LWD is expected to result in more pools and regulate the amount of sediment being routed through the stream system, which would likely allow for deeper pools (Keim et al. 2002). Refer to section 3.6.3 pertaining to the Water Quality and the LWD WCI for additional information regarding both sediment reduction and increase in LWD. Due to the measureable reduction in sedimentation and the short- and long-term measureable improvement in LWD, there should be a corresponding short- and long-term improvement in the Pool Frequency and Quality WCI and the Large Pools/Pool Quality WCI, which would benefit fish populations.

The Average Stream Wetted Width/Maximum Depth WCI is FR and the Streambank Condition WCI is FA. Implementing Alternative B would reduce overall fine sediment delivery, reduce RCA roads by 6.6 miles, and install 3 AOP road–stream crossing structures. These activities would not temporarily influence these two WCIs but would have a short- and long-term immeasurable improvement on these two WCIs.

No temporary influence to either the Width/Maximum Depth Ratio WCI or the Streambank Condition WCI would occur likely because the AOP culvert replacements are not planned until after the harvest. In the short term, the measurable improvement is first affected by replacing fish barrier culverts with AOPs. The AOPs are designed to allow for streamflow simulation and to accommodate a 100-year flood frequency. The width-to-depth ratio and streambank condition at these AOP culvert replacement locations should improve. Temporarily, there would be an increase in fine sediment delivery to the Scriver Creek subwatershed associated with the new road construction and road realignment. Due to the short duration of use on these temporary roads and minimal relative sediment delivery expected from them, no temporary measureable decrease in stream width-to-depth ratio would be expected. In the short and long term, there is a measureable improvement in the fine sediment delivery to Scriver Creek, which is estimated to result in an immeasurable improvement in the stream width-to-depth ratio. Naiman et al. (1992) identifies that sediment

accumulation in the stream channel reduces stream depth. To maintain the same channel capacity, there usually is a corresponding increase in stream width. Thus, a decrease in the amount of sediment delivery should result in an improved stream width-to-depth ratio. Increased stream width and decreased depth allows more solar radiation input, which increases stream temperature and is therefore less desirable to cold-water fish species, such as redband and rainbow trout.

Alternative B would have a very slight temporary increase in ECA. In the short and long term, a small decrease in ECA (which is currently estimated at 7 percent) occurs from road decommissioning with a net reduction in both road density and RCA road density. This reduction in ECA and road density would result in a short- and long-term immeasurable improvement in the stream Width-to-Depth Ratio WCI. Vegetation treatments are aimed at restoring desired vegetation conditions and are not expected to influence ECA.

Noncommercial thinning of plantations within the RCAs may enhance future LWD recruitment in the long term, which would benefit stream width-to-depth ratios.

Design features prohibit harvest activities within RCAs, so harvest activities would not affect streambank stability. Noncommercial thinning on 163 acres within RCAs restricts thinning closer than 15 feet from the edge of the streams high-water line. The thinning occurs in small plantations in the Project area, varying in age from approximately 13 to 40 years old. These stands have an average size ranging from 2 to 9 inches d.b.h. and an average height of 10 to 25 feet. Based on this tree size, the estimated area influenced by these tree roots is approximately a 5- to 8-foot diameter area. About 25 to 30 percent of the non-merchantable trees would be removed. Thinning provides the trees that are retained onsite (leave trees) with increased access to water, sunlight, and nutrients. These increases are achieved by removing trees of lesser quality that are competing for these resources with more desirable trees. Thinning results in accelerated diameter growth of the leave trees, which, over time, results in the production of larger trees compared to an unthinned stand. Additionally, thinning improves the overall phenotypic characteristics (i.e., how the tree looks) of the stand because the best trees, in terms of size, form, and vigor, are selected as leave trees. Poorly formed, slow-growing, suppressed, or damaged trees are removed. Attaining larger trees more quickly in RCAs provides improved shade and more trees available to become CWD and LWD in the long term. The long-term increase in tree size should provide an immeasurable benefit to the stream bank stability. Instream LWD is beneficial to fish species by providing overhead cover as well as being pool formative features.

Width-to-depth ratio and streambank condition is also related to the Change in Peak/Base Flow and Change in Drainage Network WCIs. Increases in peak flows and increases in drainage network could erode streambanks and increase the width of a stream. However, since both Peak Flows and Increase in Drainage Network WCIs would be would immeasurably improve over the short and long term under Alternative B, there should be a slight short- and long-term immeasurable benefit in the condition of the stream Width-To-Depth Ratio and Streambank Condition WCIs.

The RCAs WCI is FUR mainly because of the many miles of roads (37.8 miles) within the RCAs and 5 culverts that are barriers to fish migration and are affecting approximately 12.5.5 miles of aquatic habitat. A temporary, immeasurable negative trend in the RCAs WCI would be associated with the construction of additional new roads and realignment. A short-

and long-term measurable improvement of the RCA WCI would occur from the reduction of 6.6 miles of RCA roads and the installation of 3 AOP structures that would open up approximately 9.5 miles of habitat. Reconnecting fish habitat would increase gene flow and fitness within fish species present. Additionally, fish would be able to migrate to more suitable habitat to avoid thermal stress and reach higher quality spawning and rearing areas.

Several activities play a role in the change in the RCAs (including wetlands and floodplains) WCI within the Scriver Creek subwatershed. The effects discussed in the Road Density Location WCI have the same direct effects on the RCAs WCI. The effects discussed in the section 3.6.3 (Water Quality section of Hydrology Resources section) (stream temperature and sedimentation) have the same direct effects on the RCAs WCI. The effects discussed in the Habitat Access Indicator have the same direct effects on the riparian conservation areas WCI. The effects discussed in the Habitat Elements Indicator have the same direct effects on the RCAs WCI. The effects discussed in the Channel Conditions and Dynamics Indicator of the Hydrology Resources have the same direct effects on the RCAs WCI. The effects discussed in the Streamflow/Hydrology Indicator of the Hydrology Resources section have the same direct effects on the RCAs WCI. In addition, the effects discussed in the Watershed Conditions section of the Hydrology Resources section, including the Disturbance History WCI and Disturbance Regime WCI have an indirect relationship with the effects on the RCAs WCI.

Alternative B would not be expected to negatively change the functions or values of wetlands and floodplains as they relate to the protection of human health, safety, and welfare; prevent the loss of property values; and maintain natural systems. Forest managers would obtain applicable permits and conduct required consultation with the appropriate agencies before activities within wetlands or floodplains are undertaken as required by federal and State regulations.

Closing and rehabilitating approximately 6.6 miles of roads within RCAs would begin restoring these sites and restoring ecological functions and processes to riparian areas where these roads occur within RCAs. These activities would result in both short- and long-term beneficial effects to the wetlands and floodplains.

The Habitat Access WCI is currently FUR, primarily from the habitat access that is blocked by culverts that are barriers to fish. Three physical barriers are to be replaced with AOP structures and would reconnect approximately 9.5 miles of fish habitat within the Scriver Creek subwatershed, although there would still be 2 known migration barriers present.

A substantial amount of anthropogenic disturbance has occurred within the Scriver Creek subwatershed. Currently, the Change in Drainage Network WCI and the Road Density and Location WCI are both rated as FUR, primarily because of the very high road miles within the subwatershed and the amount of roads located within the RCAs, as previously identified. As a result of implementing Alternative B there would be a temporary immeasurable negative trend in these two WCIs and a short- and long-term measurable improvement.

The three WCIs (Change in Peak/Base Flows, Disturbance Regime, and Disturbance History) are rated as FUR. These three WCIs are all directly or indirectly affected by the previously identified high density of roads. Another related risk they share is the altered vegetative characteristics resulting from fire exclusion.

The current ECA of approximately 7 percent is low compared to the desired condition of having an ECA of <15 percent. The concern is that fire exclusion has caused an uncharacteristic vegetation condition that could lead to an uncharacteristically large and intense/severe wildfire. Within the Project area, increased stand densities and ladder fuels increase the potential for stand-replacing fires, which would burn at a higher intensity and severity over a larger area for longer periods of time. The multi-layered canopies now existing in some of the analysis area provides the greatest potential for these high intensity and severity fires to spread into the crowns and continue throughout the stand due to the abundance of ladder fuels. High intensity and severe fires can result in loss of canopy and increased sediment delivery, which can negatively impact fish species present.

Without treatment, the natural tree growth and mortality would continue to add fuels to the analysis area. Dense understory would provide ladder fuels that may move fire from the ground to the canopy. The probability of stand-replacing wildfire would increase as succession continues. Under Alternative B, timber harvest, hazardous fuels treatments, and activity fuels abatement would reduce the risk of stand-replacing wildfire within the analysis area. Where treatments are planned, understory stocking levels would be reduced, in turn reducing ladder fuels and limiting fire's spread to tree crowns. Within PVG 2, burning would continue in approximately 10–15 years after the first entry. This second entry would be of a restorative nature that would emulate historical fire effects. Future maintenance burning on a 5- 10-year interval would be planned for this Project area to retain the desired conditions created during the initial mechanical activities and subsequent prescribed fire treatments. These desired conditions are conducive to maintaining and restoring the potential vegetation and fire regime processes within PVG 2. For a more thorough discussion refer to the Fire and Fuels specialist report located in the Project Record.

The road decommissioning, vegetation management, and prescribed fire underburning activities implemented under Alternative B would result in a short- and long-term immeasurable improvement for Change in Peak/Base Flows, Disturbance Regime, and Disturbance History WCIs.

#### 3.7.6.3.2 Summary of Direct and Indirect Effects Associated with the Integration of Species and Habitat Conditions

As previously identified, the Integration of Species and Habitat Condition Pathway/WCI serves as an integration of the biophysical and aquatic habitat conditions that may be influenced by implementing Alternative B. Based on the synthesis of the information evaluated for all other individual WCIs as they relate to water quality beneficial uses and associated aquatic resources, the findings are described below.

While implementing Alternative B would maintain the FUR status for the Integration of Species and Habitat Conditions WCI, this alternative would result in a short- and long-term measurable improvement to the Integration of Species and Habitat Conditions WCI, representing an incremental shift closer to the FR category. The short- and long-term positive impacts to the Integration of Species and Habitat Condition WCI are attributed to the measureable improvement in the following WCIs:

- Sediment/Turbidity (other fishes)
- Physical Barriers

- LWD
- Pool Frequency and Quality
- Large Pools/Pool Quality
- Change in Drainage Network
- Road Density and Location
- Disturbance History
- RCAs

Overall, direct and indirect effects of implementing Alternative B would have a short- and long term beneficial effect to fish habitat compared to the existing condition.

#### 3.7.6.3.3 Cumulative Effects

##### 3.7.6.3.3.1 Past Activities

Table B.1 in Appendix B identifies which past activities were considered for this cumulative effects analysis. The impacts of past activities have contributed to the existing conditions for water quality in the analysis area and therefore are included in the affected environment discussion in section 3.7.6.1.

##### 3.7.6.3.3.2 Present/Ongoing Activities

Table B.1 in Appendix B identifies which present/ongoing activities were considered for the cumulative effects analysis. Present and ongoing activities considered for cumulative effects (see Appendix B) are not expected to affect the Integration of Species and Habitat Conditions WCI in any timeframe. These activities are subject to conditions set forth by Forest Plan standards and guides (Forest Service 2010a) where occurring on NFS lands and by State of Idaho water quality standards (IDPA 58.01.02) that require BMPs on all lands. These requirements are expected to maintain aquatic species habitat conditions within analysis area streams.

##### 3.7.6.3.3.3 Reasonably Foreseeable Activities

Table B.1 in Appendix B identifies which reasonably foreseeable activities were considered for the cumulative effects analysis. Reasonably foreseeable activities considered for cumulative effects (see Appendix B) are not expected to affect the Integration of Species and Habitat Conditions WCI in any timeframe. These activities are subject to conditions set forth by Forest Plan standards and guides (Forest Service 2010a) where occurring on NFS lands and by State of Idaho water quality standards (IDPA 58.01.02) that require BMPs on all lands. These requirements are expected to maintain aquatic species habitat conditions within analysis area streams.

Present and ongoing and reasonably foreseeable activities are not expected to affect (either positively or negatively) the Integration of Species and Habitat Conditions WCI under this alternative, while the direct and indirect effects associated with implementing Alternative B would be expected to provide short- and long-term measurable improvements to the Integration of Species and Habitat Conditions WCI for reasons discussed above. While these improvements would not shift functionality class for this WCI, implementing Alternative B

would be expected to measurably improve the condition of this WCI within the current functionality rating.

### *3.7.6.4 Environmental Consequences of Alternative C*

#### 3.7.6.4.1 Direct and Indirect Effects

The direct and indirect effects of Alternative C on the Integration of Species and Habitat Conditions WCI are similar to those disclosed under Alternative B, with the following exceptions:

- Two additional fish migration barriers, for a total of five, would be replaced under Alternative C (Figure 3-51), which would provide additional benefits to the Physical Barriers WCI and would reconnect an estimated 3 additional miles of fish habitat.
- Road-related fine sediment reductions expected under Alternative C would be greater than those expected under Alternative B (see Hydrology Resources Water Quality section 3.6.3) due to greater amounts of road decommissioning, unauthorized snowmobile route stabilization, and additional aggregate placement on NFS road 693B. Greater reductions in fine sediment delivery to streams would further benefit the Sediment/Turbidity (other fishes) WCI, Pool Frequency and Quality WCI, Large Pools/Pool Quality WCI, Average Wetted Width-to-Maximum Depth Ratio WCI, and RCAs WCI, which provides greater overall benefits to the Integration Of Species and Habitat Conditions WCI.
- While RCA road density is the same under Alternatives B and C, total road density is further reduced under Alternative C to 4.3 $mi/mi^2$ as compared to 4.5 $mi/mi^2$ under Alternative B, which provides further benefits to the Road Density and Location WCI and the Change in Drainage Network WCI, further benefiting the Integration of Species and Habitat Conditions WCI.
- Alternative C includes an additional 410 acres of commercial timber harvest directed at restoring desired vegetation conditions and reducing wildfire hazard, which provides further benefits to the Disturbance History WCI and Disturbance Regime WCI, further benefiting the Integration of Species and Habitat Conditions WCI.

#### 3.7.6.4.2 Cumulative Effects

##### 3.7.6.4.2.1 Past Activities

Table B.1 in Appendix B identifies which past activities were considered for this cumulative effects analysis. The impacts of past activities have contributed to the existing conditions for water quality in the analysis area and therefore are included in the affected environment discussion in section 3.7.6.1.

##### 3.7.6.4.2.2 Present/Ongoing Activities

Table B.1 in Appendix B identifies which present/ongoing activities were considered for the cumulative effects analysis. Present and ongoing activities considered for cumulative effects (see Appendix B) are not expected to affect the Integration of Species and Habitat Conditions

WCI in any timeframe. These activities are subject to conditions set forth by Forest Plan standards and guides (Forest Service 2010a) where occurring on NFS lands and by State of Idaho water quality standards (IDPA 58.01.02) that require BMPs on all lands. These requirements are expected to maintain aquatic species habitat conditions within analysis area streams.

#### 3.7.6.4.2.3 Reasonably Foreseeable Activities

Table B.1 in Appendix B identifies which reasonably foreseeable activities were considered for the cumulative effects analysis. Reasonably foreseeable activities considered for cumulative effects (see Appendix B) are not expected to affect the Integration of Species and Habitat Conditions WCI in any timeframe. These activities are subject to conditions set forth by Forest Plan standards and guides (Forest Service 2010a) where occurring on NFS lands and by State of Idaho water quality standards (IDPA 58.01.02) that require BMPs on all lands. These requirements are expected to maintain aquatic species habitat conditions within analysis area streams.

Present and ongoing and reasonably foreseeable activities are not expected to affect (either positively or negatively) the Integration of Species and Habitat Conditions WCI under this alternative, while the direct and indirect effects associated with implementing Alternative C would be expected to provide short- and long-term measurable improvements to the Integration of Species and Habitat Conditions WCI for reasons discussed above. While these improvements would not shift functionality class for this WCI, implementing Alternative C would be expected to measurably improve the condition of this WCI within the current functionality rating. This improvement is expected to be greater under Alternative C as compared to Alternative B for reasons discussed in the “Direct and Indirect Effects” section and is expected to provide some small improvement (compared to Alternative B) to overall aquatic species habitat.

### *3.7.6.5 Environmental Consequences of Alternative D*

#### 3.7.6.5.1 Direct and Indirect Effects

The direct and indirect effects of Alternative D on the Integration of Species and Habitat Conditions WCI are similar to those disclosed under Alternative C, with the following exceptions:

- Alternative D proposes no new road construction while Alternative C includes 1.1 miles of road construction (including 0.2 miles of RCA road, not expected to be over a fish bearing stream) on NFS road 696D1. This construction represents a small (<0.1%) benefit to overall road density and RCA road density. This small difference results in Alternative D being virtually identical to Alternative C with respect to the Integration of Species and Habitat Conditions WCI.
- While the management activities proposed under Alternative D would not shift functionality class for this WCI, implementing Alternative D would be expected to measurably improve the condition of this WCI within the current functionality rating.

#### 3.7.6.5.2 Cumulative Effects

##### 3.7.6.5.2.1 Past Activities

Table B.1 in Appendix B identifies which past activities were considered for this cumulative effects analysis. The impacts of past activities have contributed to the existing conditions for water quality in the analysis area and therefore are included in the affected environment discussion in section 3.7.6.1.

##### 3.7.6.5.2.2 Present/Ongoing Activities

Table B.1 in Appendix B identifies which present/ongoing activities were considered for the cumulative effects analysis. Present and ongoing activities considered for cumulative effects (see Appendix B) are not expected to affect the Integration of Species and Habitat Conditions WCI in any timeframe. These activities are subject to conditions set forth by Forest Plan standards and guides (Forest Plan 2010a) where occurring on NFS lands and by State of Idaho water quality standards (IDPA 58.01.02) that require BMPs on all lands. These requirements are expected to maintain aquatic species habitat conditions within analysis area streams.

##### 3.7.6.5.2.3 Reasonably Foreseeable Activities

Table B.1 in Appendix B identifies which reasonably foreseeable activities were considered for the cumulative effects analysis. Reasonably foreseeable activities considered for cumulative effects (see Appendix B) are not expected to affect the Integration of Species and Habitat Conditions WCI in any timeframe. These activities are subject to conditions set forth by Forest Plan standards and guides (Forest Service 2010a) where occurring on NFS lands and by State of Idaho water quality standards (IDPA 58.01.02) that require BMPs on all lands. These requirements are expected to maintain aquatic species habitat conditions within analysis area streams.

Present and ongoing and reasonably foreseeable activities are not expected to affect (either positively or negatively) the Integration of Species and Habitat Conditions WCI under this alternative, while the direct and indirect effects associated with implementing Alternative D would be expected to provide short- and long-term measurable improvements to the Integration of Species and Habitat Conditions WCI for reasons discussed above. While these improvements would not shift functionality class for this WCI, implementing Alternative D would be expected to measurably improve the condition of this WCI within the current functionality rating. This improvement is expected to be greater under Alternative D than Alternative B (see discussion of direct and indirect effects of Alternative C) and expected to be roughly equivalent to Alternative C.

**Table 3-56. Summary of the Baseline Conditions and Effects by Alternative**

| Pathway and WCIs | Baseline Conditions[a] | Alternative A Effects[b]: and Long term Trend[c] | Alternative B Effects[b]: and T/S/L[d] Timeframe | Alternative C Effects[b]: and T/S/L[d] Timeframe | Alternative D Effects[b]: and T/S/L[d] Timeframe |
|---|---|---|---|---|---|
| **Water Quality Pathway** | | | | | |
| Temperature (Other Fishes) | FA | M: N | M: N/+*/+* | M: N/+*/+* | M: N/+*/+* |
| Sediment/Turbidity (Other Fishes) | FR | M: N+/- | M: -/+/+ | M: -/+/+ | M: -/+/+ |
| Chemical Contaminant/Nutrients | FA | NI: N | NI: N | NI: N | NI: N |
| **Habitat Access Pathway** | | | | | |
| Physical Barriers | FUR | M: N | I: N/+/+ (FUR to FR) | I: N/+/+ (FUR to FR) | I: N/+/+ (FUR to FR) |
| **Habitat Elements Pathway** | | | | | |
| Large Woody Debris | FR | M: N | M: N/+/+ | M: N/+/+ | M: N/+/+ |
| Pool Frequency and Quality | FR | M: -* | M: -*/+/+ | M: -*/+/+ | M: -*/+/+ |
| Large Pools/Pool Quality | FUR | M: -* | M: -*/+/+ | M: -*/+/+ | M: -*/+/+ |
| **Channel Condition and Dynamics Pathway** | | | | | |
| Average Wetted Width/Maximum Depth Ratio | FR | M: N | M: N/+*/+* | M: N/+*/+* | M: N/+*/+* |
| Streambank Condition | FA | M: N | M: N/+*/+* | M: N/+*/+* | M: N/+*/+* |
| Floodplain Connectivity | FA | NI: N | NI: N | NI: N | NI: N |
| Change in Peak/Base Flows | FR | M: -* | M: -*/+*/+* | M: -*/+*/+* | M: -*/+*/+* |
| Change in Drainage Network | FUR | M: N | M: -*/+/+ | M: -*/+/+ | M: -*/+/+ |

| Pathway and WCIs | Baseline Conditions[a] | Alternative A Effects[b]: and Long term Trend[c] | Alternative B Effects[b]: and T/S/L[d] Timeframe | Alternative C Effects[b]: and T/S/L[d] Timeframe | Alternative D Effects[b]: and T/S/L[d] Timeframe |
|---|---|---|---|---|---|
| **Watershed Conditions Pathway** | | | | | |
| Road Density and Location | FUR | M: N | M: -*/+/+ | M: -*/+/+ | M: -*/+/+ |
| Disturbance History | FR | M: -* | M: -*/+*/+* | M: -*/+*/+* | M: -*/+*/+* |
| Riparian Conservation Areas | FUR | M: -* | M: -*/+/+ | M: -*/+/+ | M: -*/+/+ |
| Disturbance Regime | FR | M: -* | M: -*/+*/+* | M: -*/+*/+* | M: -*/+*/+* |
| **Integration of Species and Habitat Condition Pathway** | | | | | |
| Integration of Pathways and Habitat Conditions (Other Fishes) | FUR | M: -* | M: -*/+/+ | M: -*/+/+ | M: -*/+/+ |

[a]: Functionality for baseline conditions: FA = Functioning Acceptably, FR = Functioning at Risk, FUR = Functioning at Unacceptable Risk.
[b]: Effects to Functionality Class: M = Maintain, NI = No Influence, I = Improve (change Functionality Class).
[c]: Trend effects: N = No trend, - = negative trend, + = positive trend, * indicates immeasurable impact
[d]: Timeframe: T = Temporary (0-3 years). S = Short-term (3-15 years), L = Long-term (15+ years). Effects by Timeframe: N = None, - = negative impact, + = positive effects
* denotes immeasurable impact.Soil Resources

## 3.8 SOIL RESOURCES

This section incorporates by reference the Soil Resource Analysis and Technical Report, which contains the data, methodologies, assumptions,maps, references, and technical documentation used in the analysis of soil effects indicators.. The 11,510 acres of NFS lands within the Project boundary defines the scale of analysis for the soils resource.

Management activities create various degrees of soil disturbance, and the goal is to maintain soil quality and vegetation growth by minimizing adverse impacts to the soil's physical, biological, and chemical properties. Soil quality is primarily determined by evaluating surface soil properties, which is the critical area where plant and animal organic matter accumulate, begin to decompose, and eventually become incorporated into soil. It is also the zone of maximum biological activity and nutrient release. The physical condition of this zone plays a significant role in soil stability, nutrient cycling, water infiltration, and energy flows that substantially influence soil-hydrologic processes and overall watershed health.

### 3.8.1 Soil Quality Concerns and Indicators

Through review of the activities included in the Proposed Action and alternatives and comments received from scoping and review of the Project DEIS, the following were identified as concerns affecting soil quality. The concern statements were developed using cause-and-effect relationships that reflect potential impacts to soils when implementing certain activities included in the alternatives.

Soil Quality Concern 1: Proposed activities have the potential to cause detrimental soil compaction and increase soil erosion above natural levels. Commercial timber harvest, specifically using heavy equipment to yard logs across the ground, compacts and disturbs surface soils. Snowmelt runoff and rainfall cannot infiltrate the compacted forest floor, causing overland water flow that erodes surface soils off-site, subsequently increasing sediment delivery. Prescribed fire alters the forest floor by consuming dead and live woody material, burning vegetative ground cover and surface litter, thereby exposing mineral soil and increasing the potential for accelerated erosion. Ground disturbance from these activities may occur without negative effects to soil quality. Conversely, these activities can also result in temporary or short-term detrimental impacts to soil quality.

Indicator: Percent DD to soils within each activity area (Forest Plan Standard SWST02). DD can occur where soil has been displaced, compacted, puddled, or severely burned (Forest Service 2010a, p. GL-10).

Soil Quality Concern 2: Road construction, skid trails, and log landings cause long-term degradation of the physical, biological, and chemical soil properties and decrease the amount of area than can support desired vegetation.

Indicator: percent total soil resource commitment (TSRC) within each activity area (Forest Plan Standard SWST03). TSRC is the conversion of a productive site to an essentially non-productive site for a period of more than 50 years (Forest Service 2010a, p. GL-37).

Soil Quality Concern 3: Commercial timber harvest, noncommercial thinning, prescribed fire, and road construction may increase the potential for landslides, particularly in areas having inherently moderate and high instability.

Indicator: Acres of moderate and high slope stability hazards where activities are proposed. The initial Stability Index Mapping (SINMAP) delineations of moderate and high landslide prone areas identify specific locations that may need additional field verification (Forest Plan Standard SWST12, Forest Plan Guidelines SWGU03 and SWGU04).

Soil Quality Concern 4: Commercial timber harvest and prescribed fire may change the amount and distribution of CWD and effective ground cover (EGC), negatively impacting the above-ground organic matter important for soil nutrient cycling processes and the protective cover and structure that contributes to maintaining natural soil erosion rates.

Indicator: EGC within each activity area (Forest Plan Guideline SWGU05) is included in the soils analysis. percent EGC is the cumulative sum of live vegetation, litter, and rock (>0.75 inch) (Forest Service 2010a, p. GL-12). Discussion on the effects on CWD can be found in section 3.2.8 under Vegetation Resources.

## 3.8.2 Analysis Methods

The analysis tracks cause-and-effect relationships that compare existing conditions and estimates of the potential environmental effects known to occur from the proposed activities to a threshold or desired range for each of the indicators. The desired range for each Indicator is derived using the inherent properties of the soil types and vegetation communities that occur across the analysis area or from the applicable Forest Plan Standards and Guidelines. The change in the indicator(s) from the current condition provides a benchmark for estimating the extent and magnitude of effects from implementing the proposed activities and concludes if an alternative would meet the soil management goals and objectives. This comparative analysis determines if the potential effects from implementing the proposed activities are consistent with the applicable soils management direction in the Forest Plan (Forest Service 2010a). This analysis incorporates by reference the Forest Plan, including Appendices A and B, that provide essential data and analysis methodologies to establish a comparative baseline against potential effects of the Proposed Action and alternatives. Some conclusions are based on professional judgment from interpretations of the data. The specific analysis methods used for each Indicator are described below in their respective sections.

### *3.8.2.1 Activity Areas*

The analysis indicators are evaluated in the context of an activity area (Forest Service 2010a, p. GL-1). Activity areas may differ based on the Indicator (Table 3-57). Changes in the indicators are used as estimates of the potential direct, indirect, and cumulative effects for the temporary and short and long term.

**Table 3-57. Soil Resource Analysis Indicators and Activity Areas**

| Indicator | Activity Area for Direct and Indirect Effects | Analysis Method and Alternative Comparison |
|---|---|---|
| Detrimental Disturbance | Harvest Unit or Burn Unit | Percent change over existing conditions. |
| Total Soil Resource Commitment | Project Area | Percent change over existing conditions. |
| Slope Stability Hazard | Harvest Unit, Burn Unit, and Roads | Areas having moderate and high stability hazards where activities are proposed. |
| Effective Ground Cover | Harvest Unit or Burn Unit | Percent change over existing conditions. |

## 3.8.1 Detrimental Disturbance

### *3.8.1.1 Affected Environment*

Management activities can detrimentally alter the natural soil characteristics, resulting in the immediate and/or prolonged degradation of onsite resources or vegetation productivity. DD is associated with unacceptable levels of soil displacement, soil compaction, soil puddling, or severely burned soils (Forest Service 2010a, p. GL-12). The analysis area for DD will be the activity areas consisting of the individual timber harvest, thinning, and prescribed fire treatment units described in the Proposed Action (section 2.4.2). The rationale for this delineation is based on Forest Plan definitions for activity areas (Forest Service 2010a, p. GL-1).

Existing conditions for percent DD by activity area meet Forest Plan Standard SWST02 (Forest Service 2010a, p. III-21). The existing DD in activity areas range from 0 to 4 percent and are attributed to past timber harvest, livestock grazing, dispersed recreation, OHV use, and personal fuelwood gathering. Appendix C of this document contains the DD analysis methodology, including a table of estimated DD by activity area and assumptions made when estimating DD. The DD values were estimated by overlaying the proposed treatment units over existing disturbance features found in GIS data and through field observations. Within the delineated activity areas, detrimental soil conditions from disturbances occurring in the last 21 years were considered to be residual detrimental impacts (Arnup 1998). Timber harvest activities causing DD predating 1988 are not included in this analysis, as those impacts have naturally ameliorated.

### *3.8.1.2 Environmental Consequences of Alternative A—No Action*

#### 3.8.1.2.1 Direct and Indirect Effects

Under the No Action Alternative, no increase in DD would occur within any activity area and this alternative would be consistent with Forest Plan Standard SWST02. DD for activity areas would continue to range from 0 to 4 percent (Appendix C). This alternative would not directly or indirectly increase DD.

#### 3.8.1.2.2 Cumulative Effects

The cumulative effect of this alternative is the same as the direct and indirect effects described above. Localized areas where soils are currently detrimentally compacted and/or displaced from past timber harvest would recover and stabilize over time, as the causative

impact(s) no longer exist (Arnup 1988). Existing DD from present/ongoing livestock grazing, dispersed recreation, and personal fuelwood gathering would be expected to persist, but not increase. No reasonably foreseeable management activities influencing DD would be implemented under this alternative.

#### *3.8.1.3 Environmental Consequences of Alternative B—Proposed Action*

##### 3.8.1.3.1 Direct and Indirect Effects

Implementing the activities described in the Proposed Action would increase DD in each of the activity areas in the temporary and short term (0 to 15 years) (Appendix C, Table C-1). DD is estimated to exceed 10 percent in 2 of the 120 activity areas (tractor units 22 and 104) immediately following timber harvest activities (Appendix C). With the time lag between sequentially implemented treatments where prescribed fire occurs 1 to 3 years after timber harvest, some of the increased DD would recover to disturbed conditions as skid trails are actively reclaimed. Following implementation of the prescribed fire activities, none of the 120 activity areas would exceed 10 percent DD (Appendix C). Within 5 years of Project implementation, DD in all 120 activity units would range from 1.3 to 7.1 percent (Appendix C). Additional recovery of DD in each activity unit is anticipated between 5 and 10 years following Project implementation (Appendix C). The estimated increases in DD would be less than 15 percent for all activity areas and implementing the treatments would comply with Forest Plan Standard SWST02.

Both temporary and short-term increases in DD are expected in commercial harvest activity areas where ground-based equipment (Timco and rubber tire skidders/dozers) would cut trees and use skid trails to yard logs. Increases in DD from skyline and helicopter yarding operations are much less compared to ground-based systems (Potyondy et al. 1991). To identify the greatest potential impact, DD estimates were based on the use of ground-based Timco equipment in some harvest units designated for skyline and helicopter yarding. The primary (designated) skid trails are classified as TSRC. However, it is common to use secondary (3- to 5-pass) skid trails that either branch off primary trails or are the only trails in small harvest units, which may or may not cause detrimental soil compaction and displacement (Froehlich et al. 1983). The temporary and short-term direct effects from ground-based timber harvest decrease through stabilization of the skid trail disturbances described under Design Feature TH-7 (section 2.4.2.1); stabilization is required under the Idaho Forest Practices Act (IDAPA 20.02.02). However, some short-term (up to 10 years) increases in DD are expected due to residual impacts from primary and secondary skid trails, as it is unreasonable to expect that stabilization would occur on 100 percent of the skid trails, or be 100 percent effective. Also, short-term increases (up to 15 years) in DD would exist from residual impacts where roads have been decommissioned and soil quality conditions transition from TSRC.

As previously stated, DD is associated with ground disturbance that negatively accelerates soil displacement (erosion) or causes compaction. As noncommercial thinning (felling of small diameter or submerchantable trees) would be accomplished with hand felling using chainsaws and not result in ground disturbance, no detrimental soil impacts (erosion or compaction) would be expected from implementing this activity.

Broadcast burning and prescribed fire would be implemented to reduce existing natural fuel loads as well as harvest-related and noncommercial thinning slash. The prescription for these treatments is to burn at low-to-moderate fire intensities with low soil burn severity, thereby resulting in minimal impacts to soil quality (Parsons et al. 2010). Fuels treatment prescriptions include lop and scatter (LS) and whole tree yarding (WTY). The analysis assumes LS would result in greater fuel loads compared to WTY with a slightly increased potential for higher soil burn severity. When added to existing ground fuels, breakage and slash from commercial timber harvest and noncommercial thinning can increase the overall fuel load, which leads to longer burning duration and severely burned soils (i.e., DD). However, this is not representative of the overall effects of prescribed burning, as high intensity fire with high soil burn severity occurs infrequently in very small patches (<1.0 acre) that are widely distributed across each activity area. Therefore, prescribed burning would not measurably affect DD. The anticipated low severity burn is expected to result in minimal areas of bare soil, decreasing the potential for soil detachment and sediment transport. Moderate- to high-severity burn patches are surrounded by unburned areas on hillslopes having intact vegetation and down woody debris. Combined with the design feature prohibiting ignitions in RCAs, the unburned vegetative buffers are effective in interrupting overland flow and trapping eroded soil, thereby minimizing sediment travel distances (Arkle and Pilliod 2010). Any hand-constructed fireline needed for the prescribed burning would temporarily increase detrimental soil disturbance. These features would be reclaimed following implementation, resulting in no net increase in DD. The extent of detrimental soil disturbance at the conclusion of broadcast burning and related activities is not expected to result in measurable decreases in soil quality. Non-detrimental effects from prescribed fire would ameliorate the following growing season, with the detrimental conditions considered temporary and recovering in 1 to 3 years (Robichaud and Brown 1999, Robichaud et al. 2000). The prescription for burning piled slash would result in microsite impacts, but there would need to be more than 100 to 120 slash piles per acre to exceed 15 percent DD for any activity area.

#### 3.8.1.3.2 Cumulative Effects

The cumulative effects of Alternative B on DD would be limited to specific activity areas within the Project boundary that overlap disturbances of past, present/ongoing, and reasonably foreseeable activities. The cumulative effects from implementing the Proposed Action include the existing conditions (which reflect DD from past and present/ongoing activities) plus the direct effects presented above. The Cumulative Effect values for the tables in Appendix C of this document represent existing DD and additive direct effects for completing all treatments within a 3- to 5-year time period. The timber harvest and prescribed fire treatments would presumably be implemented sequentially, not concurrently. Within the cumulative effect timeframe, recovery of the treatment areas, especially active restoration of skid trails, would result in DD for all activity areas being below the 15 percent threshold (as defined in the Forest Plan). This alternative would be consistent with Forest Plan Standard SWST02.

The potential impacts from implementing the Proposed Action (specifically commercial timber harvest) would cause an incremental short-term, cumulative increase in DD in activity areas that overlap existing disturbances from past or present/ongoing activities. Over time, the decrease in residual DD through active reclamation or passive amelioration (Arnup 1998)

would bringthe cumulative DD within each activity area to between 0.6 and 3.5 percent by year 10 following Project implementation (Appendix C). Over the longer term (20 years or more), the residual DD, which generally equates to smaller areas, would be the result of more severe, localized impacts that have longer lasting effects.

Existing DD from present/ongoing livestock grazing, dispersed recreation, and personal fuelwood gathering would be expected to persist, but not increase, in the temporary, short-, or long-term timeframes. As forage utilization by permitted livestock occurs primarily outside of the cumulative effects activity areas, no incremental increase above the existing livestock grazing impacts would be expected.

There are no foreseeable future management activities outlined in Appendix B of this document that could measurably increase or decrease cumulative DD within the respective activity areas.

#### *3.8.1.4 Environmental Consequences of Alternative C*

##### 3.8.1.4.1 Direct and Indirect Effects

Implementing the activities described in Alternative C would increase DD in each of the activity areas in the temporary and short term (0 to 15 years) (Appendix C, Table C-2). DD is estimated to exceed 10 percent in 1 of the 123 activity areas (tractor unit 104) immediately following timber harvest activities (Appendix C, Table C-2). With the time lag between sequentially implemented treatments (where prescribed fire occurs 1 to 3 years after timber harvest), some of the increased DD would recover to disturbed conditions as skid trails are actively reclaimed. Following implementation of the prescribed fire activities, none of the 120 activities areas would exceed 10 percent DD (Appendix C, Table C-2). Within 5 years of Project implementation, DD in all 123 activity units would range from 1.3 to 8.1 percent (Appendix C, Table C-2). Additional recovery of DD in each activity unit is anticipated between 5 and 10 years following Project implementation (Appendix C, Table C-2). The estimated increases in DD would be <15 percent for all activity areas and implementing the treatments would comply with Forest Plan Standard SWST02.

##### 3.8.1.4.2 Cumulative Effects

The cumulative effects of implementing activities defined by Alternative C on DD would be similar to Alternative B. Within each activity area, DD would range from 0.6 to 4.0 percent by year 10 following Project implementation. Within the cumulative effect timeframe, recovery of the sequentially implemented treatments (especially active restoration of skid trails), would result in DD for all activity areas being below the 15 percent threshold (as defined in the Forest Plan). This alternative would be consistent with Forest Plan Standard SWST02.

#### *3.8.1.5 Environmental Consequences of Alternative D*

##### 3.8.1.5.1 Direct and Indirect Effects

Implementing the activities described in Alternative D would increase DD in each of the activity areas in the temporary and short term (0 to 15 years) (Appendix C, Table C-3). DD is estimated to exceed 10 percent in 1 of the 123 activity areas (tractor unit 104) immediately following timber harvest activities (Appendix C, Table C-3). With the time lag between

sequentially implemented treatments (where prescribed fire occurs 1 to 3 years after timber harvest), some of the increased DD would recover to disturbed conditions as skid trails are actively reclaimed. Following implementation of the prescribed fire activities, none of the 120 activities areas would exceed 10 percent DD (Appendix C, Table C-3). Within 5 years of Project implementation, DD in all 123 activity units would range from 1.3 to 8.1 percent (Appendix C, Table C-3). Additional recovery of DD in each activity unit is anticipated between 5 and 10 years following Project implementation (Appendix C,Table C-3). The estimated increases in DD would be <15 percent for all activity areas and implementing the treatments would comply with Forest Plan Standard SWST02.

#### 3.8.1.5.2 Cumulative Effects

The cumulative effects of implementing activities defined by Alternative D on DD would be similar to Alternative B. DD within each activity area would range from 0.6 to 4.0 percent by year 10 following Project implementation. Within the Cumulative Effect timeframe, recovery of the sequentially implemented treatments (especially active restoration of skid trails) would result in DD for all activity areas being below the 15 percent threshold (as defined in the Forest Plan). This alternative would be consistent with Forest Plan Standard SWST02.

## 3.8.2 Total Soil Resource Commitment

### *3.8.2.1 Affected Environment*

TSRC is the conversion of a productive site to an essentially non-productive site for a period of more than 50 years. Examples include classified or unclassified roads, inadequately restored haul roads, designated skid roads, landing areas, parking lots, mining dumps or excavations, dedicated trails (skid trails also), developed campgrounds, other dedicated facilities, and some stock driveways. Productivity on these areas ranges from 0 to 40 percent of natural (Forest Service 2010a, p. GL-50).

The TSRC activity area consists of the 11,510-acre Project area. The rationale for this delineation is based on guidance in the Forest Plan (Forest Service 2010a, p. GL-1). The greatest area of TSRC is associated with roads, which includes the total width of the road prism from the top of the cut slope to the bottom of the fill slope. The Project area has about 73.6 miles of existing roads and 5.7 miles of trails that are open to some type of motorized use during the snow free season. An additional 4.7 miles of known unauthorized routes were identified using existing data or through review of digital imagery. In addition, there are approximately 32 acres of existing TSRC resulting from developed or dispersed recreation sites. There are about 3.6 acres of TSRC per mile of road on average, a number which has been derived from the disturbed width attribute used in the BOISED Sediment Yield Prediction model (Reinig et al. 1991). Developed recreation trails are also considered TSRC and average 1.5 acres per mile of route. Additional sources of TSRC within the Project area include dispersed recreation areas, some of which are co-located on log landings from past timber harvest operations.

The existing condition of approximately 3 percent TSRC meets Forest Plan Standard SWST03 (Table 3-58). Existing TSRC acres were estimated by overlaying the transportation and past harvest data in GIS with the Project area boundary, by field observations of obvious sites, and by review of high-resolution imagery. The existing TSRC percent is attributed to impacts from the existing transportation facilities, some limited past timber harvest, past and

current livestock grazing, dispersed recreation and OHV use, and personal fuelwood gathering (Soils Technical Report, Project Record).

**Table 3-58. Total Soil Resource Commitment (TSRC) by Alternative (all values in percent).**

| TSRC Feature | Existing Condition[a] | Alternative B | | Alternative C | | Alternative D | |
|---|---|---|---|---|---|---|---|
| | | D & I[b] | CE[c] | D & I[b] | CE[c] | D & I[b] | CE[c] |
| Incremental Change | — | +0.9 | -1.0 | +1.0 | -1.2 | +1.0 | -1.2 |
| Total TSRC | 2.8 | 3.7 | 2.7 | 3.8 | 2.6 | 3.8 | 2.6 |

[a] Existing Conditions also represent Direct, Indirect, and Cumulative Effects for Alternative A.
[b] D & I: Direct and Indirect Effects.
[c] CE: Cumulative Effects.

### *3.8.2.1 Environmental Consequences of Alternative A—No Action*

#### 3.8.2.1.1 Direct and Indirect Effects

Alternative A would have no temporary, short-, or long-term, direct or indirect effects on TSRC. Assuming Travel Management restrictions prohibiting unauthorized motor vehicle use off designated routes would be enforced and no new travel routes would be created or extended, no increase in TSRC is expected. It is likely that livestock would continue to trail along existing, unauthorized routes within the Project area so these features would not fully recover through natural amelioration. Alternative A would maintain the existing TSRC of 2.8 percent for the 11,510-acre Project area (Table 3-58).

#### 3.8.2.1.2 Cumulative Effects

The cumulative effects of this alternative are the same as the direct and indirect effects described above. Existing TSRC from present/ongoing travel routes, limited livestock trailing, dispersed recreation, and personal fuelwood gathering would be expected to persist but not increase in the temporary or short or long term. No reasonably foreseeable management activities influencing TSRC would be implemented under this alternative.

### *3.8.2.2 Environmental Consequences of Alternative B—Proposed Action*

#### 3.8.2.2.1 Direct and Indirect Effects

An interim increase from 2.8 percent to 3.7 percent in TSRC would occur from the construction and use of log landings, skid trails, and an estimated one mile of temporary road to facilitate commercial timber harvest (Table 3-58). These temporary, direct effects are addressed through Project Design Features TH-7 and SW-10 (section 2.4.2.1), which require these disturbances be reclaimed when they are no longer needed for timber harvest and essentially alleviate the increased TSRC. Constructing 2.7 miles of new specified road and realigning 4.4 miles of NFS roads 696 and 696D would slightly increase TSRC over the existing conditions by about 0.2 percent. However, this increase would be reduced by decommissioning roughly 19.9 miles of existing system and non-system routes.

Most of the forested stands within the Project area that are roaded have previously been logged, most notably in the 1970s and most recently in 1998. Remnants of old skid trails are evident, many of which could be reused to implement the proposed commercial harvest. The remnant trails have varying levels of vegetative cover, and the existing effects are

discontinuous across the spectrum of soil disturbance. Therefore, the existing effects are difficult to quantify from a soil quality perspective. Some of the proposed primary skid trails would be co-located over existing disturbances, and this TSRC is already accounted for under existing conditions. While the new alignment of NFS road 696 would increase TSRC, decommissioning 19.9 miles of authorized and unauthorized routes would result in an overall net decrease when compared to the existing conditions.

Based on the configuration of the harvest units, approximately 15 helicopter landings with an average size of 0.5 acre would be needed to implement the proposed commercial timber harvest. Some variation in the number of landings and equivalent area impacted is likely, as the preference is for landings to be constructed in currently impacted locations or co-located within existing road prisms. Upon completion of harvest activities, newly constructed landings would be ripped and reshaped to provide acceptable infiltration and surface drainage, slash would be distributed to cover approximately 30 percent of the reshaped surface, and the area would be planted with a Forest Service approved seed mixture (Design Feature SW-10, section 2.4.2.1). Depending on existing or potential resource impacts which might occur, any dispersed recreation sites that are reused as landings may or may not be fully restored. Overall, activities associated with log landings would temporarily increase TSRC.

#### 3.8.2.2.2 Cumulative Effects

With the direct and indirect effects of all alternative on TSRC limited to the Project boundary, the cumulative effects analysis is confined to the 11,510-acre Project area. The existing conditions for TSRC reflect the past and present/ongoing impacts of the travel routes and long-term disturbances. Given the minimal potential for any of the ongoing or foreseeable future actions (listed in Appendix B of this document) to increase TSRC, cumulative effects from implementing Alternative B would decrease when compared to the existing conditions (Table 3-58). At the conclusion of implementing all activities in Alternative B, TSRC would be estimated to be 2.7 percent and comply with Forest Plan Standard SWST03.

The cumulative effects of implementing Alternative B would be a net decrease from existing TSRC as existing, unauthorized routes used to implement commercial timber harvest would be decommissioned when administrative access is no longer needed to implement related activities (i.e., burning). Eliminating the potential for motor vehicle access would result in unquantifiable soil quality improvements through associated reductions in TSRC from recovery of dispersed recreation impacts at sites accessed via the unauthorized routes.

Foreseeable future management activities within the cumulative effects analysis areas that may influence TSRC involve road (authorized or unauthorized) decommissioning and trail construction; details for these projects have not been defined.

### *3.8.2.3 Environmental Consequences of Alternative C*

#### 3.8.2.3.1 Direct and Indirect Effects

An interim increase from 2.8 percent to 3.7 percent in TSRC would occur from the construction and use of log landings, skid trails, and an estimated 4.2 miles of temporary road to facilitate commercial timber harvest (Table 3-58). These temporary, direct effects are

addressed through Project Design Features TH-7 and SW-10 (section 2.4.2.1), which require these disturbances be reclaimed when they are no longer needed for timber harvest and essentially alleviate the increased TSRC. In addition, construction of 1.1 miles of new specified road and the realignment of 4.4 miles of NFS roads 696 and 696D would slightly increase TSRC over the existing conditions by slightly more than 0.1 percent. However, a net decrease in TSRC would result after decommissioning roughly 23.5 miles of existing system and non-system routes.

Similar to Alternative B, the Project area is roaded and has a history of being logged, most notably in the 1970s and most recently in 1998. There is evidence of segments of old skid trails, some of which may be reused to implement the proposed commercial harvest. The remnant trail segments are difficult to quantify from a soil quality perspective due to varying levels of vegetative cover and effects which are discontinuous across the spectrum of soil disturbance.

With the increase in temporary roads, approximately 12 helicopter landings (3 less than Alternative B) would be needed to implement the proposed commercial timber harvest. Some variation in these numbers and equivalent area impacted is likely, as the preference is for landings to be constructed in currently impacted locations or co-located within existing road prisms. Upon completion of harvest activities, newly constructed landings would be ripped and reshaped to provide acceptable infiltration and surface drainage, slash would be distributed to cover approximately 30 percent of the reshaped surface, and the area would be planted with a Forest Service approved seed mixture (Design Feature SW-10, section 2.4.2.1). Depending on existing or potential resource impacts which might occur, any dispersed recreation sites that are reused as landings may or may not be fully restored. Overall, activities associated with log landings would temporarily increase TSRC.

#### 3.8.2.3.2 Cumulative Effects

With the direct and indirect effects of either alternative on TSRC limited to the Project boundary, the cumulative effects analysis is confined to the 11,510-acre Project area. The existing conditions for TSRC reflect the past and present/ongoing impacts of the travel routes and long-term disturbances. Given the minimal potential for any of the ongoing or foreseeable future actions (listed in Appendix B of this document) to increase TSRC, cumulative effects from implementing Alternative C would decrease when compared to the existing conditions (Table 3-58). At the conclusion of implementing all activities under Alternative C, TSRC would be estimated to be 2.6 percent and comply with Forest Plan Standard SWST03.

The cumulative effect of implementing Alternative C would be a net decrease from existing TSRC, as existing, unauthorized routes used to implement commercial timber harvest would be decommissioned when administrative access is no longer needed to implement related activities (i.e., burning). Eliminating the potential for motor vehicle access would result in unquantifiable soil quality improvements through associated reductions in TSRC from recovery of dispersed recreation impacts at sites accessed via the unauthorized routes.

Foreseeable future management activities within the cumulative effects analysis areas that may influence TSRC involve road (authorized or unauthorized) decommissioning and trail construction; details for these projects have not been defined.

### *3.8.2.4 Environmental Consequences of Alternative D*

#### 3.8.2.4.1 Direct and Indirect Effects

An interim increase from 2.8 percent to 3.8 percent in TSRC would occur from the construction and use of log landings, skid trails, and an estimated 4.2 miles of temporary road to facilitate commercial timber harvest (Table 3-58). These temporary, direct effects are addressed through Project Design Features TH-7 and SW-10 (section 2.4.2.1), which require these disturbances be reclaimed when they are no longer needed for timber harvest and essentially alleviate the increased TSRC. In addition, realigning 4.4 miles of NFS roads 696 and 696D would slightly increase TSRC over the existing conditions by 0.1 percent. However, there would be a net decrease in TSRC after decommissioning roughly 23.5 miles of existing system and non-system routes.

Approximately 13 helicopter landings (2 fewer than Alternative B and 1 more than Alternative C) would be needed to implement the proposed commercial timber harvest (estimates for log landings are described in the Timber Resources report). Some variation in these numbers and equivalent area impacted is likely, as the preference is for landings to be constructed in currently impacted locations or co-located within existing road prisms. Upon completion of harvest activities, newly constructed landings would be ripped and reshaped to provide acceptable infiltration and surface drainage, slash would be distributed to cover approximately 30 percent of the reshaped surface, and the area would be planted with a Forest Service approved seed mixture (Design Feature SW-10, section 2.4.2.1). Depending on existing or potential resource impacts which might occur, any dispersed recreation sites that are reused as landings may or may not be fully restored. Overall, activities associated with log landings would temporarily increase TSRC.

#### 3.8.2.4.2 Cumulative Effects

With the direct and indirect effects of either alternative on TSRC limited to the Project boundary, the cumulative effects analysis is confined to the 11,510-acre Project area. The existing conditions for TSRC reflect the past and present/ongoing impacts of the travel routes and long-term disturbances. Given the minimal potential for any of the ongoing or foreseeable future actions (listed in Appendix B of this document) to increase TSRC, cumulative effects from implementing Alternative D would decrease when compared to the existing conditions (Table 3-58). At the conclusion of implementing all activities under Alternative D, TSRC would be estimated to be 2.6 percent and comply with Forest Plan Standard SWST03.

The cumulative effect of implementing Alternative D would be a net decrease from existing TSRC, as existing, unauthorized routes used to implement commercial timber harvest would be decommissioned when administrative access is no longer needed to implement related activities (i.e., burning). Eliminating the potential for motor vehicle access would result in unquantifiable soil quality improvements through associated reductions in TSRC from recovery of dispersed recreation impacts at sites accessed via the unauthorized routes.

Foreseeable future management activities within the cumulative effects analysis areas that may influence TSRC involve road (authorized or unauthorized) decommissioning and trail construction; details for these projects have not been defined.

## 3.8.3 Slope Stability

### *3.8.3.1 Affected Environment*

This analysis follows the "Implementation Guide for Identifying and Managing Landslide and Landslide Prone Areas" (Forest Service 2003a). The intent of this guide and related Forest Plan direction is to reduce threats associated with management actions that might initiate landslides. The detailed analysis is focused on locations where management activities are being considered on lands with moderate and high slope stability hazards: individual harvest units (i.e., activity areas); noncommercial thinning; prescribed fire treatment areas; and road construction. These locations present the greatest likelihood for management activities to influence the natural processes that affect slope stability. The analysis methods and following conclusions for the alternatives, with subsequent field verification as needed, provide the level of detail needed to sufficiently address the slope stability concerns and applicable Forest Plan Management Direction for landslide prone areas (SWST12, SWGU03, SWGU04 (Forest Service 2010a , p. III-22 to III-23). The complete analysis and data used to evaluate slope stability can be found in Appendix C of the Soils Technical Report (Project Record).

To avoid or prevent landslides, it is important to understand the primary factors that regulate slope stability (i.e., soil moisture, root strength, and slope gradient) and what disturbances (management-related or natural) have a greater potential to initiate landslides. Man-caused disturbances, such as road construction and, to a lesser extent, timber harvest, can increase the potential for and occurrence of landslides. Roads account for 58 percent of management-related landslides, while forest vegetation removal accounts for only 9 percent (Megahan et al. 1978). Large blocks of tree mortality that increase water tables or substantially decrease rooting strength can increase slope instability. Loss of overstory canopy or ground cover on soils having inherently high surface erosion ratings can increase slope instability on LSP areas during storm events. Characterization and analysis of hydrologic processes and vegetation characteristics within the LSP areas (as delineated by SINMAP) identify the factors controlling slope stability and prioritize locations for field verification to validate if proposed activities have the potential to modify landslide processes.

Review of high-resolution digital imagery intersected with the slope hazard GIS data did not reveal large-scale landslide scars or features or provide indications of obvious stability hazards within the activity areas where vegetation management activities are proposed. Ground reconnaissance of the Project area did identify several existing landslides that are associated mostly with localized road cut/fill slope failures. The Scriver Creek Road Inventory (GRAIP) (Forest Service 2011d) identified 16 landslides, 9 of which were considered road related and the remainder were labeled as being naturally occurring features. During this field review, no other landslides were identified that could be attributed to past timber harvest activities. While no in-depth study has been completed, a point of interest is the orientation of the 9 road-related landslides with the distinct north/south fault lines displayed in GIS geology data.

### *3.8.3.2 Environmental Consequences of Alternative A—No Action*

#### 3.8.3.2.1 Direct and Indirect Effects

This alternative would not directly affect the three primary factors that influence slope stability (i.e., soil moisture, root strength, and slope gradient) and not increase or decrease the likelihood of new landslides. This alternative would maintain the current conditions of the existing road cut/fill slope failures. These road-related landslides are unstable, with the probability of future, chronic failures persisting over the short and long term. These sites are at risk primarily during high precipitation or rain-on-snow events. Should one of the existing road-related landslides fail, indirect effects may occur to other resources, especially if the failure occurs at a culvert location or at fill slopes adjacent to streams.

#### 3.8.3.2.2 Cumulative Effects

Considering no large-scale activities are being implemented or planned in the future, the existing conditions for slope stability represent the Alternative A (No Action) cumulative effects. The cumulative effects for slope stability would be limited to the susceptibility for failures from the existing road-related landslides. Given the Project area's disturbance history, that effects of current activities are not expected to measurably change, and because no future land management activities are planned for the Project area, there would be no additional or incremental cumulative effects under Alternative A beyond the previously described direct and indirect effects.

### *3.8.3.3 Environmental Consequences of Alternative B – Proposed Action*

#### 3.8.3.3.1 Direct and Indirect Effects

Based on the following analysis conclusions and subsequent field verification at site-specific locations where instability features may exist Alternative B is expected to comply with Forest Plan Standard SWST12.

Commercial harvest activities would occur on an estimated 278.4 acres identified as either moderate or high for slope stability hazard (Table 3-59). As discussed above, the SINMAP model was used as a preliminary tool to identify locations in the Project area that may be landslide prone. It is important to note the acres identified as slope stability hazards mostly represent the sum of numerous smaller sites within any individual activity area, although some larger, continuous patches of unstable lands exist. The potential effect of the vegetation treatments are a function of the silvicultural prescriptions combined with the intensity of ground disturbance resulting from the harvest yarding systems. The silvicultural prescriptions are designed for retaining large, mature trees with a low amount of canopy removal (section 3.2). The larger, continuous areas of moderate and high slope stability hazard range from 15 to 24 acres and are designated for helicopter or skyline yarding systems that minimize ground disturbance. With the exception of one unit, all activity areas designated for tractor yarding have <3 acres of LSP hazards, which logically conincide with less steep terrain suitable for ground-based harvest. The low intensity harvest prescriptions would be implemented in areas mapped as moderate and high hazards for slope stability and are expected to maintain the conditions for the primary factors controlling slope stability.

The Design Feature SW-11 (section 2.4.2.1) associated with the action alternatives requires field verification using the guidelines developed from Chatwin et al. (1994) where management activities are proposed on LSP areas. The intent of the design feature is to minimize direct and indirect effects of harvest activities in activity areas having large, continuous blocks of land (generally greater than 10 acres) where instability features exist. In these locations, the design feature requires modifications to the treatment prescriptions or harvest/yarding methods to avoid or prevent landslides. Given thatpast harvest activities since the late 1950s were more intensive and likely had greater impacts from vegetation manipulation and that current/ongoing activities do not appear to have increased slope instability, the proposed commercial timber harvest is not expected to influence the hillslope processes that changes the slope stability factors in the temporary or short or long term.

Other proposed vegetation treatments include thinning from below and thinning submerchantable trees on about 26 acres of LSP lands. These prescriptions improve the health and vigor of the residual forested stand by reducing competition for the available nutrients and moisture. The post-thinning conditions promote the growth of trees that are more resistant to insects, disease, and drought. Thinning activities would likely cause the soil moisture to temporarilyincrease. However, the stand would respond to balance the soil moisture regime in the short term, and the rooting strength of the residual large trees would not change. Over the long term, noncommercial thinning is expected to have a beneficial effect on the factors controlling slope stability, as decreases in competition for soil water and nutrients allows root systems of the residual small- and medium-sized trees to expand and become stronger.

Proposed prescribed fire activities include broadcast burning of harvest-created slash (62 LSP acres) and reducing fuel loads following noncommercial thinning (26 LSP acres). Burning to reduce harvest and thinning slash would occur during the spring or fall seasons when fuel moistures and atmospheric conditions contribute to low or moderate fire intensities with negligible impacts to the factors regulating slope stability. While some high intensity fire with individual tree mortality is likely, this is not representative of the overall effects of prescribed burning, as high intensity fire occurs infrequently in very small patches (<1 acre) that are widely distributed across each burn unit (activity area) and would not measurably increase slope stability hazards. Studies have shown that low intensity burns produce no mass erosion on extreme slopes (Burroughs and Thomas 1977, Gray and Megahan 1981). Therefore, these activities are not expected to measurably increase landslide activity or influence the factors controlling slope stability in the short or long term.

In addition, heavy maintenance on 1.3 miles of existing roads (mostly NFS roads 693 and 695) located on LSP areas would be expected to have beneficial effects on slope stability by improving drainage onto and off of the road surface. Portions of the surfaces on these roads are rutted and sections of the ditchline obstructed, which can lead to culvert blockage, road fill failures, and/or debris torrents. Maintenance activities would include cleaning the ditchline, reshaping the road surface to direct surface water, and placing aggregate on an additional 2.8 miles of the road surface. These activities would result in the roads being less prone to future slumps and/or culvert failures.

**Table 3-59. Acres of "Moderate" or "High" Slope Stability Hazard by Activity and Alternative**

| Activity Area (acres) | Alternative B | | Alternative C | | Alternative D | |
|---|---|---|---|---|---|---|
| | Harvest | Acres | Harvest | Acres | Harvest | Acres |
| Unit 7 (13.0) | Skyline | 0.2 | Skyline | 0.2 | Skyline | 0.2 |
| Unit 11 (25.0) | Tractor | 0.4 | Tractor | 0.4 | Tractor | 0.4 |
| Unit 12 (29.5) | Helicopter | 8.7 | — | — | — | — |
| Unit 13 (24.8) | Helicopter | 0.8 | — | — | — | — |
| Unit 14 (38.5) | Skyline | 4.5 | Skyline | 4.5 | Skyline | 4.5 |
| Unit 15 (17.4) | Tractor | 0.7 | Tractor | 0.7 | Tractor | 0.7 |
| Unit 16 (45.8) | Skyline | 2.1 | Skyline | 2.1 | Skyline | 2.1 |
| Unit 17 (4.6) | Tractor | 0.1 | — | — | — | — |
| Unit 18 (25.7) | Helicopter | 2.8 | — | — | — | — |
| Unit 19 (3.9) | Helicopter | 0.4 | — | — | — | — |
| Unit 22 (9.8) | Tractor | 1.5 | — | — | — | — |
| Unit 23 (28.5) | Skyline | 3.5 | Skyline | 3.5 | Skyline | 3.5 |
| Unit 24 (41.4) | Skyline | 0.1 | Skyline | 0.1 | Skyline | 0.1 |
| Unit 25 (26.8) | Helicopter | 7.4 | Helicopter | 7.4 | Helicopter | 7.4 |
| Unit 26 (45.4) | Helicopter | 16.2 | Helicopter | 16.2 | Helicopter | 16.2 |
| Unit 28 (58.9) | Helicopter | 11.2 | Helicopter | 11.2 | Helicopter | 11.2 |
| Unit 29 (27.9) | Helicopter | 1.3 | Helicopter | 1.3 | Helicopter | 1.3 |
| Unit 30 (106.2) | Helicopter | 13.9 | Helicopter | 13.9 | Helicopter | 13.9 |
| Unit 31 (9.2) | Helicopter | 0.4 | Helicopter | 0.4 | Helicopter | 0.4 |
| Unit 32 (17.5) | Helicopter | 1.3 | Helicopter | 1.3 | Helicopter | 1.3 |
| Unit 39 (78.5) | Tractor | 0.2 | Tractor | 0.2 | Tractor | 0.2 |
| Unit 40 (1.6) | Tractor | 0.7 | Tractor | 0.7 | Tractor | 0.7 |
| Unit 41 (10.6) | Tractor | 0.3 | Tractor | 0.3 | Tractor | 0.3 |
| Unit 42 (4.0) | Tractor | 0.4 | Tractor | 0.4 | Tractor | 0.4 |
| Unit 47 (103.7) | Skyline | 2.8 | Skyline | 2.8 | Skyline | 2.8 |
| Unit 52 (111.4) | Skyline | 1.6 | Skyline | 1.6 | Skyline | 1.6 |
| Unit 58 (12.1) | Helicopter | 0.2 | Helicopter | 0.2 | Helicopter | 0.2 |
| Unit 60 (13.3) | Helicopter | 0.2 | Helicopter | 0.2 | Helicopter | 0.2 |
| Unit 63 (33.8) | Skyline | 3.8 | Skyline | 3.8 | Skyline | 3.8 |
| Unit 67 (54.2) | Helicopter | 0.6 | Tractor | 0.6 | Tractor | 0.6 |
| Unit 69 (39.6) | Helicopter | 17.8 | Skyline | 17.8 | Skyline | 17.8 |
| Unit 70 (19.6) | Skyline | 1.6 | Skyline | 1.6 | Skyline | 1.6 |
| Unit 71 (19.3) | Skyline | 1.6 | Skyline | 1.6 | Skyline | 1.6 |
| Unit 72 (11.4) | Helicopter | 3.5 | Helicopter | 3.5 | Helicopter | 3.5 |
| Unit 74 (20.3) | Helicopter | 1.7 | Skyline | 1.7 | Skyline | 1.7 |
| Unit 76 (15.7) | Helicopter | 1.4 | Tractor | 1.4 | Tractor | 1.4 |
| Unit 77 (11.9) | Skyline | 2.2 | Skyline | 2.2 | Skyline | 2.2 |
| Unit 79 (11.1) | Helicopter | 3.7 | Helicopter | 3.7 | Helicopter | 3.7 |
| Unit 80 (28.2) | Skyline | 22.1 | Skyline | 22.1 | Skyline | 22.1 |
| Unit 81 (33.7) | Skyline | 23.5 | Skyline | 23.5 | Skyline | 23.5 |
| Unit 82 (5.2) | Skyline | 1.1 | Skyline | 1.1 | Skyline | 1.1 |
| Unit 83 (4.9) | Tractor | 2.5 | Tractor | 2.5 | Tractor | 2.5 |
| Unit 84 (58.0) | Helicopter | 3.8 | Helicopter | 3.8 | Helicopter | 3.8 |
| Unit 85 (87.1) | Helicopter | 8.2 | Helicopter | 8.2 | Helicopter | 8.2 |
| Unit 86 (98.5) | Helicopter | 23.5 | Helicopter | 23.5 | Helicopter | 23.5 |
| Unit 87 (12.0) | Helicopter | 0.8 | Helicopter | 0.8 | Helicopter | 0.8 |
| Unit 88 (35.2) | Skyline | 6.3 | Skyline | 6.3 | Skyline | 6.3 |
| Unit 90 (14.0) | Skyline | 7.5 | Skyline | 7.5 | Skyline | 7.5 |
| Unit 91 (55.7) | Skyline | 15.4 | Skyline | 15.4 | Skyline | 15.4 |
| Unit 92 (60.9) | Tractor | 1.2 | Tractor | 1.2 | Tractor | 1.2 |
| Unit 93 (65.6) | Tractor | 0.4 | Tractor | 0.4 | Tractor | 0.4 |
| Unit 96 (26.1) | Tractor | 0.7 | Tractor | 0.7 | Tractor | 0.7 |
| Unit 97 (94.8) | Tractor | 0.1 | Tractor | 0.1 | Tractor | 0.1 |
| Unit 98 (18.9) | Skyline | 10.3 | Skyline | 10.3 | Skyline | 10.3 |
| Unit 99 (12.4) | Tractor | 0.1 | Tractor | 0.1 | Tractor | 0.1 |
| Unit 101 (2.8) | Skyline | 1.3 | Skyline | 1.3 | Skyline | 1.3 |

| Activity Area (acres) | Alternative B | | Alternative C | | Alternative D | |
|---|---|---|---|---|---|---|
| | Harvest | Acres | Harvest | Acres | Harvest | Acres |
| Unit 102 (42.9) | Tractor | 6.8 | Tractor | 6.8 | Tractor | 6.8 |
| Unit 103 (11.5) | Skyline | 5.7 | Skyline | 5.7 | Skyline | 5.7 |
| Unit 105 (38.6) | Tractor | 1.1 | Tractor | 1.1 | Tractor | 1.1 |
| Unit 108 (63.1) | Tractor | 2.5 | Tractor | 2.5 | Tractor | 2.5 |
| Unit 112 (67.5) | Tractor | 0.1 | Tractor | 0.1 | Helicopter | 0.1 |
| Unit 113 (34.1) | Skyline | 8.4 | Skyline | 8.4 | Skyline | 8.4 |
| Unit 114 (79.3) | — | — | Skyline | 18.5 | Skyline | 18.5 |
| Unit 120 (34.4) | — | — | Tractor | 0.3 | Tractor | 0.3 |
| Unit 122 (83.0) | — | — | Tractor | 7.3 | Tractor | 7.3 |
| Unit 123 (49.2) | — | — | Skyline | 16.6 | Skyline | 16.6 |
| Unit 124 (42.2) | — | — | Skyline | 9.7 | Skyline | 9.7 |
| Unit 125 (23.1) | — | — | Skyline | 9.5 | Skyline | 9.5 |
| Unit 126 (7.2) | Helicopter | 0.1 | Tractor | 0.1 | Tractor | 0.1 |
| Unit 127 (6.2) | Helicopter | 0.2 | Tractor | 0.2 | Tractor | 0.2 |
| Unit 128 (10.5) | Helicopter | 0.2 | Tractor | 0.2 | Tractor | 0.2 |
| Unit 130 (8.2) | Helicopter | 2.0 | Skyline | 2.0 | Skyline | 2.0 |
| Unit 132 (1.5) | Helicopter | 0.7 | Tractor | 0.7 | Tractor | 0.7 |
| **Total Acres** | | **278.4** | | **326.0** | | **326.0** |

Decommissioning 2.1 miles of existing road located on LSP areas would also have a positive effect on slope stability. Stabilizing the road prisms would restore hydrologic function and reduce the likelihood of small localized landslides. Decommissioning the unauthorized roads, re-routed road segments, and temporary roads would mitigate slope stability concerns from management over the long term.

The cut/fill slopes for all newly constructed specified roads, [decommissioned] temporary roads, and all other decommissioned roads would require stabilization treatments intended to reduce the potential for short-term failure and increase stability over the long term. Design features to control erosion from new road construction may include but are not limited to certified weed free straw waddles or bales, slash filter windrows, and/or biodegradable erosion cloth. Stabilization treatments on decommissioned roads include some or all of the following: scarification of road bed, partial to full re-contour, removal of culverts and stabilization of stream crossings, eliminating motorized access from connecting roads, and seeding/mulching all disturbed areas with approved seed mixture. Nevertheless, the risk of temporary and short-term effects in the form of small slumps on cut/fill slopes and reclaimed slide slopes would exist for 1 to 5 years until vegetation is reestablished.

#### 3.8.3.3.2 Cumulative Effects

Giventhe selectivity of tree sizes to be removed, overall low intensity of proposed timber harvest activities, and absence of landslides from more intensive vegetation management since the late 1950s, there is a low probability for proposed activities, where they overlap with present/ongoing activities, to increase slope instability. Furthermore, design features should minimize slope instability concerns resulting from proposed harvest, thinning, prescribed fire, and road construction activities. Given the low potential for direct and indirect effects resulting from these activities, any incremental or cumulative effects would not be anticipated. However, as climate can be an unknown and uncontrolled factor influencing landslides, the road-related activities proposed under this alternative in combination with past activities pose unpredictable and but likely immeasurable adverse

cumulative effects on slope stability. Although design features would minimize the risk for landslides during and following road construction, the presence of these roads can result in a slight increase in slope instability over the long term. Proposed road maintenance and decommissioning activities would, however, reduce the potential of road failures at many locations, thus having a long-term beneficial cumulative effect on slope stability. The analysis to identify areas having slope stability concerns combined with implementing the field verification design feature (SW-11, section 2.4.2.1) complies with Forest Plan Standard SWST12.

### *3.8.3.4 Environmental Consequences of Alternative C*

#### 3.8.3.4.1 Direct and Indirect Effects

The issues presented under Alternative B, including the implementation of Design Feature SW-11 (section 2.4.2.1), are applicable to the potential effects expected under Alternative C. Similarly, the analysis and subsequent field verification in site-specific locations where instability features may exist suggests Alternative C would comply with Forest Plan Standard SWST12.

Commercial harvest activities would occur on an estimated 326 acres identified as either moderate or high for slope stability hazard (Table 3-59). The same thinning of submerchantable trees (26 acres) and prescribed fire (60 acres) activities would be implemented on slightly fewer LSP acres compared to Alternative B.

Approximately 0.5 miles of new routes (consisting of 10 road segments ranging from <0.1 to 0.3 mile) would be located on land mapped as either a moderate or high LSP rating. Newly created cut/fill slopes and vegetation removal associated with specified road construction (new construction and realignment) could increase the potential for subsurface water interception and concentration of surface water. The LSP road segments and land surfaces were reviewed using the high-resolution digital imagery and no existing landslide features were noted. Despite the apparent lack of landslide features, the design feature for field verification to validate the slope stability hazards and indentify the relative risks in the event of a failure would trigger application of the appropriate measures, as necessary, to avoid or prevent landslides. The analysis identified 11 temporary road segments totaling 0.2 miles that appear to be located on LSP areas. Where possible, the temporary roads would be located over improperly decommissioned road prisms/skid trails and would not include stream crossings. Otherwise, temporary roads would be located on or near ridges, thus minimizing the size of cut/fill slopes and the potential for subsurface water interception.

Decommissioning 2.4 miles of existing road located on LSP areas would also have a positive effect on slope stability. Stabilizing the road prisms would restore hydrologic function and reduce the likelihood of small localized landslides. Decommissioning the unauthorized roads, re-routed road segments, and temporary roads would mitigate slope stability concerns from management over the long term.

#### 3.8.3.4.2 Cumulative Effects

Given the selectivity of tree sizes to be removed, overall low intensity of proposed timber harvest activities, and absence of landslides from more intensive vegetation management since the late 1950s, there is a low probability for proposed activities, where they overlap

with present/ongoing activities, to increase slope instability. Furthermore, design features should minimize slope instability concerns resulting from proposed harvest, thinning, prescribed fire, and road construction activities. Given the low potential for direct and indirect effects resulting from these activities, any incremental or cumulative effects would not be anticipated. However, as climate is an unknown and uncontrolled factor influencing landslides, the road-related activities proposed under this alternative in combination with past activities pose unpredictable but likely immeasurable adverse cumulative effects on slope stability. Although design features would minimize the risk for landslides during and following road construction, the presence of these roads can result in a slight increase in slope instability over the long term. Proposed road maintenance and decommissioning activities would, however, reduce the potential of road failures at many locations, thus having a long-term beneficial cumulative effect on slope stability. The analysis to identify areas having slope stability concerns combined with implementing the field verification design feature (SW-11, section 2.4.2.1) maintains compliance with Forest Plan Standard SWST12.

#### *3.8.3.5 Environmental Consequences of Alternative D*

##### 3.8.3.5.1 Direct and Indirect Effects

The expected direct and indirect effects for Alternative D are the same as Alternative C. Similarly, the analysis suggests Alternative D is consistent with Forest Plan Standard SWST12.

##### 3.8.3.5.2 Cumulative Effects

The expected cumulative effects for Alternative D are the same as Alternative C. Similarly, the analysis suggests Alternative D is consistent with Forest Plan Standard SWST12.

### 3.8.4 Effective Ground Cover

#### *3.8.4.1 Affected Environment*

Ground (soil) cover maintained within inherent ranges would contribute to desired conditions for soil quality and overall watershed health. Ground cover consists of live or dead plant cover at or near the soil surface, including plant litter and rock (Forest Service 2010a, GL-12). While the activity areas for EGC are defined as the individual units where vegetation treatments are proposed to be implemented (commercial timber harvest or fuels units), the EGC values displayed in Table 3-60 represent the dominant soil unit within the delineated land type map unit for multiple activity areas. The EGC desired conditions for the dominant soil unit underlying the treatment prescriptions is used as the baseline for comparing potential effects of the proposed activities to the existing conditions.

The status and trend describing existing conditions for EGC are displayed in Table 3-60. These values were derived from a combination of SHA data, stand exam data, fuels data, and general field observations. Considering management activities or natural disturbances that could notably influence EGC have been absent from the Project area, an underlying assumption is the status and trends for EGC are meeting desired conditions in the specific locations where treatments are proposed. There are scattered areas along the perimeters of forested stands in the south one-half of the Project area where temporary, seasonal impacts to EGC are evident from livestock use that consists of once-over utilization, which is basically

livestock trailing through the area. There are other site-specific areas, which are primarily localized settings <1 acre in size adjacent to existing roads where dispersed recreation and OHV use are limiting ground cover potential. These impacts are disclosed under the more restrictive soil quality Forest Plan standards for DD or TSRC.

### *3.8.4.2 Environmental Consequences of Alternative A—No Action*

#### 3.8.4.2.1 Direct and Indirect Effects

Because no ground-disturbing activities would be implemented under Alternative A, no direct or indirect effects on EGC would occur within the activity areas (forested stands) (Table 3-60). Current status and trends for EGC would not change when compared to the existing conditions. This alternative would continue compliance with Forest Plan Guideline SWGU05.

#### 3.8.4.2.2 Cumulative Effects

Because the direct and indirect effects of either alternative on EGC would be limited to the treatment units, the cumulative effects analysis area for EGC consists of the same delineations. The existing EGC levels, in comparison to desired ranges, the ongoing livestock grazing and dispersed recreation disturbances do not appear to be negatively affecting EGC. Considering no large-scale activities are being implemented or planned in the future, the existing conditions for EGC represent the Alternative A (No Action) cumulative effects.

The NFS lands defining the Project area boundary include one permitted livestock grazing allotment. Therefore, the livestock uses overlap the individual treatment units delineated for the EGC analysis. The cumulative effects on EGC would be limited to the ongoing livestock grazing, dispersed recreation, and fuelwood gathering activities that would be expected to continue over time. The existing conditions in Table 3-60 represent estimates for these past and present/ongoing disturbances. Seasonal impacts to EGC from these disturbances would be expected, but would not measurably increase in the temporary or short or long term.

There are no other present/ongoing or reasonably foreseeable activities within the cumulative impacts area that would affect this indicator.

### *3.8.4.3 Environmental Consequences of Alternative B—Proposed Action*

#### 3.8.4.3.1 Direct and Indirect Effects

The qualitative effects of implementing Alternative B are displayed in Table 3-60. Alternative B would be consistent with Forest Plan Guideline SWGU05. Alternative B includes multiple treatments (commercial and/or noncommercial thinning followed by prescribed fire) for the same ground. Disturbance to EGC within each activity area would not equal 100 percent, yet some of the treated ground would experience a temporary effect of having the existing ground cover either grubbed up and/or burned when implementing the proposed treatments.

The placement and use of primary and secondary skid trails to facilitate commercial timber harvest would result in bare ground. However, correctly implementing the treatment prescriptions and design features would result in temporary effects (one or two growing

seasons) as the disturbed vegetation recovered. As mentioned in the DD effects discussion, noncommercial thinning (submerchantable or, for aspen, enhancement) does not result in ground disturbance, therefore, no loss of EGC would result from implementing this activity. Overall, reducing stand density may increase ground cover over existing conditions because removing the overstory canopy would provide more favorable growing conditions for grasses and shrubs.

Prescribed fire poses a greater potential for effects to EGC. Burning planned on 963 acres to alleviate increased fuel loads can remove the EGC, with the following possible scenarios: low-to-moderate intensity burning with low soil burn severity removes the above ground material, but does not damage the root crown of live plants; burning EGC exposes the organic soil horizon, increasing its susceptibility to erosion, or longer duration burning consumes the organic soil horizon (FSM ID 2520-2012-1, February 7, 2012). All of these scenarios occur subsequent to a large-scale wildland fire event and decreases soil quality in the short and long term by increasing soil erosion and negatively impacting nutrient cycling. However, these effects have a low probability of occurring, as prescribed burning to reduce harvest and thinning slash would occur during the spring or fall seasons when fuel moistures and atmospheric conditions contribute to low or moderate fire intensities with low soil burn severity (Robichaud and Brown 1999, Stone et al. 2010). Properly implementing prescribed fire would result in temporary, negligible impacts to EGC but comply with the intent of Forest Plan Guideline SWGU05.

Moderate-to-high soil burn severity would be isolated to small areas (<1 acre), having either heavy concentrations of finer fuels or multiple large pieces (<8 inches d.b.h.) of CWD which are completely consumed by fire. In specific areas where prescribed fire may burn at higher intensity and possibly moderate-high severity, recovery of ground cover would be temporarily decreased (up to 3 years). Localized areas that burn at moderate and high severity would be buffered by adjacent areas that burned at low severity or did not burn. Therefore, any accelerated soil erosion would be confined to the severely burned areas and not occur at levels that would result in detrimental impacts to soils. Any large areas burned at undesired intensity and severity would be evaluated for potential rehabilitation measures to ensure long term soil quality is maintained (Fire Management Guideline, FMGU02 [Forest Service 2010a, p. III-42]).

**Table 3-60. Effective Ground Cover (EGC) by Soil Map Unit**

| Landtype[a] & Soils[b] | EGC Desired Condition [c] (%) | Existing Condition and Alternative A[d] (%) | Alternative B | | Alternatives C and D | | Treatment Effects[e] |
|---|---|---|---|---|---|---|---|
| | | | Harvest (acres) | Prescribed Fire (acres) | Harvest (acres) | Prescribed Fire (acres) | |
| 120a GEBA-5 | 90–100 | 85–95 | — | — | 12 | — | Temporary decrease in localized areas, return to Existing Conditions in 1–2 years. |
| 120b-4 GEBA-2 | 90–100 | 90–95 | 443 | 10 | 589 | 10 | Temporary decrease in localized areas, return to Existing Conditions in 1–3 years. |
| 120b-6 JEAA-2 | 50–75 | 75-85 | 558 | — | 559 | — | Temporary decrease in localized areas, return to Existing Conditions in 1–3 years. |
| 120c GEBA-2 | 90–100 | 85–95 | 1,250 | 408 | 1276 | 401 | Temporary decrease, return to Existing Conditions in 2–4 years. |
| 120c-11 IFBA-5 | 70–100 | 85–95 | 576 | 394 | 570 | 387 | Temporary decrease, return to Existing Conditions in 2–4 years. |
| 120c-3 GEBA-2 | 70–80 | 75–85 | 329 | 151 | 382 | 151 | Temporary decrease in localized areas, return to Existing Conditions in 2–4 years. |
| 120e-2 JEAA-3 | 75–100 | 89–93 | 93 | — | 188 | — | Temporary, negligible decrease in localized areas, return to Existing Conditions in 1–3 years. |
| 122-4 GEBA-5 | 90–100 | 85–95 | 14 | — | — | — | Temporary, negligible decrease in localized areas, return to Existing Conditions in 1–2 years. |

[a] Landtype: map unit representing land where proposed vegetation treatments are used to achieve Project objectives.
[b] Dominant soil unit within land type where vegetation treatments are proposed.
[c] From Table 3 in Wendt et al. (1973).
[d] Existing Condition estimated from vegetation, fuels, and soil health assessment (SHA) data from sites having respective land type/soils. Also represents Alternative A (no net change).
[e] Treatment Effects represent expected direct, indirect, and cumulative effects for Action Alternatives.

#### 3.8.4.3.2 Cumulative Effects

Because the direct and indirect effects of Alternative B on EGC would be limited to the treatment units, the cumulative effects analysis area for EGC consists of the same delineations. The existing EGC levels, in comparison to desired ranges, do not appear to have been affected by ongoing livestock grazing and dispersed recreation. The cumulative effects of implementing Alternative B are estimated to be similar to the status and trends estimated for the existing conditions (Table 3-60). Given the Project area's disturbance history, the fact that effects of present/ongoing activities are not expected to measurably influence EGC, and that no reasonably foreseeable land management activities are planned for the Project area, there would be no additional or incremental cumulative effects under Alternative B beyond

the previously described direct and indirect effects. The Forest Plan Guideline SWGU05 would be met.

The NFS lands defining the Project area boundary includes one permitted livestock grazing allotment. Where individual activity areas for implementing Alternative B overlap, livestock grazing defines the EGC cumulative effects analysis areas. Because dispersed recreation sites are usually located adjacent to roads, these disturbances are assumed to be within the same delinated footprint. The cumulative effects on EGC would be limited to the past and present/ongoing livestock grazing, dispersed recreation, and fuelwood gathering activities that would be expected to continue over time. The existing conditions in Table 3-60 represent estimates for these past and present/ongoing disturbances. Seasonal impacts to EGC from these disturbances would be expected, but would not considerably increase in the temporary or short or long term.

There are no other present/ongoing or reasonably foreseeable activities within the cumulative impacts area that would affect this indicator.

#### *3.8.4.4 Environmental Consequences of Alternative C*

##### 3.8.4.4.1 Direct and Indirect Effects

The qualitative effects estimated for implementing Alternative C would emulate those described for Alternative B. Alternative C would cause greater disturbance with commercial harvesting, and would mandate slightly fewer acres burned, but Alternative C would remain consistent with Forest Plan Guideline SWGU05.

##### 3.8.4.4.2 Cumulative Effects

The cumulative effects of implementing Alternative C are estimated to be similar to the status and trends estimated for Alternative B (Table 3-60). Given the Project area's disturbance history, the fact that the effects of present/ongoing activities are not expected to measurably influence EGC, and that no reasonably foreseeable land management activities are planned for the Project area, there would be no additional or incremental cumulative effects under Alternative C beyond the previously described direct and indirect effects. The Forest Plan Guideline SWGU05 would be met.

#### *3.8.4.5 Environmental Consequences of Alternative D*

##### 3.8.4.5.1 Direct and Indirect Effects

The treatments proposed under Alternative D that would influence EGC are essentially the same as Alternative C. Therefore, the expected direct and indirect effects for Alternative D would be the same as Alternative C. Similarly, the analysis suggests Alternative D is consistent with Forest Plan Guideline SWGU05.

##### 3.8.4.5.2 Cumulative Effects

The expected cumulative effects for Alternative D are the same as Alternative C, and the analysis suggests Alternative D is also consistent with Forest Plan Standard SWGU05.

## 3.9 BOTANICAL RESOURCES

This section incorporates by reference the Botanical Specialist's Report and Biological Evaluation (available in the Project Record), which contains the data, methodologies, analyses, conclusions, maps, references, and technical documentation. This section discusses the effects of each alternative on the Threatened, Endangered, Proposed, Candidate, R4 Sensitive, and Boise National Forest Watch (TESW) plant species.

The analysis area for direct, indirect, and cumulative effects for the botanical resources analysis is the 11,510-acre Project area. A 1.0-mile buffer around the Project area was used to evaluate incidental populations and/or subpopulations of TESW plants that exist outside the Project area to provide a broader context for the species considered in the analysis. As no rare plant populations or exceptional suitable habitat was identified in within this buffer area, it is accepted that activity effects to botanical resources would be limited to the Project area.

### 3.9.1 Botanical Resources Indicators

The indicators identified below were used to evaluate the measure of change between alternatives for botanical resources in the analysis area:

**Indicator: Presence of TESW plant populations or individuals.** This Indicator was used to evaluate whether actual TESW plants would be impacted by each alternative in the analysis area. The following measures were used for this indicator:

- Evaluation of known locations of TESW with reference to analysis area
- Surveys in analysis area for TESW plants

**Indicator: Presence of potential habitat for TESW plant populations or individuals.** This Indicator was used to evaluate whether habitat for TESW plants would be impacted by each alternative in the analysis area. The following measures were used for this indicator:

- Evaluation of PVGs for TESW plants with reference to analysis area
- Surveys in analysis area for TESW plant habitat

**Indicator: Ground-disturbing activities.** This Indicator was used to evaluate potential disturbance of potential habitat for TESW plant species in the analysis area as a result of proposed activities. The following measures were used for this indicator:

- Level of sensitivity of TESW plants as indicated by level of listing
- Overlap of potential habitat for TESW plants with ground-disturbing project activities
- Intensity of ground-disturbing project activities in potential habitat for TESW plants

### 3.9.2 Analysis Methodology

The USFWS maintain a list of Threatened, Endangered, Proposed and Candidate Species as required by the ESA. The only plant species from this list identified for Boise and Valley counties is the Candidate species, whitebark pine (USFWS 2011). The Regional Forester maintains a Sensitive Species list for the Intermountain Region. The current list is dated July 27, 2011 (Forest Service 2011c).

The *Boise National Forest Watch Plant List* (Forest Watch List) was updated in July 2012 (Forest Service 2012b) and may undergo further revision with additional species evaluated. Each Forest Botanist develops the Forest Watch Plant List for those Forest plants of local concern that may not qualify for the Regional Forester's Sensitive List.

The methodology used to complete the analysis was to evaluate the Project GIS data, including known locations for TESW plants and conduct a habitat analysis and field surveys to determine the impacts to the botanical resources by the alternatives. The area within a 1.0-mile buffer around the Project area was preliminarily chosen to evaluate incidental populations and/or subpopulations of TESW plants that exist outside the Project area boundaries to provide a broader context for the species considered in the analysis.

### 3.9.3 Affected Environment

Rare plant field surveys were conducted in summer 2007, 2008, and 2009. The surveys were conducted at all intensity levels (survey intensity descriptions are available in the Botanical Specialist Report in the Project Record); however, the entire Project area was not examined. The surveys focused on potential habitat for species that may be affected by Project activities. Information gathered during field surveys was used to evaluate existing conditions and potential impacts on TESW species. Project survey logs, daily survey notes, and mapped locations of survey transects are on file in the Project Record.

No known populations of any TESC, Region 4 Sensitive, or Forest Watch species occur within the analysis area. The closest known documented TESW plant is the Forest Watch Species, *Epipactis gigantea* (Giant helleborine orchid), which is known to occur near hot spring sites in the Middle Fork Payette River drainage (Figure 3-52).

The area proposed for management activities includes the following principle upland forested types: PVG 2 (Warm, Dry Douglas-fir/Moist Ponderosa Pine); PVG 5 (Dry Grand Fir), and PVG 6 (Moist Grand Fir). Additionally, a very small area of land is classified as PVG 8 (Warm, Moist Subalpine Fir) and PVG 9 (Hydric Subalpine Fir). Table 3-61 documents the likelihood of finding rare plants in the uplands of the Project area by PVG and lists rare species that may be found in riparian or wetland habitats (RCAs).

Based on the likelihood of finding rare plants in vegetation types within the Project area; field survey results; the presence of potential habitat and known characteristics of species tracked by the Forest (e.g., elevation, soils, moisture, exposure, aspect), the following six species were identified for further analysis:

- *Allium validum* (tall swamp onion)
- *Botrychium crenulatum* (scalloped moonwort)
- *Botrychium lineare* (slender moonwort)
- *Botrychium simplex* (least moonwort)
- *Lewisia sacajaweana* (Sacajawea's bitterroot)
- *Phacelia minutissima* (least phacelia)

Table 3-62 summarizes the status, habitat description, and habitat presence in the analysis area for these TESW plants.

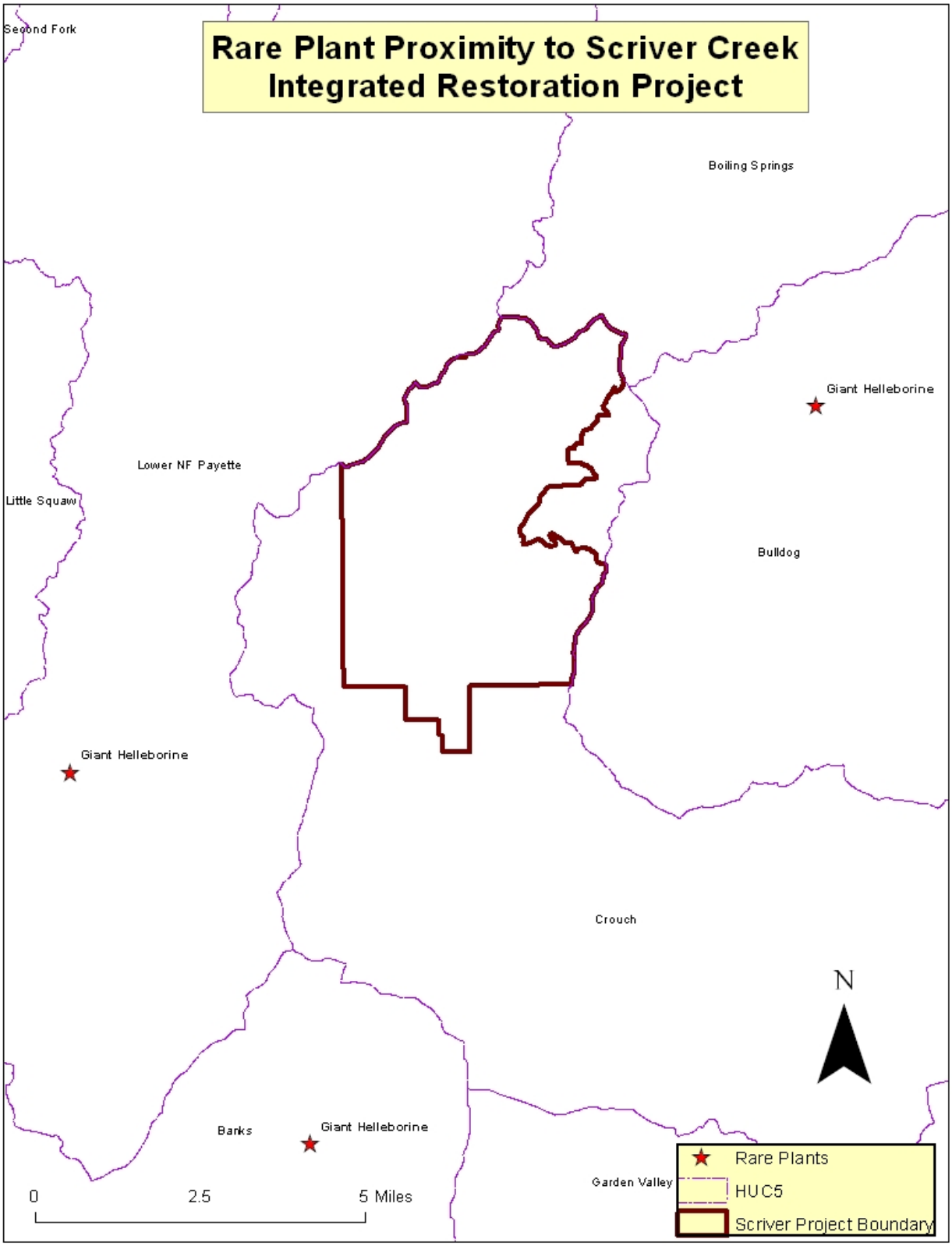


**Figure 3-52. Rare Plant Proximity to Scriver Project Area**

**Table 3-61. Threatened, Endangered, R4 Sensitive, and Forest Watch (TESW) species habitat and locations for the Scriver Creek Integrated Restoration Project by Potential Vegetation Group (PVG)**

| PVG | Acres (Percentage of Total Project Area) | Potential for TESW and Habitat | Potential TESW Species | |
|---|---|---|---|---|
| | | | Scientific Name | Common Name |
| 2 | 1,482 (13%) | Low to-Moderate | *Lewisia sacajaweana* | Sacajawea's bitterroot |
| | | | *Phacelia minutissima* | Least phacelia |
| 5 | 508 (4%) | Low to-Moderate | *Allotropa virgata* | Candystick |
| | | | *Botrychium crenulatum* | Scalloped moonwort |
| | | | *Botrychium lineare* | Slender moonwort |
| | | | *Botrychium simplex* | Least moonwort |
| | | | *Sanicula graveolens* | Northern sanicle |
| | | | *Sedum leibergii* | Leiberg stonecrop |
| 6 | 9,413 (82%) | Low to-Moderate | *Allium validum* | Tall swamp onion |
| | | | *Allotropa virgata* | Candystick |
| | | | *Botrychium crenulatum* | Scalloped moonwort |
| | | | *Botrychium lineare* | Slender moonwort |
| | | | *Botrychium simplex* | Least moonwort |
| 8 | 48 (<1%) | Moderate to High | *Allium validum* | Tall swamp onion |
| | | | *Allotropa virgata* | Candystick |
| | | | *Botrychium crenulatum* | Scalloped moonwort |
| | | | *Botrychium lineare* | Slender moonwort |
| | | | *Botrychium simplex* | Least moonwort |
| | | | *Lewisia sacajaweana* | Sacajawea's bitterroot |
| | | | *Sedum leibergii* | Leiberg stonecrop |
| 9 | 20 (<1%) | High | *Allium validum* | Tall swamp onion |
| | | | *Botrychium crenulatum* | Scalloped moonwort |
| | | | *Botrychium lineare* | Slender moonwort |
| | | | *Botrychium simplex* | Least moonwort |

| PVG | Acres (Percentage of Total Project Area) | Potential for TESW and Habitat | Potential TESW Species | |
|---|---|---|---|---|
| | | | Scientific Name | Common Name |
| NA (not classified separately) | | High | *Allium madidum* | Mountain swamp onion |
| | | | *Allium validum* | Tall swamp onion |
| | | | *Botrychium crenulatum* | Scalloped moonwort |
| | | | *Botrychium lineare* | Slender moonwort |
| | | | *Botrychium simplex* | Least moonwort |
| | | | *Bryum calobryoides* | Bryum moss |
| | | | *Carex parryana* var. *brevisquama* | Parry's sedge |
| | | | *Carex livida* | Livid sedge |
| | | | *Carex flava* | Yellow sedge |
| | | | *Cicuta bulbifera* | Bulblet-bearing water hemlock |
| | | | *Drosera intermedia* | Spoonleaf sundew |
| | | | *Epilobium palustre* | Marsh willowherb |
| | | | *Epipactis gigantea* | Giant helleborine orchid |
| | | | *Helodium blandowii* | Blandow's helodium moss |
| | | | *Hierochloe odorata* | Sweetgrass |
| | | | *Rhynchospora alba* | White beaksedge |
| | | | *Phacelia minutissima* | Least phacelia |
| | | | *Scheuchzeria palustris* | Annoch-rush |
| | | | *Schoenoplectus subterminalis* | Swaying bulrush |
| | | | *Spiranthes diluvialis* | Ute ladies'- tresses |
| | | | *Sphaeromeria potentilloides* var. *nitrophila* | Cinquefoil tansy |
| | | | *Triantha occidentalis* spp. *brevistyla* | Sticky tofieldia |
| Unclassified | 39 (<1%) | NA | NA | |

**Table 3-62. Rare Plants Analyzed in Detail for the Scriver Creek Integrated Restoration Project (U.S. Fish and Wildlife Service Listed, Proposed, and Candidate Species; Region 4 Sensitive species; and Forest Watch List species)**

| Species | Status | Habitat Description | Habitat Present in Analysis Area? |
|---|---|---|---|
| **USFWS Listed/Proposed and Candidate Species** | | | |
| None | | No suitable habitat identified in the project analysis area for any Listed, Proposed or Candidate species. | No |
| **Current Region 4 Sensitive** | | | |
| *Lewisia sacajaweana* Sacajawea's bitterroot | R4 Sensitive | Relatively sparse upper slopes and ridgetops that may have an overstory. Fractured bedrock and granitic soils near late snowbanks. Present at 5,400–9,500 feet. | Yes[a] |
| *Phacelia minutissima* Small Phacelia | R4 Sensitive | Sagebrush and aspen stands with late snow banks or seeps. Dense false hellebore patches, down slope from aspen, open understory. Present at 5,000–8,200 feet. | Yes[a] |
| **Forest Watch List Species** | | | |
| *Allium validum* Tall swamp onion | Forest Watch List | Mid-to-high elevation riparian areas, forested seeps, margins of streams in subalpine fir habitat, boggy subalpine lake edges. Present at 5,500–8,100 feet. | Yes[a] |
| *Botrychium crenulatum* Scalloped moonwort | Forest Watch List | Moist meadows, creek banks, shrub- or tree-dominated wetlands, springy spots, and wet roadside areas. Present at 3,900–8,200 feet. | Yes[a] |
| *Botrychium lineare* Slender moonwort | Forest Watch List | Wide variety of habitats, including meadows and forested types. Found from sea level to 10,000 feet. | Yes[a] |
| *Botrychium simplex* Least moonwort | Forest Watch List | Wide variety of habitats, including meadows and forested types. Found at 4,000–6,600 feet + or- on BNF. | Yes[a] |

Source: U.S. Fish and Wildlife Service list is available at http://www.fws.gov/idaho/species/IdahoSpeciesList.pdf; GIS data available in Project Record.
aYes = no documented sites are known from Project area, but potential habitat/or populations may occur in the analysis area

***Lewisia sacajaweana* (formerly *L. kelloggii*; Wilson et al. 2005) (Sacajawea's bitterroot):** This small, perennial fleshy leaved rosette is typically found on sparsely vegetated, gravelly openings in decomposed granite, commonly near late snow banks, upper slopes, and ridgetops. *Lewisia sacajaweana* is endemic to the mountains of central Idaho, growing at elevations between 5,400 and 9,500 feet. It is typically found on open balds or under an open overstory of several different conifer species, including ponderosa pine, Douglas-fir, subalpine fir, lodgepole, and whitebark pine. The plant is often found with a specific, yet diverse group of high-elevation forbs (Forest Service 2000a).

*Lewisia sacajaweana* was recently formally recognized as a new species (Wilson et al. 2005), and is now considered to be "Globally Rare" rather than a "State Rare" taxon.

The closest *Lewisia sacajaweana* population to the Project area is about 10 miles to the east near Scott Mountain. No *Lewisia sacajaweana* populations were identified during field surveys. Aerial photography was used to identify approximately 9.0 acres of potential *Lewisia sacajaweana* habitat within the Project area, namely sparsely vegetated openings or balds on granitic soils above 5,400 feet.

***Phacelia minutissima* (small or least phacelia)**: This tiny lavender-flowered annual grows in upper-elevation (5,000 to 8,200 feet) ephemerally moist drainages in sagebrush-steppe or lower montane ponderosa pine or Douglas-fir forests. It is often near areas of late snow banks, typically occurring in meadows, springs, and seeps. Idaho populations occur mostly in stands of *Veratrum californicum* (or *Veratrum viride*) false hellebore and adjacent forbs/grasses or near mixed aspen, willow, and subalpine fir communities above 5,000 feet (Atwood 1997).

No known locations of this plant occur on the Forest (GIS data available in project record). The two documented sites north of the Snake River (Soldier Mountain on the Sawtooth National Forest and Hash Spring on the Shoshone Bureau of Land Management [BLM] District) are historic; surveys conducted in the 1990s failed to relocate the sites. Multiple occurrences are known from the southwestern corner of Idaho in the Owyhee Mountains.

Suitable habitat may exist within the project boundaries for this plant in moist patches of aspen, grassland/sagebrush seeps, stands of false hellebore, or moist portions of non-forested areas above 5,000 feet.

***Allium validum* (tall swamp onion)—***Allium validum* is found in mid-to-high elevation riparian areas, wet meadows, forested seeps, and along stream margins in subalpine-fir habitat and boggy subalpine lake edges. When in bloom in July and August, it is easily recognizable by its bright pink flowers and flat, succulent blue-green leaves. *Allium validum* is found at elevations between 5,500 and 8,100 feet (Forest Service 2000a).

The nearest population is about 8 miles to the east of the Project area in Onion Valley below Lightning Ridge (GIS data available in project record). Suitable habitat in the Project area would be at the upper elevations in seeps, moist streambanks, or meadows. Streams located above 5,500 feet within the Project area may provide habitat wet enough for *Allium validum*. This plant would not be found in the dry, upland vegetation types.

***Botrychium* spp. (moonwort ferns), including *Botrychium crenulatum* (scalloped moonwort); *Botrychium lineare* (slender moonwort); and *Botrychium simplex* (least moonwort)—***Botrychium* species are very small perennial ferns that typically occur in moist grass/forb meadows, open woodlands, and montane forests or near streams, springs, seeps, or other wet areas. *Botrychium* species occur over a wide elevational range from sea level to over 10,000 feet. Common associates may be *Fragaria* (strawberry), *Antennaria* (pussy-toes), *Galium* (bedstraw), *Symphoricarpos* (snowberry), *Vaccinium* (huckleberry), *Festuca* (fescue), and a variety of conifer species and aspens (USFWS 2001).

Because of their diminutive size and irregular appearance of above-ground fronds, they are difficult to survey for and populations can often go undetected. Plants may remain dormant underground for as long as 5 years, receiving nutrients through obligate association with endomychorrizal fungi (USFWS 2001). *Botrychium* species are notorious for being difficult

to distinguish, and to further confuse matters, often appear in “genus clusters”, where a number of species grow in the same area.

Members of this genus range widely in rarity, and species such as *Botrychium lineare* are known to occupy only 22 sites worldwide (USFWS 2007; Nature Serve 2010). The closest known population of *Botrychium lineare* is to the west in the Lostine Range of the Wallowa Whitman National Forest.

Recently, several populations of *Botrychium* species, including *Botrychium simplex* and *Botrychium crenulatum* were discovered in a variety of habitats across the Forest. These species belong in the subgenus Botrychium. *Botrychium multifidum* (leathery grape-fern) and *Botrychium virginianum* (rattlesnake fern) have also been located on several Boise National Forest Ranger Districts. These later two species are in a different part of the genus and are not considered rare. However, they have been placed on the Forest Watch List because they are relatively uncommon on the Forest and can prove valuable as indicators for suitable potential habitat for species in the *Botrychium* subgenus. These Indicator species will not be addressed in detail in this report.

Three populations of *Botrychium simplex* are known on the Forest (GIS data available in project record). The closest is in the Banner Creek Fen/Bull Trout Lake area (Lowman RD), growing on the wetland margin of a *Carex buxbaumii* (Buxbaum’s sedge)/ *Carex aquatilis* (water sedge*)* community in the gaps of the *Pinus contorta* (lodgepole)/ *Dasiphora fruticosa* (shrubby cinquefoil) upland community. A second population occurs at Tranquil Basin (Lowman RD) in openings of mesic forbs/graminoids growing transitionally between *Salix* (willow)/ *Deschampsia caespitosa* (tufted hairgrass) and *Calamagrostis canadensis* (bluejoint reedgrass) /*Salix* communities and a drier meadow. *Botrychium simplex* has also been identified at two locations (may be considered subpopulations) in the Johnson Creek Road corridor (Cascade RD), where they occupy grassy swales surrounded by lodgepole pine dominated uplands characterized as PVGs 7 and 10.

Three documented populations of *Botrychium crenulatum* occur on the Forest (GIS data available in project record). The closest to the Project area occurs in the Bear Creek Research Natural Area (RNA) (Lowman RD) on a moist lower terrace along the stream channel (with possible frequent flooding) under a dense shrub canopy of *Rhamnus alnifolia* (alderleaf buckthorn), with an understory of *Ribes* (gooseberry) and Carex (sedges). A second population is known from a riparian area to the south in the Roaring River RNA. Here, a solitary specimen was found growing along the Roaring River (Mountain Home RD) on a rocky streambank terrace under *Cornus sericea* (red-osier dogwood), and surrounded by other common riparian shrubs, forbs, and grasses. The third known *Botrychium crenulatum* population is located along a small, unnamed stream near Harris Creek Summit (Idaho City RD) in the understory of willows and other riparian shrubs.

The closest documented *Botrychium* species population to the Project area is about 14 miles northeast in Tranquil Basin. No *Botrychium* species have been so far identified within the Project area, but suitable habitat exists in the perennial drainages or wet areas, meadows, aspen stands, or moist swales in upland habitat. It is unlikely that *Botrychium* species would be found outside RCAs in the driest habitat types. Because these plants are difficult to locate and they lack consistent above-ground vegetative displays, the plants cannot be assumed to not occupy the Project area even if they were not located during field surveys.

## 3.9.4 Environmental Consequences of Alternative A—No Action

### *3.9.4.1 Direct and Indirect Effects*

Alternative A (No Action) does not propose any new management actions in the analysis area. No known populations or subpopulations of TESW occur within the analysis area although potential habitat for six TESW species does occur (Table 3-62). No direct effects would occur as a result of this alternative because no ground-disturbing activities that would impact TESW plant species or potential habitat would occur. Indirect effects of Alternative A may include loss of TESW habitat due to increasing shrub fields and canopy cover in forested stands, as well as noxious weed colonization and/or alteration of plant community composition.

### *3.9.4.2 Cumulative Effects*

#### 3.9.4.2.1 Past Actions

Appendix B of this document outlines the past, ongoing, and reasonably foreseeable actions evaluated for inclusion in this analysis. Past management actions have been considered in describing the existing conditions of the TESW plants species or habitat in the analysis area.

#### 3.9.4.2.2 Present Actions

Present activities in the analysis area include active timber harvest (Stolle 7, Peacemaker, and Frontier vegetation management projects). Ongoing activities that would be expected to continue in the future would include recreational activities, road use and maintenance activities, trail use and maintenance activities, livestock grazing, and wildfire suppression as needed.

Cumulative impacts of the present and ongoing activities with the indirect effects associated with Alternative A in the analysis area would include continued and/or additional soil disturbance and the resulting habitat disturbance, potential additional noxious weed colonization, and/or alteration of vegetative communities in TESW plant habitat.

#### 3.9.4.2.3 Reasonably Foreseeable Actions

Reasonably foreseeable projects and activities in the analysis area that could cumulatively impact TESW plants include the Scriver Creek Trail Project, Scriver Creek Snowmobile Bridge Project, and Rocky Canyon Prescribed Fire Project. The Rocky Canyon Prescribed Fire project proposes to reintroduce low-to-moderate intensity fire to the dominant nonlethal fire regimes, as well as improve vegetative and wildlife habitat conditions in the eastern portion of the analysis area and the area immediately east of the analysis area. The Scriver Creek Trail and Scriver Snowmobile Bridge project proposals are being developed and are not finalized to date. The Scriver Creek Trail project could add miles of NFS trails using new trail construction, conversion of existing NFS roads to trail, and/or designation of NFS trail on NFS road (i.e., dual designation) within the analysis area. In conjunction with other landowners, the Scriver Creek Snowmobile Bridge project would replace an existing snowmobile bridge with a new bridge to provide access for over snow use that meets Forest Service standards.

Cumulative impacts of reasonably foreseeable activities with the indirect effects associated with Alternative A in the analysis area would include continued and/or additional soil disturbance and the resulting habitat disturbance, potential additional noxious weed colonization, and/or alteration of vegetative communities in TESW plant habitat.

### 3.9.5 Environmental Consequences of Alternative B—Proposed Action

#### *3.9.5.1 Direct and Indirect Effects*

No documented rare plant populations occur within the analysis area although potential habitat for several species exists, particularly near streams, seeps, springs, or areas that otherwise retain moisture; aspen stands; and upper elevation, open, sparsely vegetated granitic uplands. Drier ponderosa pine and grand fir vegetation types have a lower likelihood of providing suitable environmental conditions for the species analyzed in this report, especially at lower elevations.

The actions proposed under Alternative B vary widely in potential impacts to rare plants and suitable rare plant habitat. Potential impacts are displayed in Table 3-63, which integrates assumed potential impacts to rare plant species/habitat and the likelihood of those impacts occurring. These rankings are best estimates based on type of habitat that the plants occupy (e.g., PVG, elevation, RCA/upland); proximity of known populations; habitat availability within locations of the proposed activities; and the predicted severity of potential impacts.

This section will address effects to populations and potential habitat for plants described in the “Affected Environment” section. Species may be grouped where effects are expected to be similar. Direct and indirect effects will be considered those that occur within the Project area boundaries. Following Table 3-63 is a more detailed discussion of effects of specific activities to the plant species described above.

**Table 3-63. Anticipated Effects to Rare Plants Analyzed for the Scriver Creek Integrated Restoration Project under Alternative B by Proposed Activity**

| Proposed Activity (Proposed Action – Alternative B) | Scope of Activity | *Lewisia sacajaweana*[a] | *Phacelia minutissima*[a,b] | *Allium validum*[b] | *Botrychium lineare*[a,b] | *Botrychium crenulatum*[b] | *Botrychium simplex*[b] |
|---|---|---|---|---|---|---|---|
| **Commercial Treatment by Yarding System** | | | | | | | |
| Tractor/Off Road Jammer | 1,212 acres | S/L | S/L | N | S/L | S/L | S/L |
| Skyline | 969 acres | S/L | S/L | N | S/L | S/L | S/L |
| Helicopter | 1,084 acres | S/L | N | N | S/L | S/L | S/L |
| Subtotal Commercial | 3,265 acres | — | — | — | — | — | — |
| **Noncommercial Treatment** | | | | | | | |
| Plantation Outside Riparian Conservation Areas | 676 acres | N | N | N | N | N | N |
| Plantation Within Riparian Conservation Areas | 163 acres | N | S/L | N | S/L | S/L | S/L |
| Subtotal Noncommercial Treatment | 839 acres | — | — | — | — | — | — |
| Total Mechanically Treated | 4,104 acres | N | N | S/L | S/L | S/L | S/L |
| **Treatment by Potential Vegetation Group** | | | | | | | |
| Potential Vegetation Group 2 | 1,069 acres | N | N | N | N | N | N |
| Potential Vegetation Group 5 | 36 acres | N | N | N | N | N | N |
| Potential Vegetation Group 6 | 2,999 acres | S/L | S/L | S/L | S/L | S/L | S/L |
| Total Potential Vegetation Group Acres | 4,005 acres | S/L | S/L | S/L | S/L | S/L | S/L |

| Proposed Activity (Proposed Action – Alternative B) | Scope of Activity | *Lewisia sacajaweana*[a] | *Phacelia minutissima*[a,b] | *Allium validum*[b] | *Botrychium lineare*[a,b] | *Botrychium crenulatum*[b] | *Botrychium simplex*[b] |
|---|---|---|---|---|---|---|---|
| **Silvicultural Prescription** | | | | | | | |
| Improvement Cut | 2,196 acres | S/L | S/L | N | S/L | S/L | S/L |
| Commercial Thin | 1,069 acres | S/L | S/L | N | S/L | S/L | S/L |
| Total Acres | 3,265 acres | — | — | — | — | — | — |
| **Vegetation Cumulative Effects Area** | | | | | | | |
| Vegetation Cumulative Effects Area | 4,532 acres | N | S/L | N | S/L | S/L | S/L |
| **Fuels Treatments—Commercial Treatment** | | | | | | | |
| Whole Tree Yard and Prescribed Underburn | 500 acres | N | N | N | S/L | S/L | S/L |
| LOP and Prescribed Underburn | 462 acres | N | N | N | S/L | S/L | S/L |
| LOP to 36 inches Only | 622 acres | S/L | S/L | S/L | S/L | S/L | S/L |
| Whole Tree Yard and Haulback | 1011 acres | S/L | N | N | S/M | S/M | S/L |
| Whole Tree Yard and Burn Landing Piles | 670 acres | S/L | N | N | S/L | S/L | S/L |
| Total Acres | 3265 acres | — | — | — | — | — | — |
| **Prescribed Underburn** | | | | | | | |
| Prescribed Underburn Area | 962 acres | N | N | N | S/L | S/L | S/L |
| **Helicopter Landings** | | | | | | | |
| New | 14 landings | S/L | N | N | N | N | N |
| Existing | 1 landing | S/L | N | N | N | N | N |
| Total Helicopter Landings | 15 landings | — | — | — | — | — | — |

| Proposed Activity (Proposed Action – Alternative B) | Scope of Activity | *Lewisia sacajaweana*[a] | *Phacelia minutissima*[a,b] | *Allium validum*[b] | *Botrychium lineare*[a,b] | *Botrychium crenulatum*[b] | *Botrychium simplex*[b] |
|---|---|---|---|---|---|---|---|
| **AOP Culvert Replacements** | | | | | | | |
| NFS road 695 at Middle Fork or Scriver Creek | 1 culvert | N | N | N | S/L | S/L | S/L |
| NFS road 693A at Scriver Creek | 1 culvert | N | N | N | S/L | S/L | S/L |
| NFS road 693 at Scriver Creek | 1 culvert | N | N | N | S/L | S/L | S/L |
| NFS road 693B at Scriver Creek | 0 culverts | N | N | N | S/L | S/L | S/L |
| NFS road 693 at West Fork of Scriver Creek | 0 culverts | N | N | N | S/L | S/L | S/L |
| Total Number of Culverts | 3 culverts | — | — | — | — | — | — |
| **Transportation System—Decommission** | | | | | | | |
| National Forest System Road | 12.8 miles | S/ LB | S/ LB | S/ LB | S/ LB | S/ LB | S/ LB |
| Unauthorized | 3.3 miles | S/ LB | S/ LB | S/ LB | S/ LB | S/ LB | S/ LB |
| Realignment | 3.8 miles | S/ LB | S/ LB | S/ LB | S/ LB | S/ LB | S/ LB |
| Total Decommission | 19.8 miles | — | — | — | — | — | — |
| **Transportation System—New Road Construction** | | | | | | | |
| New Specified Road Construction—National Forest System Roads | 2.7 miles | S/L | S/L | S/L | S/L | S/L | S/L |
| Temporary Road Construction | 1.0 mile | N | N | N | S/L | S/L | S/L |
| Total Road Construction | 3.7 miles | — | — | — | — | — | — |

| Proposed Activity (Proposed Action – Alternative B) | Scope of Activity | *Lewisia sacajaweana*[a] | *Phacelia minutissima*[a,b] | *Allium validum*[b] | *Botrychium lineare*[a,b] | *Botrychium crenulatum*[b] | *Botrychium simplex*[b] |
|---|---|---|---|---|---|---|---|
| **Transportation System—Road Reconstruction** | | | | | | | |
| NFS road 696 Realignment (New Prism) | 4.3 miles | N | S/L | S/L | S/L | S/L | S/L |
| NFS road 696 Realignment (Existing Prism) | 3.5 miles | N | S/L | S/L | S/L | S/L | S/L |
| Subtotal NFS road 696 Realignment | 7.8 miles | — | — | — | — | — | — |
| NFS road 696D Realignment (New Prism) | 0.1 miles | N | S/L | S/L | S/L | S/L | S/L |
| NFS road 696D Realignment (Existing Prism) | 0.4 miles | N | S/L | S/L | S/L | S/L | S/L |
| Subtotal NFS road 696D Realignment | 0.5 miles | — | — | — | — | — | — |
| NFS road 693 New Surface Aggregate | 2.8 miles | N | S/L | N | S/L | S/L | S/L |
| NFS road 693B New Surface Aggregate | 0 miles | N | S/L | N | S/L | S/L | S/L |
| Subtotal New Surface Aggregate | 2.8 miles | — | — | — | — | — | — |
| Total Road Reconstructions | 11.1 miles | — | — | — | — | — | — |
| **Road Maintenance** | | | | | | | |
| Road Maintenance | 39.3 miles | N | S/L | S/L | S/M | S/M | S/M |
| **Unauthorized Route Stabilization** | | | | | | | |
| Stabilization | 0 miles | N | N | N | N | N | N |

| Proposed Activity (Proposed Action – Alternative B) | Scope of Activity | *Lewisia sacajaweana*[a] | *Phacelia minutissima*[a,b] | *Allium validum*[b] | *Botrychium lineare*[a,b] | *Botrychium crenulatum*[b] | *Botrychium simplex*[b] |
|---|---|---|---|---|---|---|---|
| **Roads—Other** | | | | | | | |
| Maintenance Level 1 | 38.7 miles | N | S/L | S/L | S/L | S/L | S/L |
| Maintenance Level 2 | 17.1 miles | N | S/L | S/L | S/M | S/M | S/M |
| Maintenance Level 3 | 8.6 miles | N | S/L | S/L | S/M | S/M | S/M |
| Total Authorized Road miles | 64.4 miles | — | — | — | — | — | — |
| Existing Aggregate | 9.7 miles | N | N | N | S/L | S/L | S/L |
| Groomed Snowmachine Trail | 21.2 miles | NA | NA | NA | NA | NA | NA |
| Motorized Trail Open Yearlong—NFS route 035 | 1.7 miles | S/L | S/L | S/L | S/L | S/L | S/L |
| Motorized Trail Seasonal Closure NFS route 448 | 4.0 miles | N | S/L | S/L | S/L | S/L | S/L |

Note: **N**—No Habitat at Activity Site; **S**—Suitable Habitat; **LB**—Long term Benefit; **O**—Occupied Habitat
**H**—Risk High; **M**—Risk Medium: **L**—Risk Low
**NA**—Not Applicable
[a]U—Upland
[b]R—Riparian/Wetland

#### 3.9.5.1.1 Direct and Indirect Effects to Analyzed Rare Plant Species

***Lewisia sacajaweana*—**No known populations of *Lewisia sacajaweana* occur in the Project area. Approximately 9.0 acres of potential habitat (sparsely vegetated openings or balds on knobs of granitic soils above 5,400 feet) was identified in the analysis area through aerial photography.

Risk to potential *Lewisia sacajaweana* habitat from proposed activities is expected to be very low. The patches of suitable habitat identified within the Project area do not directly overlap with proposed activities; however, because tractor logging and associated activities including road construction are planned nearby (< 0.1 mi away), the risk is not totally eliminated. No landing use, landing construction or prescribed burning is planned within the 9.0 acres within the Project area identified as potential *Lewisia sacajaweana* habitat. Any impacts occurring to suitable or potential habitat are expected to be incidental.

***Phacelia minutissima*—**Typical habitat for *Phacelia minutissima* in Idaho has been described as occurring in stands of false hellebore and adjacent forbs/grasses or near mixed aspen, willow, subalpine fir communities above 5,000 feet. Suitable habitat may be present in the Project area in RCAs or aspen patches at upper elevations. As aspen patches here are limited and small, the greatest likelihood would be within the RCAs.

The effects to riparian or wetland habitat for *Phacelia minutissima* would be similar to that for *Botrychium* species and *Allium validum*. Anticipated affects to suitable habitat for this species relative to proposed activity range from none to low. Activities that would most likely affect habitat include road construction/realignment/decommissioning/maintenance and culvert removal/replacement occurring in RCAs above 5,000 feet. The three targeted culvert replacements for Alternative B are below 5,000 feet. The interior and south end of the Project area also lie below the typical elevation range of this species, excluding potential impacts from much of the vegetation treatments, prescribed fire, use of helicopter landings, and road-related activities.

Risk to suitable habitat is lowered by the following design features that would protect the integrity of RCAs:

- FF-1—Construct no fireline and/or handline within RCAs
- FF-2 and SW-8—No fueling or storing of hazardous fuel in RCAs
- FF-6—Do not allow direct fire ignitions within RCAs
- TH-4—Timber Sale Administrator shall approve skid trails prior to development and use to limit impacts to plantations and/or other resources
- RM-3—Install erosion control devices to minimize sediment delivery to streams from road management activities
- SW-2—Allow thinning of noncommercial trees (i.e., <8 inches d.b.h.) within RCAs, except within 15 feet of perennial and intermittent streams, ponds, lakes, reservoirs, and wetlands. Trees felled as part of noncommercial thinning within RCAs would be left onsite.
- SW-3—Prohibit commercial timber harvest or ground-based skidding within RCAs
- SW-9—All log landings are currently designed to be located outside of RCAs

***Allium validum*—**This plant is found at mid-high elevation riparian areas, wet meadows, forested seeps, along stream margins in subalpine-fir habitat and boggy subalpine lake edges, typically above 5,500 feet. No known populations occur in the Project area, and no plants were identified during field surveys.

The effects to riparian or wetland habitat for *Allium validum* would be similar to that for *Botrychium* species and *Phacelia minutissima*. Anticipated affects to suitable habitat for this species relative to proposed activity range from none to low. Activities that would affect most likely affect habitat include road construction/realignment/decommissioning/maintenance and culvert removal/replacement occurring in RCAs above 5,500 feet. The interior and south end of the Project area lie below this elevational range, excluding potential impacts from much of the vegetation treatments, prescribed fire, use of helicopter landings, and road-related activities.

Risk to suitable habitat for *Allium validum* is lowered by the same design features described above that would help maintain *Phacelia minutissima* habitat.

***Botrychium* species—***Botrychium* species are very small perennial ferns that typically occur in moist grass/forb meadows; open woodlands and montane forests; or near streams, springs, seeps, or other wet areas. *Botrychium* species are found from sea level to over 10,000 feet. No known *Botrychium* species populations occur in the Project area, and no plants were identified during field surveys. However, due to the minute size of these rare ferns, irregular above-ground appearance, and their deciduous nature, asserting their absence is difficult.

The highest quality of *Botrychium* species habitat within the Project area is found within RCAs, particularly at higher, cooler, and moister portions. The effects to riparian or wetland habitat for *Botrychium* species would be similar to that for *Allium validum* and *Phacelia minutissima*.

Risk to suitable habitat for *Botrychium* is lowered by the same design features described above that would help maintain *Allium validum* and *Phacelia minutissima* habitat.

However, *Botrychium* species have also been identified within aspen stands on the Forest in ephemerally moist, grassy swales inside conifer stands. This additional potential habitat extends the possibility of proposed activity impacts to include vegetation management. Of the vegetation types where most of the activity would occur (i.e., PVG 2, 5, and 6), PVG 6 is the only type likely to harbor pockets of suitable *Botrychium* species habitat.

Impacts of forest management activities, such as timber harvest or thinning, on *Botrychium* species are not well known since little research has been done in this area. Logging systems that incur ground disturbance (e.g., tractor jammer, skid trails) have a higher potential to impact subterranean structures and associated endomycorrhizal fungi of *Botrychium* plants. While research has shown that some limited disturbance to the above-ground portion of the plants can be sustained, destroying the underground network could have long-lasting (>15 years) impacts. In this event, recolonization would have to occur through distribution of spores from plants in undisturbed areas.

Both noncommercial treatment and commercial treatment activities may change light by altering canopy cover, hydrologic regimes, airflow, and microclimate. These changes may be positive or negative, and impacts could range from temporary (0–3 years) to long term (15 or more years).

Additional disturbance from tractor jammer landing construction is expected to be minimal. Existing landings, which may require additional maintenance, and wide open spaces along existing and temporary roads would be used. Risk to upland *Botrychium* species habitat should be low where existing disturbed areas are utilized as landings, and design features (SW-9) would be in place to protect RCAs (i.e., quality *Botrychium* species habitat) when no alternative landing locations are available. New helicopter landing construction is proposed in lower elevation areas with a lower likelihood of high-quality *Botrychium* species habitat and outside RCAs.

Fire is a natural part of western ecosystems, and most plants, rare and common species, in fire prone areas are adapted to living under such conditions (Forest Service 2003a). Prescribed fire activities favor early seral species, including aspen and non-forested lands. The effects of fire (both prescribed and wildfire) on *Botrychium* species have not yet been determined. Either positive or negative impacts may occur in suitable habitat, depending on burn severity, degree of effect to endomycorrhizal fungi, consumption of ground litter, stage of plant development, and degree of ground disturbance incurred during fire ignition/containment/ suppression activities. However, as all prescribed fire activities are proposed in PVG 2 (Dry Douglas-fir, Moist Ponderosa Pine), crossover between this activity and suitable *Botrychium* species habitat is unlikely. Therefore, this activity should not impact *Botrychium* species habitat.

Pile burning concentrates heat in one area and has greater potential for negatively impacting plants or habitat than broadcast burning due to possible subsurface heat damage. Excessive ground temperatures can sterilize the soil and damage/kill the endomychorrizal fungi on which *Botrychium* species depend. Pile burning could potentially be detrimental to *Botrychium* species if built in suitable habitat, from a site preparation or intensive heat perspective. Recovery in such a case may require many years. However, burn piles would be established on previously disturbed or cleared areas following whole tree yarding. Past removal of all vegetation to clear a road or landing would have eliminated any suitable habitat that may have previously been present. Using these cleared areas for pile burning would not constitute any negative effects to *Botrychium* species habitat.

Transportation-related activities, such as new road construction, temporary road construction, road realignment, road maintenance, and road improvements for sediment reduction would negatively impact *Botrychium* species when activity corridors overlap suitable habitat. Many of these proposed activities are permanent or at the least represent a long-term (>15 years) commitment of resources. While multiple design features are in place that would decrease impacts to *Botrychium* species habitat within RCAs (see description of effects and RCA design features in *Allium validum* discussion above), small, unidentified pockets of suitable habitat within upland areas could be severely negatively impacted. Of all activities proposed in this Project, road-related effects have the potential to be the most profound.

Road decommissioning and closures may provide long-term benefits and possibly an increase in suitable habitat for this group. Re-establishing suitable habitat would likely take many years.

## 3.9.6 Environmental Consequences of Alternative C

### *3.9.6.1 Direct and Indirect Effects*

The actions proposed under Alternative C vary widely in potential impacts to rare plants and suitable rare plant habitat. Potential impacts are displayed in Table 3-64, which integrates assumed potential impacts to rare plant species/habitat and the likelihood of those impacts occurring. These rankings are best estimates based on type of habitat that the plants occupy (PVG, elevation, RCA/upland); proximity of known populations; habitat availability within locations of the proposed activities; and the predicted severity of potential impacts.

This section will address effects to populations and potential habitat for plants described in the “Affected Environment” section. Species may be grouped where effects are expected to be similar. Direct and indirect effects will be considered those that occur within the Project area boundaries.

**Table 3-64. Anticipated Effects to Rare Plants Analyzed for the Scriver Creek Integrated Restoration Project (Alternative C) by Proposed Activity**

| Proposed Activity (Alternative C) | Scope of Activity | *Lewisia sacajaweana*[a] | *Phacelia minutissima*[a,b] | *Allium validum*[b] | *Botrychium lineare*[a,b] | *Botrychium crenulatum*[b] | *Botrychium simplex*[b] |
|---|---|---|---|---|---|---|---|
| **Commercial Treatment by Yarding System** | | | | | | | |
| Tractor/Off Road Jammer Acres | 1,582 acres | S/L | S/L | N | S/L | S/L | S/L |
| Skyline Acres | 1,238 acres | S/L | S/L | N | S/L | S/L | S/L |
| Helicopter Acres | 755 acres | S/L | N | N | S/L | S/L | S/L |
| Total Commercial | 3,575 acres | — | — | — | — | — | — |
| **Noncommercial Treatment** | | | | | | | |
| Plantation Acres outside RCAs | 676 acres | N | N | N | N | N | N |
| Plantation Acres within RCAs | 163 acres | N | S/L | N | S/L | S/L | S/L |
| Total Noncommercial Treatment | 839 | — | — | — | — | — | — |
| Total Acres Mechanically Treated | 4,414 acres | N | N | S/L | S/L | S/L | S/L |
| **Treatment by Potential Vegetation Group** | | | | | | | |
| Potential Vegetation Group 2 | 1,069 acres | N | N | N | N | N | N |
| Potential Vegetation Group 5 | 36 acres | N | N | N | N | N | N |
| Potential Vegetation Group 6 | 3,309 acres | S/L | S/L | S/L | S/L | S/L | S/L |
| Total Potential Vegetation Group Acres | 4,414 acres | — | — | — | — | — | — |
| **Silvicultural Prescription** | | | | | | | |
| Improvement Cut | 2,518 acres | S/L | S/L | N | S/L | S/L | S/L |
| Commercial Thin | 1,057 acres | S/L | S/L | N | S/L | S/L | S/L |
| Total Acres | 3,575 acres | — | — | — | — | — | — |
| **Vegetation Cumulative Effects Area** | | | | | | | |
| Vegetation Cumulative Effects Area (Acres) | 4,532 acres | N | S/L | N | S/L | S/L | S/L |

| Proposed Activity (Alternative C) | Scope of Activity | *Lewisia sacajaweana*[a] | *Phacelia minutissima*[a,b] | *Allium validum*[b] | *Botrychium lineare*[a,b] | *Botrychium crenulatum*[b] | *Botrychium simplex*[b] |
|---|---|---|---|---|---|---|---|
| **Fuels Treatments – Commercial Treatment** | | | | | | | |
| Whole Tree Yard and Prescribed Underburn | 488 acres | N | N | N | S/L | S/L | S/L |
| LOP and Prescribed Underburn | 462 acres | N | N | N | S/L | S/L | S/L |
| LOP to 36 inch Only | 293 acres | S/L | S/L | S/L | S/L | S/L | S/L |
| Whole Tree Yard and Haulback | 1,241 acres | S/L | N | N | S/M | S/M | S/L |
| Whole Tree Yard and Burn Landing Piles | 1,091 acres | S/L | N | N | S/M | S/M | S/L |
| Total Acres | 3,575 acres | — | — | — | — | — | — |
| **Prescribed Underburn** | | | | | | | |
| Prescribed Underburn | 949 | N | N | N | S/L | S/L | S/L |
| **Helicopter Landings** | | | | | | | |
| New | 11 landings | S/L | N | N | N | N | N |
| Existing | 1 landings | S/L | N | N | N | N | N |
| Total Helicopter Landings | 12 landings | — | — | — | — | — | — |
| **AOP Culvert Replacements** | | | | | | | |
| 695 at Middle Fork or Scriver Creek | 1 culvert | N | N | N | S/L | S/L | S/L |
| 693A at Scriver Creek | 1 culvert | N | N | N | S/L | S/L | S/L |
| 693 at Scriver Creek | 1 culvert | N | N | N | S/L | S/L | S/L |
| 693B at Scriver Creek | 1 culvert | N | N | N | S/L | S/L | S/L |
| 693 at West Fork of Scriver Creek | 1 culvert | N | N | N | S/L | S/L | S/L |
| Total Number of Culverts | 5 | — | — | — | — | — | — |
| **Transportation System–Decommission** | | | | | | | |
| Decommission—NFSR | 16.4 miles | S/ LB | S/ LB | S/ LB | S/ LB | S/ LB | S/ LB |
| Decommission—Unauthorized | 3.3 miles | S/ LB | S/ LB | S/ LB | S/ LB | S/ LB | S/ LB |
| Decommission—Realignment | 3.8 miles | S/ LB | S/ LB | S/ LB | S/ LB | S/ LB | S/ LB |
| Total Decommission miles | 23.5 miles | — | — | — | — | — | — |

| Proposed Activity (Alternative C) | Scope of Activity | *Lewisia sacajaweana*[a] | *Phacelia minutissima*[a,b] | *Allium validum*[b] | *Botrychium lineare*[a,b] | *Botrychium crenulatum*[b] | *Botrychium simplex*[b] |
|---|---|---|---|---|---|---|---|
| **Transportation System–New Construction** | | | | | | | |
| New Specified Road Construction—NFSR | 1.1 miles | S/L | S/L | S/L | S/L | S/L | S/L |
| Temporary Road Construction | 4.2 miles | N | N | N | S/L | S/L | S/L |
| Total Road Construction miles | 5.3 miles | — | — | — | — | — | — |
| **Transportation System–Road Reconstruction** | | | | | | | |
| NFS road 696 Realignment (New Prism) | 4.3 miles | N | S/L | S/L | S/L | S/L | S/L |
| NFS road 696 Realignment (Existing Prism) | 3.5 miles | N | S/L | S/L | S/L | S/L | S/L |
| Subtotal | 7.8 miles | — | — | — | — | — | — |
| NFS road 696D Realignment (New Prism) | 0.1 miles | N | S/L | S/L | S/L | S/L | S/L |
| NFS road 696D Realignment (Existing Prism) | 0.4 miles | N | S/L | S/L | S/L | S/L | S/L |
| Subtotal | 0.5 | — | — | — | — | — | — |
| New Surface Aggregate[2] - 693 | 2.8 miles | N | S/L | N | S/L | S/L | S/L |
| New Surface Aggregate[2] – 693B | 2.5 miles | N | N | N | S/L | S/L | S/L |
| Subtotal | 5.3 miles | — | — | — | — | — | — |
| Total Road Reconstruction miles | 13.6 miles | — | — | — | — | — | — |
| **Road Maintenance** | | | | | | | |
| Road Maintenance | 36.8 miles | N | S/L | S/L | S/M | S/M | S/M |
| Total Road Maintenance miles | 36.8 miles | — | — | — | — | — | — |
| **Unauthorized Route Stabilization** | | | | | | | |
| Stabilization | 0.5 miles | N | S/L | N | S/L | S/L | S/L |
| Total Stabilization miles | 0.5 miles | | | | | | |

| Proposed Activity (Alternative C) | Scope of Activity | *Lewisia sacajaweana*[a] | *Phacelia minutissima*[a,b] | *Allium validum*[b] | *Botrychium lineare*[a,b] | *Botrychium crenulatum*[b] | *Botrychium simplex*[b] |
|---|---|---|---|---|---|---|---|
| **Roads–Other** | | | | | | | |
| Maintenance Level 1 | 33.6 miles | N | S/L | S/L | S/L | S/L | S/L |
| Maintenance Level 2 | 17.1 miles | N | S/L | S/L | S/M | S/M | S/M |
| Maintenance Level 3 | 8.6 miles | N | N | N | S/M | S/M | S/M |
| Total Authorized Road miles | 59.3 | — | — | — | — | — | — |
| Existing Aggregate | 9.7 miles | N | N | N | S/L | S/L | S/L |
| Groomed Snowmachine Trail | 21.2 miles | NA | NA | NA | NA | NA | NA |
| Motorized Trail Open Yearlong - Route 035 | 1.7 miles | S/L | S/L | S/L | S/L | S/L | S/L |
| Motorized Trail Seasonal Closure – Route 448 | 4.0 miles | N | S/L | S/L | S/L | S/L | S/L |

Note: **N**—No Habitat at Activity Site; **S**—Suitable Habitat; **LB**—Long term Benefit; **O**—Occupied Habitat
**H**—Risk High; **M**—Risk Medium: **L**—Risk Low
**NA**—Not Applicable
[a]U—Upland
[b]R—Riparian/Wetland

#### 3.9.6.1.1 Direct and Indirect Effects to Analyzed Rare Plant Species

Activity effects to the rare plant species and habitat analyzed is expected to be similar between Alternatives C and B, in part because overall impacts are expected to be low or, in some cases, non-existent because the activity locations do not coincide with suitable habitat. In situations where suitable habitat is more likely to be disturbed (e.g., road maintenance, culvert replacements, burns backing into the RCA) activity effects are essentially the same between alternatives.

A slightly higher likelihood of habitat disturbance occurs under Alternative C because more of the commercial vegetation treatments would use tractor/jammer and skyline systems than helicopters, and an additional 310 acres of area is to be treated than under Alternative B. The additional ground disturbance means an increased risk of disturbance to rare plant habitat, as well as a larger area of potential colonization and spread for invasive species.

Underburning may impact *Botrychium* species, but the other plants analyzed occupy higher elevations and have no suitable habitat coincident with planned burns. Most helicopter landings are also located at lower elevations and are generally outside RCAs, thus risk to species analyzed is reduced.

Less road decommissioning as well as less road construction would occur under Alternative B. The difference in permanent and temporary road construction is not great in terms of disturbance to plant habitat; both represent a long-term and total commitment of resources. While both Alternative B and Alternative C include road reconstruction, Alternatives C includes about 2.5 miles more. Alternative B has more miles of “authorized” road than Alternative C, but the difference is found in ML 1 roads, which are essentially closed to use and routinely receive little if any maintenance (i.e., less disturbance to plant habitat and lower risk of weed invasion).

Overall, disturbance to rare plants and suitable habitat is lower in Alternative B than Alternative C.

## 3.9.7 Environmental Consequences of Alternative D

### *3.9.7.1 Direct and Indirect Effects*

The actions proposed under Alternative D vary widely in potential impacts to rare plants and suitable rare plant habitat. Potential impacts are displayed in Table 3-65, which integrates assumed potential impacts to rare plant species/habitat and the likelihood of those impacts occurring. These rankings are best estimates based on type of habitat that the plants occupy (PVG, elevation, RCA/upland); proximity of known populations; habitat availability within locations of the proposed activities; and the predicted severity of potential impacts.

This section will address effects to populations and potential habitat for plants described in the “Affected Environment” section. Species may be grouped where effects are expected to be similar. Direct and indirect effects will be considered those that occur within the Project area boundaries.

**Table 3-65. Anticipated Effects to Rare Plants Analyzed for the Scriver Creek Integrated Restoration Project (Alternative D) by Proposed Activity**

| Proposed Activity (Alternative D) | Amount of Activity | *Lewisia sacajaweana* [a] | *Phacelia minutissima* [a,b] | *Allium validum* [b] | *Botrychium lineare* a,b | *Botrychium crenulatum* [b] | *Botrychium simplex* [b] |
|---|---|---|---|---|---|---|---|
| **Commercial Treatment by Yarding System** | | | | | | | |
| Tractor/Off Road Jammer Acres | 1,472 acres | S/L | S/L | N | S/L | S/L | S/L |
| Skyline Acres | 1,238 acres | S/L | S/L | N | S/L | S/L | S/L |
| Helicopter Acres | 865 acres | S/L | N | N | S/L | S/L | S/L |
| Subtotal Commercial Treatment | 3,575 acres | — | — | — | — | — | — |
| **Acres of Noncommercial Treatment** | | | | | | | |
| Plantation Acres outside RCAs | 676 acres | N | N | N | N | N | N |
| Plantation Acres within RCAs | 163 acres | N | S/L | N | S/L | S/L | S/L |
| Subtotal Noncommercial Treatment | 839 acres | — | — | — | — | — | — |
| Total Acres Mechanically Treated | 4,414 acres | — | — | — | — | — | — |
| **Treatment by Potential Vegetation Group** | | | | | | | |
| PVG 2 | 1,069 acres | N | N | N | N | N | N |
| PVG 5 | 36 acres | N | N | N | N | N | N |
| PVG 6 | 3,309 acres | S/L | S/L | S/L | S/L | S/L | S/L |
| Total PVG Acres | 4,414 acres | — | — | — | — | — | — |
| **Silvicultural Prescription** | | | | | | | |
| Improvement Cut | 2,518 acres | S/L | S/L | N | S/L | S/L | S/L |
| Commercial Thin | 1,057 acres | S/L | S/L | N | S/L | S/L | S/L |
| Total Acres | 3,575 acres | — | — | — | — | — | — |

| Proposed Activity (Alternative D) | Amount of Activity | *Lewisia sacajaweana* [a] | *Phacelia minutissima* [a,b] | *Allium validum* [b] | *Botrychium lineare* a,b | *Botrychium crenulatum*[b] | *Botrychium simplex*[b] |
|---|---|---|---|---|---|---|---|
| **Vegetation Cumulative Effects Area** | | | | | | | |
| Vegetation Cumulative Effects Area | 4,532 acres | N | S/L | N | S/L | S/L | S/L |
| **Fuels Treatments—Commercial Treatment** | | | | | | | |
| Whole Tree Yard and Prescribed Underburn | 488 acres | N | N | N | S/L | S/L | S/L |
| LOP and Prescribed Underburn | 462 acres | N | N | N | S/L | S/L | S/L |
| LOP to 36 inch Only | 403 acres | S/L | S/L | S/L | S/L | S/L | S/L |
| Whole Tree Yard and Haulback | 1,131 acres | S/L | N | N | S/M | S/M | S/L |
| Whole Tree Yard and Burn Landing Piles | 1,091 acres | S/L | N | N | S/M | S/M | S/L |
| Total Acres | 3,575 acres | — | — | — | — | — | — |
| Prescribed Underburn | 949 acres | N | N | N | S/L | S/L | S/L |
| Total Acres | 949 acres | — | — | — | — | — | — |
| **Helicopter Landings** | | | | | | | |
| New | 12 landings | S/L | N | N | N | N | N |
| Existing | 1 landings | S/L | N | N | N | N | N |
| Total Helicopter Landings | 13 landings | — | — | — | — | — | — |
| **AOP Culvert Replacements** | | | | | | | |
| 695 at Middle Fork or Scriver Creek | 1 crossings | N | N | N | S/L | S/L | S/L |
| 693A at Scriver Creek | 1 crossings | N | N | N | S/L | S/L | S/L |
| 693 at Scriver Creek | 1 crossings | N | N | N | S/L | S/L | S/L |
| 693B at Scriver Creek | 1 crossings | N | N | N | S/L | S/L | S/L |
| 693 at West Fork of Scriver Creek | 1 crossings | N | N | N | S/L | S/L | S/L |

| Proposed Activity (Alternative D) | Amount of Activity | *Lewisia sacajaweana* [a] | *Phacelia minutissima* [a,b] | *Allium validum* [b] | *Botrychium lineare* a,b | *Botrychium crenulatum*[b] | *Botrychium simplex*[b] |
|---|---|---|---|---|---|---|---|
| Total Number of Culverts | 5 crossings | — | — | — | — | — | — |
| **Transportation System—Decommission** | | | | | | | |
| Decommission – NFSR | 16.4 miles | S/ LB | S/ LB | S/ LB | S/ LB | S/ LB | S/ LB |
| Decommission –Unauthorized | 3.3 miles | S/ LB | S/ LB | S/ LB | S/ LB | S/ LB | S/ LB |
| Decommission –Realignment | 3.8 miles | S/ LB | S/ LB | S/ LB | S/ LB | S/ LB | S/ LB |
| Total Decommission miles | 23.5 miles | — | — | — | — | — | — |
| **Transportation System—New Construction** | | | | | | | |
| New Specified Road Construction - NFSR | 0 miles | N | N | N | N | N | N |
| Temporary Road Construction | 4.2 miles | N | N | N | S/L | S/L | S/L |
| Total Road Construction miles | 4.2 miles | — | — | — | — | — | — |
| **Transportation System—Road Reconstruction** | | | | | | | |
| NFS road 696 Realignment (New Prism) | 4.3 miles | N | S/L | S/L | S/L | S/L | S/L |
| NFS road 696 Realignment (Existing Prism) | 3.5 miles | N | S/L | S/L | S/L | S/L | S/L |
| Subtotal | 7.8 miles | — | — | — | — | — | — |
| NFS road 696D Realignment (New Prism) | 0.1 miles | N | S/L | S/L | S/L | S/L | S/L |
| NFS road 696D Realignment (Existing Prism) | 0.4 miles | N | S/L | S/L | S/L | S/L | S/L |
| Subtotal | 0.5 miles | — | — | — | — | — | — |
| New Surface Aggregate[2] –693 | 2.8 miles | N | S/L | N | S/L | S/L | S/L |
| New Surface Aggregate[2] –693B | 2.5 miles | N | N | N | S/L | S/L | S/L |
| Subtotal | 5.3 miles | — | — | — | — | — | — |
| Total of Road Reconstruction miles | 13.6 miles | — | — | — | — | — | — |

| Proposed Activity (Alternative D) | Amount of Activity | *Lewisia sacajaweana* [a] | *Phacelia minutissima* [a,b] | *Allium validum* [b] | *Botrychium lineare* a,b | *Botrychium crenulatum*[b] | *Botrychium simplex*[b] |
|---|---|---|---|---|---|---|---|
| **Transportation System—Road Maintenance** | | | | | | | |
| Road Maintenance | 36.8 miles | N | S/L | S/L | S/M | S/M | S/M |
| Total Road Maintenance miles | 36.8 miles | — | — | — | — | — | — |
| Unauthorized Route Stabilization | | — | — | — | — | — | — |
| Stabilization | 0.5 miles | N | N | N | N | N | N |
| Total Stabilization miles | 0.5 miles | — | — | — | — | — | — |
| **Roads—Other** | | | | | | | |
| Maintenance Level 1 | 32.4 miles | N | S/L | S/L | S/L | S/L | S/L |
| Maintenance Level 2 | 17.1 miles | N | S/L | S/L | S/M | S/M | S/M |
| Maintenance Level 3 | 8.6 miles | N | N | N | S/M | S/M | S/M |
| Total Authorized Road miles | 58.1 miles | — | — | — | — | — | — |
| Existing Aggregate | 9.7 miles | N | N | N | S/L | S/L | S/L |
| Groomed Snowmachine Trail | 21.2 miles | NA | NA | NA | NA | NA | NA |
| Motorized Trail Open Yearlong - Route 035 | 1.7 miles | S/L | S/L | S/L | S/L | S/L | S/L |
| Motorized Trail Seasonal Closure – Route 448 | 4.0 miles | N | S/L | S/L | S/L | S/L | S/L |

Note: **N**—No Habitat at Activity Site; **S**—Suitable Habitat; **LB**—Long term Benefit; **O**—Occupied Habitat
**H**—Risk High; **M**—Risk Medium: **L**—Risk Low
**NA**—Not Applicable
[a]U—Upland
[b]R—Riparian/Wetland

#### 3.9.7.1.1 Activity Effects to Analyzed Rare Plant Species

Activity effects to the rare plant species and habitat analyzed is expected to be similar between Alternatives D and B, in part because overall impacts are expected to be low or, in some cases, non-existent because the activity locations do not coincide with suitable habitat. In situations where there is a higher likelihood that suitable habitat would be disturbed (e.g., road maintenance, culvert replacements, burns backing into the RCA) activity effects are essentially the same between alternatives.

A slightly higher likelihood of habitat disturbance occurs under Alternative D because more of the commercial vegetation treatments would use tractor/jammer and skyline systems than helicopters, and an additional 310 acres of area is to be treated than under Alternative B. The additional ground disturbance means an increased risk of disturbance to rare plant habitat, as well as a larger area of potential colonization and spread for invasive species. The total acres to be treated under Alternatives D are the same as under Alternative C; however, under Alternative D a slightly higher proportion of helicopter logging would occur (i.e., less disturbing than ground based and skyline logging creates.

Underburning may impact *Botrychium* species, but the other plants analyzed occupy higher elevations and have no suitable habitat coincident with planned burns. The number of acres with fuel treatments is higher under both Alternatives D and C than Alternative B, but the acres designated for underburning are close to the same. Most helicopter landings are also located at lower elevations and are generally outside RCAs, thus risk to species analyzed is reduced. These effects are similar across all action alternatives.

Less road decommissioning as well as less road construction would occur under Alternative B than either Alternative C or Alternative D. Alternatives C and D propose equal number of miles of road decommissioning and temporary roads, but Alternative D does not include the new construction proposed under Alternative C. The difference in permanent and temporary road construction is not great in terms of disturbance to plant habitat; both represent a long-term and total commitment of resources. Road reconstruction is the same under Alternatives D and C, about 2.5 miles more than Alternative B. Alternative B has more miles of “authorized” road than the other two alternatives, but the difference is in ML 1 roads, which are essentially closed to use and routinely receive little if any maintenance (i.e., less disturbance to plant habitat and lower risk of weed invasion).

Overall, disturbance to rare plants and suitable habitat is higher under Alternative D than Alternative B, and Alternative D poses slightly lower risk to the integrity of rare plant habitat than Alternative C.

### 3.9.8 Cumulative Effects Common to All Action Alternatives

No documented populations of rare plants occur within the analysis area, but potential habitat exists at the upper elevations and in streams, seeps, wet meadows, and aspen stands. Only minor negative effects are expected from implementing any of the action alternatives described, partly because of design features protecting RCAs and in partly because of the lack of coincidence in location of proposed activities and potential habitat.

#### *3.9.8.1 Past Activities*

Table B.2 in Appendix B identifies which past activities were considered for this cumulative effects analysis. Past activities that would have impacted rare plant habitat include grazing, vegetation treatments, recreational activities, road and trail construction, and fire. These activities and their consequences were considered as part of the baseline for project analysis and included in the affected environment discussion in section 3.11.1.

#### *3.9.8.2 Present/Ongoing Activities*

Table B.2 in Appendix B identifies which present/ongoing activities were considered for this cumulative effects analysis.

Ongoing road maintenance, grazing, recreation, and weed treatment are expected to continue at similar levels with similar contribution of effects for rare plants. If fire suppression using heavy equipment is necessary and results in additional introduction and spread of invasive plant species, it may contribute cumulatively to the negative effects possible as a result of ground disturbance and additional bare ground opened through road-related activities.

#### *3.9.8.3 Reasonably Foreseeable Activities*

Table B.2 in Appendix B identifies which reasonably foreseeable activities were considered for this cumulative effects analysis. Reasonably foreseeable projects and activities in the analysis area that could cumulatively impact rare plants and habitat include the Scriver Creek Trail and Scriver Creek Snowmobile Bridge projects. The project proposals for both of these projects are being developed and are not finalized to date. The Scriver Creek Trail Project could cumulatively add miles of NFS trails designated for motorized use through a variety of means, including new trail construction, conversion of existing NFS roads (ML 1) to trail, and/or designation of NFS trail on NFS road (i.e., dual designation) within the analysis area. In conjunction with other landowners, the Scriver Creek Snowmobile Bridge project would replace an existing snowmobile bridge with a new bridge to provide access for over snow use that meets Forest Service standards. Any new construction activities may contribute cumulatively to short term effects through ground disturbance and increased risk of invasive plant introduction and spread, in addition to longer term cumulative effects to rare plants relative to the permanent commitment of land resources.

The Rocky Canyon Prescribed fire is also listed as a reasonably foreseeable project. Low to moderate intensity fire would be used to re-establish natural regimes in the roadless area directly east of the Scriver Project area. Native vegetation in these types is typically fire adapted. At a low to moderate intensity, with no planned line construction and no ignitions in the RCAs, no long-term cumulative effects from prescribed fire would be expected, as long as precautionary measures to prevent weed introduction or spread were in place

### 3.9.9 Determinations for Rare Plant Species

No known rare plant populations occur with the Project area. Potential habitat exists at upper elevations and within aspen stands and RCAs. Expected negative impacts to rare plant habitat are low, primarily due to proposed activity locations being away from high-quality potential habitat. With design features in place, direct and indirect impacts from most proposed activities are expected to range from none to short term for the plant species analyzed with a low risk of long-

term negative effects or cumulative effects occurring. Determinations for rare plant species are listed in Table 3-66 and Table 3-67.

Potential risks to rare plant habitat and the native plant community exist from the introduction or continued spread of noxious weeds and undesirable invasive species (refer to section 3.10).

**Table 3-66. Determinations for Region 4 Sensitive Plant Species for the Scriver Creek Integrated Restoration Project**

| Plant Species | Alternative A No Action | Alternative B Proposed Action | Alternative C | Alternative D |
|---|---|---|---|---|
| *Lewisia sacajaweana* Sacajawea's bitterroot | None | MII | MII | MII |
| *Phacelia minutissima* Least phacelia | None | MII | MII | MII |

**MII** = May impact individuals, but will not likely contribute to a trend towards Federal listing or loss of viability to the populations or species. **NI** = No impact to any populations, species or habitat.**BI**= Beneficial impact to the species or habitat.

**Table 3-67. Determinations for Risk to Population Viability for Boise Forest Watch List Plant Species for the Scriver Creek Integrated Restoration Project**

| Plant Species | Alternative A No Action | Alternative B Proposed Action | Alternative C | Alternative D |
|---|---|---|---|---|
| *Allium validum* Tall swamp onion | None | Low | Low | Low |
| *Botrychium lineare* Slender moonwort | None | Low | Low | Low |
| *Botrychium crenulatum* Scalloped moonwort | None | Low | Low | Low |
| *Botrychium simplex* Least moonwort | None | Low | Low | Low |
| **COMPARISON OF RISK BETWEEN ACTION ALTERNATIVES** | **None** | **Least** | **Most** | **Moderate** |

## 3.10 NOXIOUS WEEDS

This section incorporates by reference the Noxious Weeds Specialist's Report (available in the Project Record), which contains data, methodologies, analyses, conclusions, maps, references, and technical documentation. This section discusses the effects of each alternative on noxious weeds.

Non-native plants are species that do not have their origin in a local area. They have not adapted to or evolved with the local environment, including native plants, animals, and disturbances. Non-native plants include noxious weeds. Noxious weeds are plant species that can have detrimental effects on agriculture, commerce, or public health. They spread aggressively and are difficult to manage. These species are generally new or not common to the United States.

Noxious weeds present the most immediate and disruptive threat to ecosystem function of those non-native plants present on the Forest.

Noxious weed species are spreading rapidly locally, regionally, and nationally. Roads, trails, and rivers have been identified as primary conduits for noxious weed and exotic plant transport and establishment. This rapid rate of weed expansion is partly due to the lack of natural control agents in new environments, prolific seed production, physiological advantages over other plants, and a strong ability to establish in various vegetative successional stages and communities. Some landscapes are more susceptible to invasion than others, due to productivity of sites and the similarity of environmental conditions from where the plant originated. This susceptibility can affect rate of spread and the extent or size of infestations.

Noxious weeds that are classified as invaders pose the greatest threat. These plants are capable of becoming established in pristine or relatively undisturbed areas and can spread quickly over large geographical areas. Spotted knapweed, diffuse knapweed, yellow starthistle, leafy spurge, and rush skeletonweed are invaders of primary concern on the Forest and in Idaho. Infestations of these invaders can substantially change overall biological diversity by affecting the amount and distribution of native plants and animals. They can also negatively affect recreational experiences, forest regeneration, wildlife and livestock forage, native plant resources associated with tribal rights, landscape and soil productivity, fire cycles, nitrogen cycling, riparian and hydrologic function, and water quality.

### 3.10.1 Methodology and Scale of Analysis

The analysis area for direct, indirect, and cumulative effects of noxious weeds is the Project area (about 11,510 acres). This scale is sufficient to show the likely direct and indirect effects of proposed activities in regard to their potential as vectors for the introduction and spread of noxious weeds as well as their potential addition to existent or anticipated present/future effects. The vectors below will be the focus of disclosures.

**Roads—**Road construction and decommissioning are proposed under all action alternatives. Most existing infestations within the Project area are along or have originated from roadsides, as vehicle traffic provides ideal means for noxious weed spread. Roads and their associated vehicle traffic are the largest contributors to noxious weed expansion and pose the most difficult challenge to manage.

**Timber Harvest and Fire—**Commercial and noncommercial vegetation management activities and prescribed fire treatments are proposed under all action alternatives. These ground-disturbing activities and associated equipment transport influence the expansion of noxious weeds. Most of these risks are minimized with localized site restoration and rehabilitation. Opening of forested canopies in the drier forest vegetation groups, which are common in this analysis area (e.g., PVGs 2, 5 and drier 6), with either fire or mechanical means can also influence the establishment and growth of new infestations, more so than in the moister forest vegetation groups at higher elevations.

**Recreation Areas and Use—**While activities proposed under the action alternatives do not include recreational use, these activities occur within the analysis area and may contribute cumulatively to overall effects. Motorized and non-motorized recreation activities are likely the second most common vector of weed seed transport and establishment because of the minimal control over allowing weed- free vehicles to travel Forest roads and trails. Initial infestations for

noxious weeds and exotic plants frequently occur in conjunction with trailheads, trails, campgrounds, and other developed recreation sites.

**Livestock Grazing—**While activities proposed under the action alternatives do not include livestock grazing, these activities occur within the analysis area and may contribute cumulatively to overall effects. Noxious weed expansion may also occur with the transport of seed by livestock from infested areas, though this vector is not as prevalent as that resulting from the first three vectors discussed above. It has been documented that seeds can be spread through livestock feces, fleeces, and hooves (Callihan et al. 1991; Belsky and Gelbard 2000). Many can pass through the digestive system and still retain their germination ability (Messersmith 1989; Belsky and Gelbard 2000). In addition to livestock, native grazers (e.g., mule deer, bighorn sheep, elk) and some birds (e.g., mourning doves) can perform this same role of seed spread.

#### *3.10.1.1 Methodology:*

The Interior Columbia Basin Ecosystem Assessment identified lands that were highly susceptible to noxious weed invasion (Forest Servie and BLM 2000a). The susceptibility ratings were based on vegetation cover types and precipitation zones that have a high frequency of invasion and presence. Further refinement of the noxious weed susceptibility evaluation was conducted during the Forest Plan revision process document in the 2003 FEIS (Forest Service 2003b).

The effects disclosure between alternatives compares the areas identified as susceptible to the five primary noxious weed invaders (Spotted knapweed, diffuse knapweed, yellow starthistle, leafy spurge, and rush skeletonweed). The disclosure also shows the overlap between the susceptibility area and the acres proposed for vegetative or prescribe fire treatments and the miles proposed for road construction (system roads or temporary) and road decommissioning. This ranking will provide a relative comparison as to the potential risk for further introductions and spread of noxious weeds.

The effects of integrated weed management are largely dependent upon the implementation effectiveness of detection, prevention, control, containment, and monitoring practices. Three considerations typically influence these weed management practices:

1. The *risk of exposure* is affected by the level of activities that either transport seed or create potential sites for new seedlings to establish within an area. For example, the amount of vehicular traffic, recreation, and stock use and other forms of dispersed recreation can affect the potential for seed dissemination risk. Soil or ground disturbance activities such as fire, construction projects, or ground-based logging activities can also affect the number of potential sites for new seedlings to become established.
2. The *ability to detect and monitor weed populations* will influence the size and density of new weed populations. Detection is strongly connected to the frequency and length of time various management activities occur in an area during the year, consistency among personnel to detect or document sites, and the amount of visitation by the general public. For example, in areas where other resource management activities are low and administrative visits are infrequent, the likelihood of detecting new populations is also low. If a new infestation becomes established, a couple of years could potentially pass without detection, thus creating a large weed seed source that would take several years to eliminate. For example, the Supplemental Draft Environmental Impact Statement for the Frank Church–River of No Return Wilderness gives an actual scenario where a new infestation expanded from 2 to 15 acres in a 3-year timeframe (Forest Service 1999).

3. The *ability to treat established infestations* is affected by the accessibility, financial flexibility, or treatment restrictions associated with an area. The degree of accessibility will influence the costs, logistics, timing, and scope of treatment. Also, effective treatment depends on the application of chemicals, fire, or other means during certain time windows. If not treated at the correct phenological stage, eradication or control effectiveness is reduced. In addition, the ability to finance treatments may be limited, given that some activities (e.g., timber harvest) and associated funding sources may not be allowed in certain areas.

The likelihood of minimizing or avoiding the introduction and spread of noxious weeds in regard to specific design features is discussed below.

### 3.10.2 Affected Environment

Noxious weeds have already altered the plant communities within the 11,510-acre Project area. The most serious infestation to-date within the analysis area is the widespread rush skeletonweed, which appears to be most prevalent adjacent to roads and trails[51]. These infestations are monitored and treated by the Forest Noxious Weed Program.

The analysis area lies within the Upper Payette Cooperative Weed Management Area where landowners and agencies work together to improve weed control using integrated pest management. Integrated pest management uses all available control techniques, including mechanical, cultural, biological, and chemical, and applies the most appropriate, effective, and light-on-the-land techniques available. Early detection rapid response methods have been employed for several years to eradicate new outbreaks before they become established, or contain infestations that are not eradicated, across and around the analysis area.The analysis area has been assessed as to the susceptibility of different portions of the area to the five invasive noxious weeds of focus in this analysis. Table 3-68 identifies the estimated number of acres within the analysis area considered susceptible. Susceptibility areas for several species overlap each other within analysis area. Figure 3-53 provides a spatial display of the general locations within the analysis area that are susceptible to each of the five invasive species.

**Table 3-68. Acres within the 11,510-acre Analysis Area Susceptible to the Five Invasive Species of Focus in this Analysis**

| Invasive Noxious Weed | | Acres Susceptible within Analysis Area |
|---|---|---|
| Common Name | Scientific Name | |
| Leafy Spurge | *Euphorbia esula* | 2,142 |
| Rush Skeletonweed | *Chondrilla juncea* | 6,065 |
| Diffuse Knapweed | *Centaurea diffusa* | 16 |
| Spotted Knapweed | *Centaurea stoebe* ssp. *micranthos* | 1,834 |
| Yellow Starthistle | *Centaurea solstitialis* | 75 |

[51] There is one known population of hound's tongue (*Cynoglossum* L.) (approximately 1 acre) within the analysis area. While considered a noxious weed, it does not represent the same risk and threat as the five invaders of focus in this analysis (ISDA 2005–2006). Design features and mitigation developed to address the five invaders of focus in this analysis will address other noxious weeds, such as hound's tongue, thus for purposes of this analysis comparisons will focus on the five primary threats and assume that effects relative to these species would be similar for other noxious weeds that may occur.

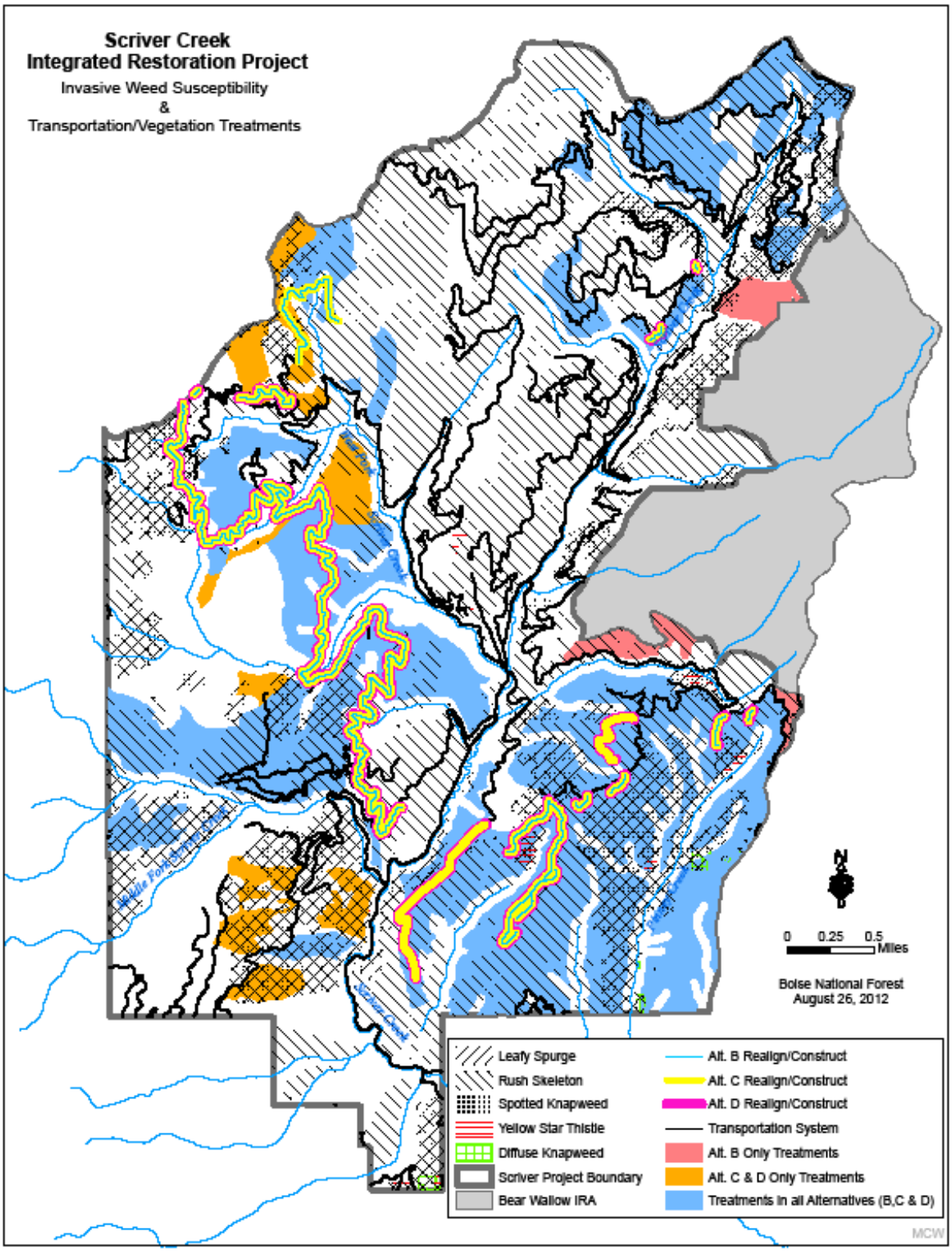


**Figure 3-53. Noxious Weed Susceptibility within the Project Area**

### *3.10.2.1 Environmental Consequences of Alternative A—No Action*

#### 3.10.2.1.1 Direct and Indirect Effects

Under Alternative A, no effect to the distribution and status of noxious weeds in the analysis area would occur given no new ground-disturbing management activities or changes to the transportation system would occur.

#### 3.10.2.1.2 Cumulative Effects

Since this alternative would have no direct or indirect effect, there would be no cumulative effects.

### *3.10.2.2 Environmental Consequences of Alternatives B, C, and D*

#### 3.10.2.2.1 Direct and Indirect Effects

The effects of integrated weed management largely depend on the implementation effectiveness of detection, prevention, control, containment, and monitoring practices. The considerations which typically influence these weed management practices are the exposure risk to new weed infestation establishment, the ability to detect and monitor weed populations, and the ability to treat existing infestations.

##### 3.10.2.2.1.1 Risk of Exposure

Implementing these alternatives would increase the potential for the introduction of new noxious weed species and/or spread of known noxious weed species in the analysis area based on the proposed ground-disturbing activities and modification of the transportation system. Ground-disturbing activities include timber harvest; prescribed fire; road construction and reconstruction, including culvert replacement; and road decommissioning. Harvest activities and log haul would be expected to produce potential establishment sites for noxious weeds. Road activities, including new construction, reconstruction, and decommissioning, would be expected to create new establishment sites for noxious weeds. The miles of NFS roads open to motorized wheeled vehicles would increase with these alternatives as a result of the relocation of NFS road 696, thereby increasing the potential of noxious weed spread along these road corridors in the analysis area (section 3.11.3)[52]. The proposed low- to moderate-intensity prescribed fire could also create establishment sites for noxious weeds. Table 3-69 displays how many acres or road miles overlap susceptibility areas for the five identified invasive noxious weeds.

[52] Note that roads proposed for road decommissioning are not currently open to motorized use. Thus, while road decommissioning increases under Alternatives C and D compared to Alternative B, because it does not change miles open to motorized use, decommissioning does not measurably contribute to risk exposure.

**Table 3-69. Treatment Acres or Road miles of Proposed Activities which Overlap Acres within the Analysis Area Susceptible to Each of the Five Invasive Species of Focus**

| Activity | Alternative A | Alternative B | Alternative C | Alternative D |
|---|---|---|---|---|
| **LEAFY SPURGE** | | | | |
| **Commercial Timber Harvest (acres)** | | | | |
| Helicopter | 0 | 259 | 220 | 243 |
| Skyline Cable | 0 | 242 | 358 | 358 |
| Tractor | 0 | 153 | 246 | 223 |
| **Noncommercial Tree Thinning (acres)** | | | | |
| In RCA | 0 | 73 | 73 | 73 |
| Outside RCA | 0 | 285 | 285 | 285 |
| **Prescribed Burning (acres)** | | | | |
| Total | 0 | 293 | 291 | 291 |
| **Road Construction/Reconstruction and Decommissioning (miles)** | | | | |
| Construct/Reconstruct | 0 | 1.6 | 1.9 | 1.5 |
| Decommissioning | 0 | 1.8 | 2.5 | 2.5 |
| **RUSH SKELETONWEED** | | | | |
| **Commercial Timber Harvest (acres)** | | | | |
| Helicopter | 0 | 615 | 422 | 482 |
| Skyline Cable | 0 | 585 | 736 | 736 |
| Tractor | 0 | 635 | 842 | 782 |
| **Noncommercial Tree Thinning (acres)** | | | | |
| In RCA | 0 | 103 | 103 | 103 |
| Outside RCA | 0 | 506 | 506 | 506 |
| **Prescribed Burning (acres)** | | | | |
| Total | 0 | 639 | 630 | 630 |
| **Road Construction/Reconstruction and Decommissioning (miles)** | | | | |
| Construct/Reconstruct | 0 | 3.6 | 4.7 | 4.0 |
| Decommissioning | 0 | 9.8 | 12.0 | 12.0 |

| Activity | Alternative A | Alternative B | Alternative C | Alternative D |
|---|---|---|---|---|
| **DIFFUSE KNAPWEED** | | | | |
| **Commercial Timber Harvest (acres)** | | | | |
| Helicopter | 0 | 5 | 5 | 5 |
| Skyline Cable | 0 | 1 | 1 | 1 |
| Tractor | 0 | 0 | 0 | 0 |
| **Noncommercial Tree Thinning (acres)** | | | | |
| In RCA | 0 | 0 | 0 | 0 |
| Outside RCA | 0 | 0 | 0 | 0 |
| **Prescribed Burning (acres)** | | | | |
| Total | 0 | 6 | 6 | 6 |
| **Road Construction/Reconstruction and Decommissioning (miles)** | | | | |
| Construct/Reconstruct | 0 | 0 | 0 | 0 |
| Decommissioning | 0 | 0 | 0 | 0 |
| **SPOTTED KNAPWEED** | | | | |
| **Commercial Timber Harvest (acres)** | | | | |
| Helicopter | 0 | 206 | 166 | 189 |
| Skyline Cable | 0 | 242 | 358 | 358 |
| Tractor | 0 | 153 | 246 | 223 |
| **Noncommercial Tree Thinning (acres)** | | | | |
| In RCA | 0 | 65 | 65 | 65 |
| Outside RCA | 0 | 237 | 237 | 237 |
| **Prescribed Burning (acres)** | | | | |
| Total | 0 | 288 | 286 | 286 |
| **Road Construction/Reconstruction and Decommissioning (miles)** | | | | |
| Construct/Reconstruct | 0 | 1.6 | 1.9 | 1.5 |
| Decommissioning | 0 | 1.7 | 2.5 | 2.5 |
| **YELLOW STARTHISTLE** | | | | |
| **Commercial Timber Harvest (acres)** | | | | |
| Helicopter | 0 | 4 | 4 | 4 |
| Skyline Cable | 0 | 21 | 21 | 21 |
| Tractor | 0 | 1 | 1 | 1 |
| **Noncommercial Tree Thinning (acres)** | | | | |
| In RCA | 0 | 7 | 7 | 7 |
| Outside RCA | 0 | 8 | 8 | 8 |
| **Prescribed Burning (acres)** | | | | |
| Total | 0 | 10 | 10 | 10 |
| **Road Construction/Reconstruction and Decommissioning (miles)** | | | | |
| Construct/Reconstruct | 0 | >1 | >1 | >1 |
| Decommissioning | 0 | 0 | 0 | 0 |

As displayed in Table 3-69, areas susceptible to leafy spurge, rush skeletonweed, and spotted knapweed within the analysis area have the greatest overlap of treatment acres and miles of proposed road activity. Acres/miles at risk are greatest under Alternative C, followed by D; Alternative B has the least risk. Alternatives C and D have greater number of acres of commercial harvest activity, new road construction (system and/or temporary), and more miles of road decommissioning than Alternative B in areas susceptible to noxious weeds. Alternative C has slightly greater risk than Alternative D due to the greater number of commercial vegetative treatments utilizing tractor logging systems (as opposed to less ground=disturbing systems such as helicopter and, to some degree, skyline cable). There are also less miles of new road construction in areas susceptible to noxious weeds under Alternative D than under Alternative C (i.e., NFS road 696D1 is not constructed in the northwest portion of the Project area, which falls within areas susceptible to rush skeletonweed, leafy spurge and spotted knapweed).

The exposure risk of each action alternative is reduced through inclusion of design features that are based on Forest Plan standards developed to minimize or avoid the introduction and spread of noxious weeds. These Design Features include NX-1 through NX-4 (section 2.4.2.1) and require that off-road equipment (e.g., skidders) is cleaned and that seed mixes, organic matter, and aggregate brought into the Project area are weed-free. These features would minimize the potential for noxious weed introduction, dispersal, or establishment. Several other design features, including RM-1, SW-7, and SW-10 (section 2.4.2.1), would also be expected to lessen the potential for noxious weed introduction or spread because they require applying approved seed and/or mulch to disturbed areas following road activities and landing reclamation activities.

#### 3.10.2.2.1.2 Ability to Detect and Monitor Weed Populations

Detection of new weed populations is strongly connected to the frequency and amount of time various management activities take place in an area during the year, consistency among personnel to detect or document sites, and the amount of visitation by the general public. For example, in areas where other resource management activities are low and administrative visits are infrequent, the likelihood of detecting new populations is also low. If a new infestation becomes established, a couple of years could potentially pass without detection, thus creating a large weed seed source that would take several years to eliminate.

In the case of the Project area (i.e., analysis area), it is frequently used by various resource managers (e.g., vegetation management and recreation managers) who are trained to identify noxious weed populations. This frequent use would continue under all of the action alternatives. In addition, the Forest Noxious Weed monitoring and treatment program targets areas such as Scriver Creek due to the existence of known populations of noxious weeds (e.g., rush skeletonweed) and the need to monitor and treat these areas. As a result of frequent visits by various resource managers, the ability to detect potentially new populations and monitor existing populations is high, thus reducing the risk that an existing or new weed source could establish that would take several years to eliminate.

#### 3.10.2.2.1.3 Ability to Treat Established Infestations

The degree of accessibility will influence treatment costs and the logistics of treatment. As identified in all action alternative descriptions in Chapter 2, the Scriver Creek drainage has sufficient road and trail access that should reduce treatment costs and logistics for treatment of established infestations, such as currently exists with rush skeletonweed. This accessibility, while

providing a vector for potential spread and establishment of weed sources, also provides the necessary access to allow effective containment and eradication treatments of established weeds when and where detected

#### 3.10.2.2.2 Cumulative Effects of Alternatives B, C, and D

In addition to other past, present and foreseeable future timber harvest and road activities and their potential to contribute to the establishment and spread of noxious weeds, recreational uses and livestock grazing are also considered vectors that could cumulatively add to the establishment and spread of noxious weeds under any of the action alternatives. How these additional vectors could contribute is discussed in section 3.10.1.

Appendix B outlines the past, ongoing, and foreseeable actions evaluated for inclusion in this analysis. Past management actions have been considered in describing the existing conditions of noxious weeds in the analysis area. Ongoing activities that would be expected to continue in the future would be recreation activities, road and trail use, road and trail maintenance activities, livestock grazing, and wildfire suppression as needed. Reasonably foreseeable projects in the analysis area include the Scriver Creek Trail and Scriver Creek Snowmobile Bridge projects. The Scriver Creek Trail and Scriver Snowmobile Bridge project proposals are currently being developed and are not finalized to date. The Scriver Creek Trail project could add miles of NFS trails utilizing new trail construction, conversion of existing NFS roads to trail, and/or designation of NFS trail on NFS road (i.e., dual designation) within the analysis area. In conjunction with other landowners, the Scriver Creek Snowmobile Bridge Project would replace an existing snowmobile bridge with a new bridge to provide a bridge for over snow use that meets Forest Service standards. These ongoing and reasonably foreseeable Projects in the analysis area have the potential to cumulatively impact noxious weed conditions from ground-disturbing activities, additional establishment sites and additional miles of NFS trail, and human and livestock activities providing the mechanism for seed dispersal. However, as with activities proposed under the action alternatives, noxious weed project design features would also be required during implementation of future projects, such as new trail construction and bridge replacement. Thus, with application of design features as part of the Project proposals would be expected to minimize exposure risk to the introduction and spread of noxious weeds.

While differences do exist between the risk of exposure between alternatives, the ability to detect, monitor, and treat infestations is the same because the accessibility to the Project area remains similar between alternatives. Thus, while current Forest weed management programs would likely not avoid the introduction of new populations and/or spread of existing noxious weeds in the Project area, the weed management program would be anticipated to contain and/or eradicate any occurring weed populations.

## 3.11 RANGE

This section incorporates by reference the Range Specialist's Report (available in the Project Record), which contains detailed data, methodologies, analyses, conclusions, maps, references, and technical documentation. This section discusses the current livestock management in the Project area, as well as the effects of the proposed activities on the range resources.

The analysis area for direct effects to range resources is the approximately 9,943 acres of the Middle Fork South S&G Allotment that lies within the Project area because direct impacts to this resource would be limited to this area. The analysis area for indirect and cumulative effects to

range resources would be the approximately 117,000 acres of the Middle Fork North and South S&G allotments because this would be the area impacted by displacing livestock from the Project area and modifying grazing patterns caused by the action alternatives.

### 3.11.1 Affected Environment

The Project falls within the southwestern portion of the Middle Fork South S&G Allotment (Figure 3-54). One permittee operates this allotment in concert with the Middle Fork North S&G Allotment, which lies north of the Project area. About 9,943 acres of the 46,804-acre Middle Fork South S&G Allotment occurs within the Scriver Creek subwatershed. The authorized use under the current term grazing permit includes a 920 ewe/lamb band, or wet band, for each allotment with an annual grazing season of June 6 to August 22. In addition, a bucking band, or dry band, is authorized for an annual grazing season of August 23 to October 5. The ewe/lamb bands are kept separate and graze different areas until late July when they begin trailing west to shipping corrals. After the lambs are shipped to market in August, bucks are added and the two bands are combined into one. These bands are then grazed into the Middle Fork Payette River/Rocky Canyon area, which is located northeast of the analysis area, until leaving the allotment in October.

The AOI (available in the Project Record) for the Middle Fork North and South S&G allotments provide direction for livestock management. The allotment is managed with “once over” grazing, utilizing open or loose herding with limited use of dogs to keep the sheep from bunching up into tight groups. Bed grounds are to be used for only 1 night with camps moved every 3 to 4 days to facilitate proper movement of the band. The routing pattern in the allotment changes every grazing season and is outlined in the AOI. No range improvements are located in the analysis area. The AOI also outlines allotment monitoring requirements. The current AOI indicates that Scriver Creek is a “riparian area of concern” in the Middle Fork South S&G Allotment. Riparian areas with the greatest potential for resource damage are open, flat areas next to roads or trails; the AOI for these allotments prescribes monitoring for livestock utilization, streambank stability, and riparian recovery in these areas.

In the recent past, permitted sheep regularly used parts of these grazing allotments within the Project area. Use would be expected to continue as part of the livestock grazing rotation plan for this allotment.

### 3.11.2 Environmental Consequences of Alternative A—No Action

#### *3.11.2.1 Direct and Indirect Effects*

Alternative A does not propose any new management activities, thus no management-induced changes to the range resources would be expected to occur. Current authorized livestock grazing would be anticipated to occur under the term grazing permit and AOI under this alternative. Range conditions, including forage quality, forage quantity, and the area usable for livestock grazing, would be expected to be maintained at levels similar to existing conditions.

#### *3.11.2.2 Cumulative Effects*

Alternative A would not have any cumulative effects to range resources given that there would be no direct or indirect effects.

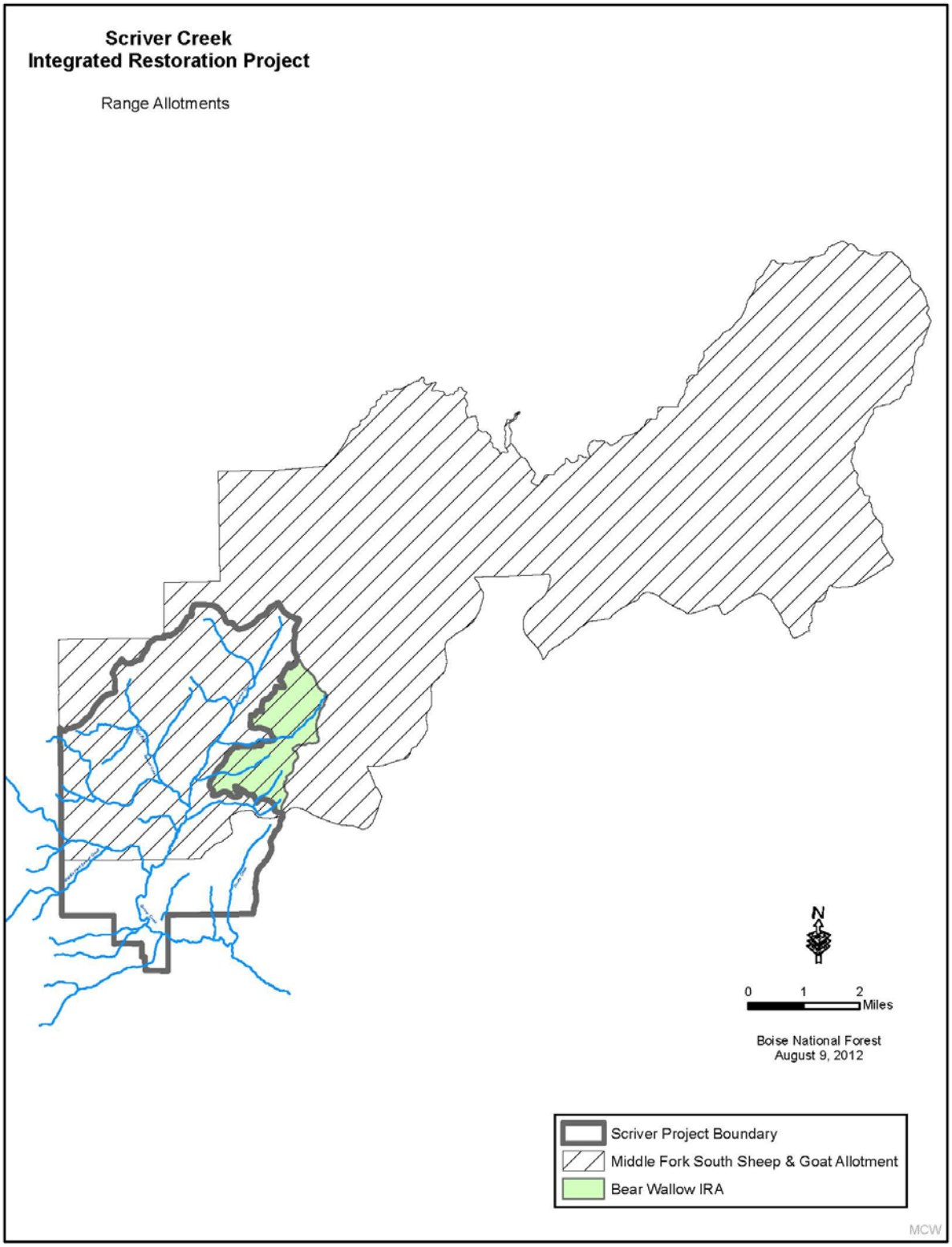


**Figure 3-54. Portion of the Middle Fork South Sheep and Goat Allotment that Falls within the Scriver Creek Integrated Resource Management Project Area**

### 3.11.3 Environmental Consequences of Alternative B—Proposed Action

#### *3.11.3.1 Direct and Indirect Effects*

Implementing Alternative B would likely improve the forage quality and quantity. Improvements to rangeland conditions would result from proposed vegetation treatments (Table 3-70) that would reduce stand densities and canopy cover (see Table 3-10 and Table 3-12), thereby increasing solar radiation into the stands and stand access by livestock. Walburger et al. (2005) found that forage production, particularly perennial grasses and forbs, increased following timber harvest.

**Table 3-70. Vegetation and Prescribed Burning Treatments and Road Activity by Alternative**

| Activity Type | Alternative A | Alternative B | Alternative C | Alternative D |
|---|---|---|---|---|
| Acres of commercial vegetation treatments | 0 | 3,265 | 3,575 | 3,575 |
| Acres of noncommercial vegetation treatments | 0 | 839 | 839 | 839 |
| Acres of prescribed burning | 0 | 962 | 949 | 949 |
| **Total miles of road activity[a]** | | | | |
| Decommission/obliteration | 0 | 19.8 | 23.5 | 23.5 |
| New system/temporary construction | 0 | 2.7/1.0 | 1.1/4.2 | 0.0/4.2 |
| Reconstruction | 0 | 11.1 | 13.6 | 13.6 |

[a]Road maintenance activities are not included because they should not disrupt grazing patterns

Proposed timber harvest, road activities, and/or prescribed burning activities (Table 3-70) may be expected to temporarily displace livestock the from the direct effects analysis area (9,943 acres) into other areas of the Middle Fork North and South S&G allotments (indirect effects analysis area) during the grazing season. As specified in Design Feature RG-1, the District Range Management Specialist would be notified of the timing of project activities, including timber harvest and road activities. This design feature also specifies that the permittee would be informed through the allotment AOI of pending project activities to minimize the potential for conflicts and allow for modifying grazing practices where necessary (section 2.4.5).

Indirect effects of this alternative in the temporary to short term (i.e., during implementation) would include modifying allotment grazing patterns to exclude all or some portions of the 9,943 acres of Middle Fork South S&G Allotment that falls within the Project area (Figure 3-54). However, modifying the grazing patterns would not be expected to impact the livestock numbers and/or grazing season because of the overall size of the allotment which extends well outside the Project area (Figure 3-54) and the ability to move livestock into portions of the allotment unaffected by the disturbance activity.

#### *3.11.3.2 Cumulative Effects*

Appendix B of this document outlines the past, ongoing, and foreseeable actions evaluated for this analysis. Review of Appendix B indicated that past vegetation management activities within the analysis area may have impacted range resources. Ongoing activities that could potentially impact range resources in the analysis area include active timber harvest operations (Stolle 7, Frontier, and Peacemaker Sales), road activities, NFS trail activities, dispersed recreation activities, and wildfire suppression as needed. Two reasonably foreseeable projects could

potentially impact range resources in the analysis area: Scriver Creek Trail Project and Rocky Canyon Prescribed Fire Project. The project proposal for the Scriver Creek Trail Project is being developed and not finalized to date. The Scriver Creek Trail Project could add miles of NFS trails within the analysis area. The Rocky Canyon Prescribed Fire Project proposed to reintroduce low-to-moderate intensity fire to the dominant nonlethal fire regimes, as well as improve vegetative and wildlife habitat conditions in the watershed north-northeast of the Project area. Both of these projects would likely impact range resources through displacement of livestock and/or modification of grazing patterns within the cumulative effects analysis area for a short time during project implementation. This alternative and the applicable reasonable foreseeable project could be implemented during the same time and space, thereby temporarily cumulatively impacting the grazing patterns within the Middle Fork North and South S&G allotments. However, modification of the grazing patterns would be addressed, as needed, in the allotment AOI and would not be expected to impact the livestock numbers and/or grazing season because of the overall allotment size (Figure 3-54), the temporary to short-term nature of the disturbance, and the ability to move livestock into portions of the allotment unaffected by the various disturbance activities.

## 3.11.4 Environmental Consequences of Alternatives C and D

### *3.11.4.1 Direct and Indirect Effects*

Similar to that expected under Alternative B, implementing Alternative C or D would likely improve the forage quality and quantity, as well as increase the area available for livestock grazing, within the areas proposed for vegetation treatments. Based on total acres proposed for treatment (Table 3-70), Alternative C and D would improve about 5–10 percent more acres than Alternative B. These improvements to rangeland conditions would result from the proposed vegetation treatments that would reduce stand densities and canopy cover, thereby increasing solar radiation into the stands and stand access by livestock. Walburger et al. (2005) found that forage production, particularly perennial grasses and forbs, increased following timber harvest.

Similar to Alternative B, timber harvest, road activities, and/or prescribed burning activities proposed under Alternatives C and D might temporarily displace livestock from all or portions of the direct effects analysis area (9,943 acres) into other areas of the Middle Fork North and South S&G allotments (indirect effects analysis area) for short time periods during the grazing season. Because Alternatives C and D treat more acres and complete more road management activities than Alternative B, the displacement/disruption could be slightly greater under Alternatives C or D. However, the small relative change between the alternatives and flexibility to adjust livestock grazing patterns in this large allotment would prevent a measurable change to grazing between any of the action alternatives.

Design Feature RG-1, which requires the District Range Management Specialist be notified of the timing of project activities, including timber harvest and road activities, has also been included in Alternatives C and D. This design feature specifies that the permittee would be informed through the allotment AOI of pending project activities to minimize the potential for conflicts and allow for modifying grazing practices where necessary (section 2.4.5).

Similar to that disclosed under Alternative B, indirect effects of this alternative in the temporary to short term (i.e., during implementation) would include modifying grazing patterns in the allotments to exclude all or some portions of the 9,943 acres of Middle Fork South S&G

Allotment that falls within the Project area (Figure 3-54). However, modifying the grazing patterns would not be expected to impact the livestock numbers and/or grazing season because of the overall size of the allotment which extends well outside the Project area (Figure 3-54) and the ability to move livestock into portions of the allotment unaffected by the disturbance activity.

#### *3.11.4.2 Cumulative Effects*

Appendix B of this document outlines the past, ongoing, and foreseeable actions evaluated for this analysis. Review of Appendix B indicated that past vegetation management activities within the analysis area may have impacted range resources. Ongoing activities that could potentially impact range resources in the analysis area include active timber harvest operations (Stolle 7, Frontier, and Peacemaker Sales), road activities, NFS trail activities, dispersed recreation activities, and wildfire suppression as needed. Two reasonably foreseeable projects could potentially impact range resources in the analysis area: Scriver Creek Trail Project and Rocky Canyon Prescribed Fire Project. The project proposal for Scriver Creek Trail Project is being developed and not finalized to date. The Scriver Creek Trail Project could add miles of NFS trails within the analysis area. The Rocky Canyon Prescribed Fire Project proposed to reintroduce low-to-moderate intensity fire to the dominant nonlethal fire regimes, as well as improve vegetative and wildlife habitat conditions in the watershed north-northeast of the Project area. Both of these projects would likely impact range resources through displacement of livestock and/or modification of grazing patterns within the cumulative effects analysis area for a short time during project implementation. Activities under either Alternative C or D and the applicable reasonable foreseeable project could be implemented during the same time and space, thereby temporarily cumulatively impacting the grazing patterns within the Middle Fork North and South S&G allotments. However, modification of the grazing patterns would be addressed, as needed, in the allotment AOI and would not be expected to impact the livestock numbers and/or grazing season because of the overall allotment size (Figure 3-54), the temporary to short-term nature of the disturbance, and the ability to move livestock into portions of the allotment unaffected by the various disturbance activities.

## 3.12 TRANSPORTATION SYSTEM

This section incorporates by reference the Transportation Specialist's Report (available in the Project Record), which contains detailed data, methodologies, analyses, conclusions, maps, references, and technical documentation. This section discusses the effects of each alternative on the authorized NFS roads and unauthorized routes.

The analysis area for direct, indirect, and cumulative effects for the transportation analysis is the approximately 11,510-acre Project area since this is the largest extent to which impacts from the proposed activities to the transportation system could be measured.

### 3.12.1 Transportation System Indicators

The indicators identified below were used to evaluate the measure of change between alternatives for the transportation system in the analysis area.

**Indicator:** Road Maintenance Level—This Indicator was used to evaluate the change in miles by maintenance level within the analysis area as a result of proposed activities. Road closure devices are included as a subset of this indicator.

**Indicator:** Road Maintenance Cost—This Indicator was used to evaluate the change in annual maintenance cost by maintenance level within the analysis area as a result of proposed activities.

**Indicator**: miles of Unauthorized Routes—This Indicator was used to evaluate the change in miles of inventoried unauthorized routes in the analysis area as a result of the proposed activities.

**Indicator**: Motor Vehicle Use Designations—This Indicator was used to evaluate the change in miles of NFS roads and trails designated for motorized vehicle use in the analysis area as a result of the proposed activities.

**Indicator:** Open and Total Road Density—This Indicator was used to evaluate the change in road density in the analysis area as a result of proposed activities.

**Analysis Methodology**

The analysis was completed by evaluating the Project GIS road data, Forest Service INFRA database road and spatial information, the Motor Vehicle Use Map (MVUM), and the Scriver Creek Transportation Analysis Process (TAP) (Forest Service 2011b) and by conducting field surveys to determine impacts to the indicators from each alternative.

### 3.12.2 Affected Environment

The Scriver Creek transportation system was primarily designed and developed to facilitate the removal of wood fiber from NFS lands with a majority of the roads being built during the 1950s, 1960s, and 1970s (Figure B-1 and Table B-2 in Appendix B). Specific past projects considered in developing the existing conditions for the transportation system and opportunities are identified in Table B-2 (Appendix B). The past vegetation management activities identified in Table B-2 (Appendix B) have structurally and temporally contributed to the existing NFS road infrastructure to varying extents. Past activities were able to support needed road maintenance and extensive road infrastructure. The declining funding available for general road maintenance and the steep decline in annual forest product removal levels has created a backlog of road maintenance within the analysis area. The last vegetation management project to utilize the existing transportation system was Bear Wallow II (Map Index Number 62, Figure B-1 Table B-2, Appendix B).

The transportation system within the analysis area receives a wide variety of summer and winter recreational use (section 3.12). About 73.6 miles of authorized NFS roads and 4.7 miles of unauthorized routes occur in the analysis area (Table A-3 in Appendix A). Approximately 9.7 miles of NFS road in the analysis area have aggregate road surfacing. NFS road conditions in the analysis area vary by the road maintenance level; length of time since last maintained; and location, design, and maintainability of the road. The existing authorized NFS roads are classified into three road maintenance levels (ML) (Table 3-71). Table 3-71 summarizes the

existing road miles by maintenance level. The total road density[53] in the analysis area is 4.4 mi/mi$^2$ (Figure 3-55).

**Table 3-71. Summary of National Forest System Roads by Maintenance Level (ML) in the Analysis Area**

| Road Maintenance Level | Definition | Miles |
|---|---|---|
| ML1 | Assigned to intermittent service roads during the time they are closed to vehicular traffic. Basic custodial maintenance is performed to keep damage to adjacent resources to an acceptable level and to perpetuate the road to facilitate future management activities. | 51.7 |
| ML2 | Assigned to roads open for public or permitted use by high clearance vehicles. Passenger car traffic is not a consideration. | 13.3 |
| ML3 | Assigned to roads open and maintained for travel by a prudent driver in a standard passenger car. User comfort and convenience area not considered priorities. | 8.6 |
| Total National Forest System Road miles in the Analysis Area | | 73.6 |

Motorized vehicle travel in the analysis area is restricted to NFS roads and trails designated for motorized use pursuant to the Forest Service's *Travel Management Rule* (36 CFR 261.13, 2005). Motorized wheeled vehicle designated access is limited to 21.2 miles (29 percent) of the NFS roads in the analysis area (Forest Service 2012c). NFS roads 693, 693B, 695, and 696 are designated "Open to All Vehicles, Yearlong" on the Emmett RD Motor Vehicle Use Map (MVUM) (Forest Service 2012c). The open road density[54] in the analysis area is 1.2 mi/mi$^2$. Additionally, 4.0 miles of NFS trail 448 is designated on the MVUM as "Open to Vehicles 50 inches or less" with a seasonal closure from October 1 to June 30. This trail is located on portions of authorized NFS roads 693Q, 693L, and 693L5, which are in ML 1 status (Figure 3-55and Figure 3-56). Another 1.7 miles of NFS trail 035 (Bear Wallow) is within the Project area and designated on the MVUM as "Open to Vehicles 50 inches or less, Yearlong". Figure 3-56 displays the NFS roads and trails currently designated for motorized use in the analysis area.

[53] Total Road Density includes both authorized NFS roads and known unauthorized routes in the analysis area. Total Road Density = Total Road Miles/Analysis Area (mi$^2$). Total Road Miles = 78.3 mi, Analysis Area = 17.98 mi$^2$, and Total Road Density = 78.3 mi/17.98 mi$^2$ = 4.4 mi/mi$^2$.

[54] Open road density includes authorized NFS roads that are designated open to all vehicles in the analysis area. Open road density is calculated as roads open to all vehicles (mi) divided by the analysis area (mi$^2$). For example, if the open road miles is 21.2 miles and the analysis area is 17.98 mi$^2$, then the Open Road Density equals 21.2 mi divided by 17.98 mi$^2$, which equals 1.2 mi/mi$^2$.

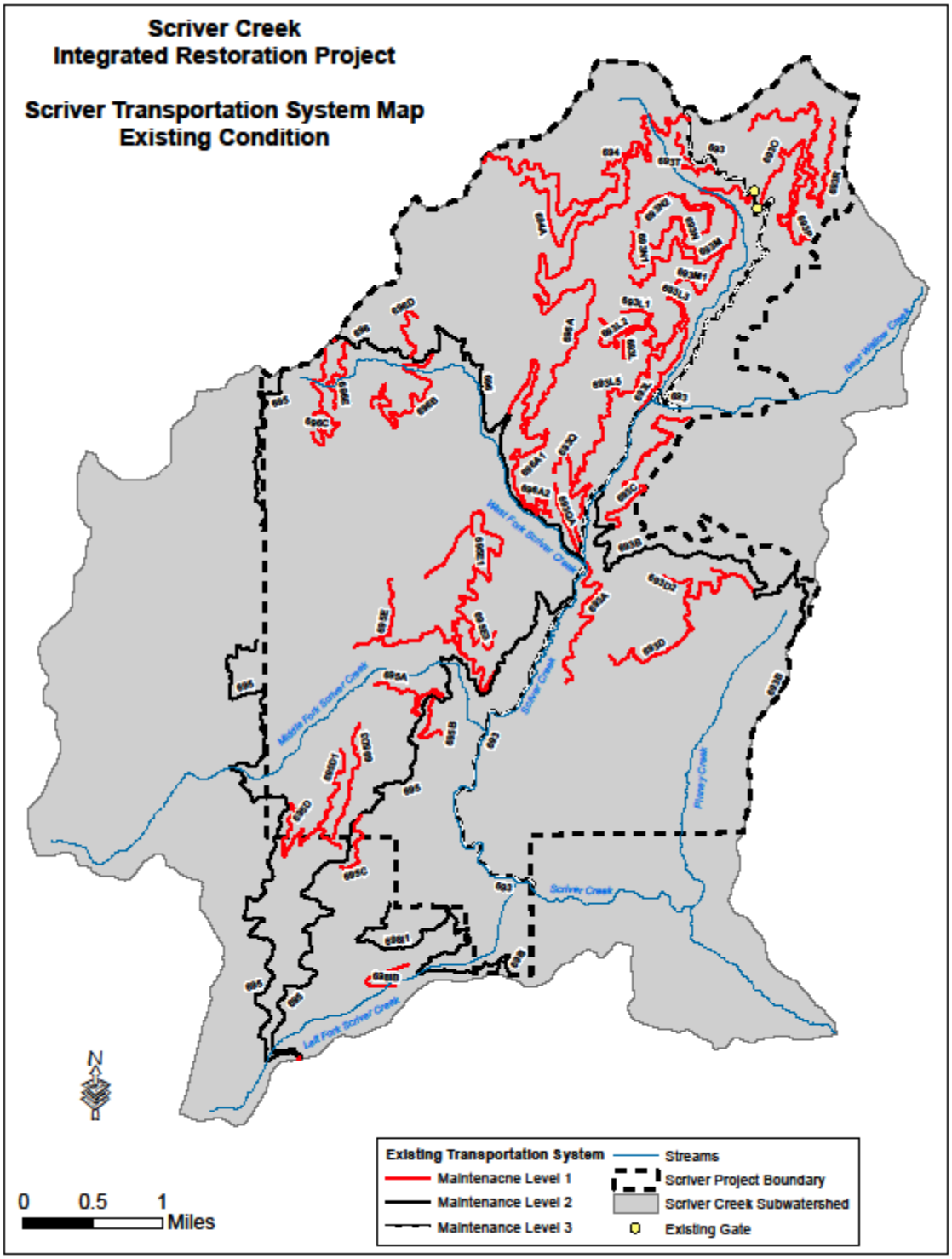


**Figure 3-55. Existing National Forest System Roads in the Scriver Creek Integrated Restoration Project Area**

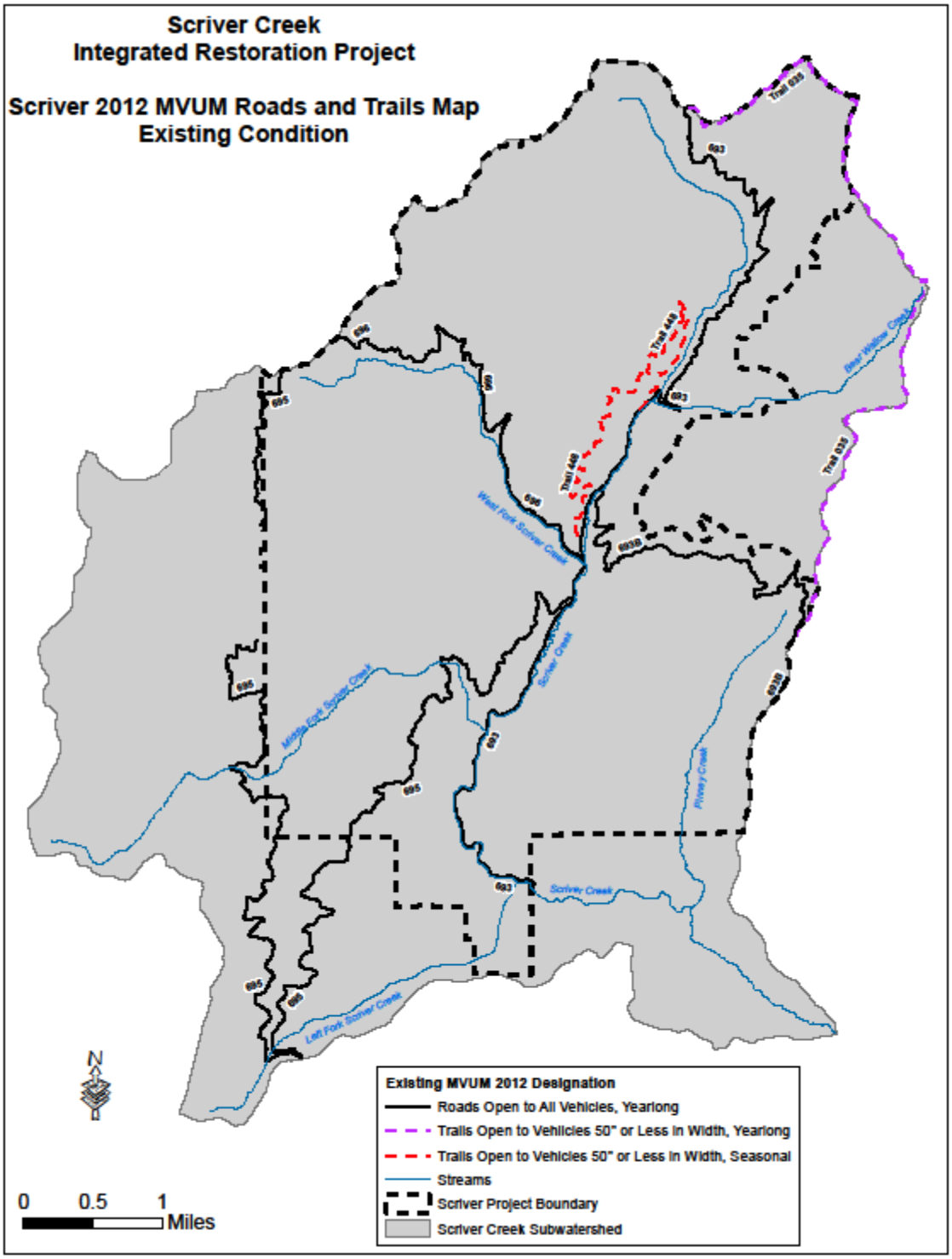


**Figure 3-56. Existing National Forest System Roads and Trails Designated for Motorized Use in the Scriver Creek Integrated Restoration Project Area**

Annual NFS road maintenance and deferred maintenance costs in the analysis area are estimated to be about $65,840 (Table 3-72). Road maintenance is the ongoing upkeep of a road necessary to retain or restore the road to the approved road management objective (FSM 7712.3). Deferred maintenance refers to road maintenance activities, such as bridge, culvert, and/or aggregate replacement, that are required at some time in the future. Annual road maintenance costs and deferred maintenance costs, based on the annualized total anticipated cost of these activities, have been combined to estimate the total annual road maintenance cost per mile for the Forest.

**Table 3-72. Summary of Existing National Forest System Road System Annual Maintenance Costs by Road Maintenance Level (ML) in the Analysis Area**

| Road Maintenance Level | Road miles | Total Annual Road Maintenance Cost per mile ($) | Annual Maintenance Cost ($) |
|---|---|---|---|
| ML 1 | 51.7 | 65 | 3,360 |
| ML 2 | 13.3 | 1,400 | 18,620 |
| ML 3 | 8.6 | 5,100 | 43,860 |
| Total | 73.6 | — | 65,840 |

## 3.12.3 Environmental Consequences of Alternative A—No Action

### 3.12.3.1.1 Direct and Indirect Effects

This alternative does not propose changes to the transportation system in the analysis area. Therefore, no direct or indirect effects would result from implementing Alternative A. The existing NFS road system and associated maintenance costs, as well as the total road density in the analysis area, would remain at current levels (section 3.11.1). The motorized wheeled vehicle designations, as illustrated on the annual Emmett RD MVUM, and the open road density would also remain at the current levels under this alternative. Finally, 4.7 miles of unauthorized routes in the analysis area would continue to exist.

### 3.12.3.1.2 Cumulative Effects

No cumulative effects would be associated with this alternative since there would be no direct or indirect effects to the transportation system with the implementation of Alternative A.

## 3.12.4 Environmental Consequences of Alternative B—Proposed Action

### 3.12.4.1.1 Direct and Indirect Effects

Alternative B would modify the transportation system in the analysis area based on the recommendations of the TAP (Forest Service 2011b). Alternative B includes constructing 2.7 miles[55] of new authorized NFS road and 1.0 mile of temporary road. In the analysis area, 39.3 miles of NFS roads would receive general road maintenance and 11.1 miles would be reconstructed. About 2.8 miles of NFS road 693 would be reconstructed by applying aggregate

[55] Road miles are approximate

surfacing to the existing native road surface to reduce sediment production and stream delivery. NFS road 696 would be realigned by reconstructing it at a location outside of the West Fork Scriver Creek RCA. Realigning NFS road 696 would require decommissioning 3.7 miles of existing road prism, of which 2.8 miles is located in an RCA; relocating the road using portions of NFS roads 695E (0.5 miles), 695E1 (2.0 miles), 696B (0.2 miles), and 696C (0.8 miles); and constructing 4.3 miles of new road prism. In addition, NFS road 696D would be reconstructed to facilitate log haul by addressing ingress and egress issues related to the realignment of NFS road 696. Realigning NFS road 696D would require decommissioning 0.1 miles of existing road prism, relocating the road using existing portions of unauthorized route 696DX (0.4 miles), and constructing 0.1 miles of new road prism.

Alternative B would also decommission an additional 12.8 miles of authorized NFS road, as well as, 3.3 miles of known unauthorized routes in the analysis area (Table 3-73). New aggregate would be placed for 300 feet on both sides of perennial stream crossings as part of general road maintenance under this alternative. An additional 9.7 miles of NFS Roads 693 and 695 would receive aggregate road surfacing on road segments where the existing aggregate surface has been degraded since initial aggregate placement to maintain the resource benefits of this road surfacing. Table A-4 in Appendix A summarizes the proposed transportation system changes by road segment.

**Table 3-73. Summary of National Forest System Roads and Unauthorized Routes Decommissioned by Alternative**

| Road Classification | Alternative A (miles) | Alternative B (miles) | Alternative C (miles) | Alternative D (miles) |
|---|---|---|---|---|
| National Forest System Road | 0.0 | 12.8 | 16.4 | 16.4 |
| National Forest System Road—Realignment | 0.0 | 3.8 | 3.8 | 3.8 |
| Unauthorized Route | 0.0 | 3.3 | 3.3 | 3.3 |
| **Total** | **0.0** | **19.9** | **23.5** | **23.5** |

Following implementation of the proposed activities, NFS roads in the analysis area would be reduced to 64.4 miles under Alternative B (Table 3-74). In addition, decommissioning authorized NFS roads and unauthorized routes would decrease total road density in the analysis area to 3.6 mi/mi$^2$. Implementation and post-Project road maintenance levels would be affected under Alternative B: 25.6 miles of roads currently in ML 1 status would be converted to ML 2 status to facilitate vegetation treatments, and then either be reverted back to ML 1 following completion of those activities or decommissioned and permanently removed from the transportation system. Figure 3-57 illustrates where new closure devices, such as gates, barrier rock, and/or berms, would be placed on the following ML 1 roads after completing vegetation treatments: 693B1, 696A, 696D, 696B, 696C, 696E, and 696F. These closures would mitigate unauthorized use on ML1 NFS roads (i.e., roads not designated for motorized wheeled vehicle use) in the analysis area and also provide for long-term management access. Furthermore, use on NFS road 693 (ML 3) and NFS road 696 (ML 2) would be expected to increase during vegetation management activities when these roads would be utilized as the main haul routes in the analysis area (section 3.14). Following the completion of all project activities, the miles of ML 1 road would decrease by 13.0 miles, primarily because of road decommissioning. ML 2 road miles would

increase 3.8 miles from realigning NFS road 696, and ML 3 road miles would remain static at the existing condition (Table 3-74). Annual road maintenance and deferred maintenance costs would be expected to increase across the Project area by $4,480/year based on the increase of ML 2 roads resulting from the realignment of NFS road 696 (Table 3-75).

**Table 3-74. Summary of miles of Road Maintenance Level (ML) by Alternative by and Project Phase**

| Road Maintenance Level | Alternative A (miles) | Alternative B (miles) | | Alternative C (miles) | | Alternative D (miles) | |
|---|---|---|---|---|---|---|---|
| | | Implementation | Post Project | Implementation | Post Project | Implementation | Post Project |
| ML 1 | 51.7 | 24.6 | 38.7 | 26.4 | 33.6 | 36.4 | 32.4 |
| ML 2 | 13.3 | 47.8 | 17.1 | 44.4 | 17.1 | 43.3 | 17.1 |
| ML 3 | 8.6 | 8.6 | 8.6 | 8.6 | 8.6 | 8.6 | 8.6 |
| Total | 73.6 | 81.0 | 64.4 | 79.4 | 59.3 | 78.3 | 58.1 |

**Table 3-75. Summary of Annual Road Maintenance Cost by Alternative and Road Maintenance Level (ML)**

| Road Maintenance Level | Alternative A | Alternative B | Alternative C | Alternative D |
|---|---|---|---|---|
| ML 1 | $3,360 | $2,520 | $2,180 | $2,110 |
| ML 2 | $18,620 | $23,940 | $23,940 | $23,940 |
| ML 3 | $43,860 | $43,860 | $43,860 | $43,860 |
| **Total:** | **$65,840** | **$70,320** | **$69,980** | **$69,910** |

The realignment of NFS road 696 under Alternative B would increase the miles of NFS roads "Open to All Vehicles, Yearlong" to 25.0 miles and increase the open road density in the analysis area to 1.4 mi/mi$^2$ (Table 3-76). In addition, the designation of NFS trail 448 as "Open to Vehicle 50 inches or less" and its seasonal closure (October 1 to June 30) would be expected to remain the same, even with the decommissioning of 1.1 miles of the ML 1 NFS roads that are coincident with this trail (Table 3-77). Decommissioning the coincident roads would be done to maintain a trail surface of appropriate width of the current designated trail system. Figure 3-58 illustrates the NFS roads and trails designated for motorized use under Alternative B.

**Table 3-76. Summary of Open and Total Road Density (miles/miles$^2$) by Alternative.**

| Road Density | Alternative A (miles/miles$^2$) | Alternative B (miles/miles$^2$) | Alternative C (miles/miles$^2$) | Alternative D (miles/miles$^2$) |
|---|---|---|---|---|
| Open road | 1.2 | 1.4 | 1.4 | 1.4 |
| Total road | 4.4 | 3.6 | 3.4 | 3.3 |

**Table 3-77. Summary of Motor Vehicle Use by Designation by Alternative**

| Motor Vehicle Use Designation | Alternative A (miles) | Alternative B (miles) | Alternative C (miles) | Alternative D (miles) |
|---|---|---|---|---|
| NFS Road—Open to All Vehicles, Yearlong | 21.2 | 25.0 | 25.0 | 25.0 |
| NFS Road—Open to Vehicles 50 inches or Less Only, Seasonal (Dual Designation) | 4.0 | 2.9 | 2.9 | 2.9 |
| NFS Trail—Open to Vehicles 50 inches or Less, Seasonal | 0.0 | 1.1 | 1.1 | 1.1 |
| NFS Trail—Open to Vehicles 50 inches or Less, Yearlong | 1.7 | 1.7 | 1.7 | 1.7 |

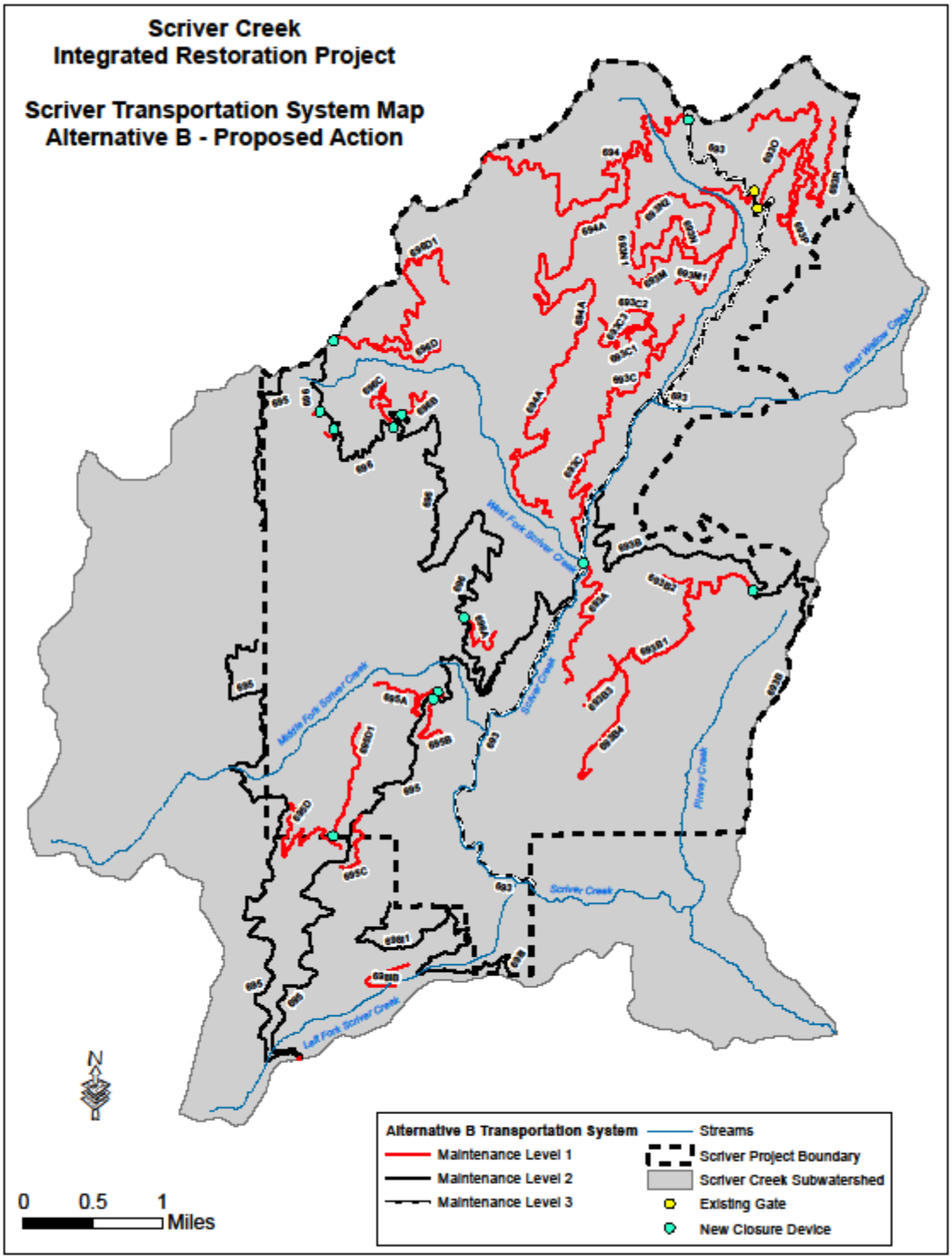


**Figure 3-57. National Forest System Roads in the Analysis Area by Maintenance Level under Alternative B**

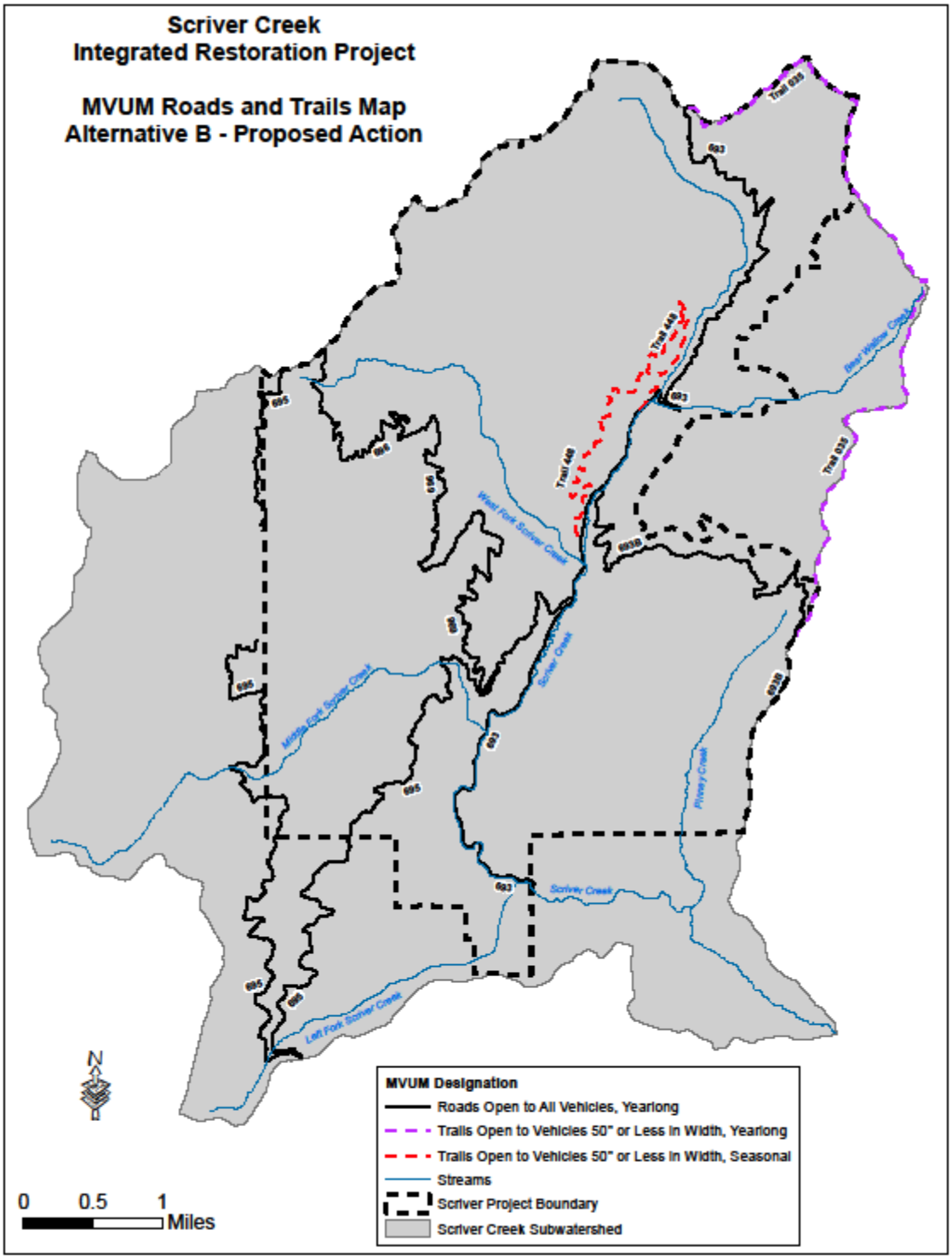


**Figure 3-58. National Forest System Roads and Trails Designated for Motorized Use under Alternative B**

## 3.12.1 Environmental Consequences of Alternative C

### 3.12.1.1.1 Direct and Indirect Effects

Alternative C would modify the transportation system in the analysis area based on comments received on the Proposed Action as portrayed in the DEIS (Forest Service 2011). Alternative C would not implement TAP (Forest Service 2011b) recommendations. The TAP would be modified to meet the transportation system recommendation of Alternative C if selected. The major differences between the TAP and Alternative C would be additional miles of road decommissioning and a reduction in the miles of new road construction.

Under Alternative C, 1.1 miles of new authorized NFS road and 4.2 miles of temporary road would be constructed. In the analysis area, 36.8 miles of NFS roads would receive general road maintenance and 11.1 miles would be reconstructed. Aggregate would be applied to the native road surface of 2.8 miles of NFS road 693 and 2.5 miles of NFS road 693B to reduce sediment production and stream delivery. NFS road 696 would be reconstructed outside of the West Fork Scriver Creek RCA. Realigning NFS road 696 would require decommissioning 3.7 miles of existing road prism, of which 2.8 miles is located in an RCA; relocating the road using portions of NFS Roads 695E (0.5 mile), 695E1 (2.0 miles), 696B (0.2 mile), and 696C (0.8 mile); and constructing 4.3 miles of new road prism. In addition, NFS road 696D would be reconstructed to facilitate log haul by addressing ingress and egress issues related to the realignment of NFS road 696. Realigning NFS road 696D would require decommissioning 0.1 miles of existing road prism and relocating the road using portions of unauthorized route 696DX (0.4 miles) and constructing 0.1 miles of new road prism.

Alternative C would also decommission and remove 16.4 miles of NFS road from the authorized road system and decommission 3.3 miles of known unauthorized routes in the analysis area. New aggregate would be placed for 300 feet on both sides of perennial stream crossings as part of the general road maintenance under this alternative. An additional 9.7 miles of (NFS Roads 693 and 695) would receive of aggregate road surfacing on road segments where the existing aggregate surface has been degraded since initial aggregate placement would be replaced on segments of road to maintain the useful life and resource benefits of this road surfacing. Table A-5 in Appendix A summarizes the proposed transportation system changes by road segment.

Under alternative C, new closure devices, such as gates, barrier rock, and/or berms, would be placed on the following ML 1 roads after completing vegetation treatments: 693B1, 696A, 696D, 696B, 696C, 696E, and 696F (Figure 3-59). These closures would mitigate unauthorized use on ML1 roads (i.e., roads not designated for motorized wheeled vehicle use) in the analysis area and also provide for long-term management access. The unauthorized route 693X4 would be gated at each end to discourage unauthorized wheeled vehicle use while maintaining access for snow groomer operations during the winter.

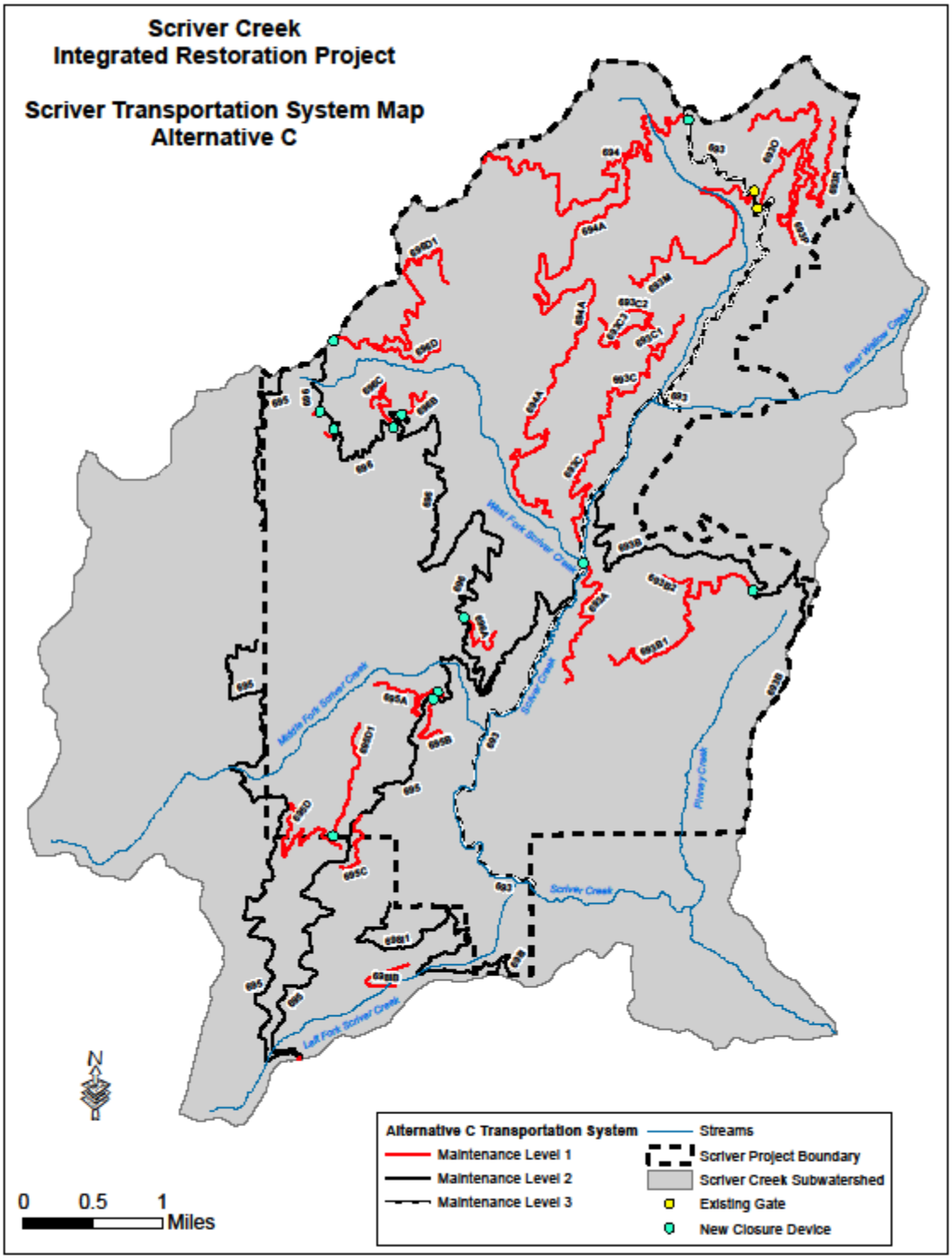


**Figure 3-59. National Forest Service Roads in the Analysis Area by Maintenance Level Following Implementation of Alternative C**

The realignment of NFS road 696 under Alternative C would increase the miles of NFS roads "Open to All Vehicles, Yearlong" to 25.0 miles (Table 3-77) and increase the open road density in the analysis area to 1.4 mi/mi$^2$ (Table 3-76). In addition, the designation of NFS trail 448 as "Open to Vehicle 50 inches or less" and its seasonal closure (October 1 to June 30) would remain the same, even with the decommissioning of 1.1 miles of the ML 1 NFS roads that are coincident with the trail (Table 3-77). Decommissioning of the coincident roads would be done to maintain a trail surface of appropriate width of the current designated trail system. Figure 3-60 illustrates the NFS roads and trails designated for motorized use under Alternative C.

Under Alternative C, 0.4 miles of known unauthorized route 693X4 would be stabilized to reduce sediment delivery to Left Fork Scriver Creek and Scriver Creek. Stabilization would be done to maintain existing snow grooming activities. Stabilization methods may include placing rock/cobble surfacing in spot locations or along the entire length, surface blading and shaping, cross ditch construction, and seeding. Installing new gates at either end would allow winter use for snow grooming but restrict unauthorized access to wheeled motorized vehicles.

Under Alternative C, miles of NFS roads in the analysis area would be reduced to 59.3 miles (Table 3-74). In addition, the total road density in the analysis area would decrease to 3.4 mi/mi$^2$ (Table 3-76) based on decommissioning of authorized NFS roads and unauthorized routes. Implementation and post-Project road maintenance levels would be affected under Alternative C: 23.8 miles of roads currently in ML 1 status would be converted to ML 2 status to facilitate vegetation treatments, and then would either be reverted back to ML 1 following completion of those activities or decommissioned and permanently removed from the transportations system (Table 3-74). Following completion of all Project activities, the miles of ML 1 road would decrease by 18.1 miles, primarily because of road decommissioning. ML 2 road miles would increase 3.8 miles from the realignment of NFS road 696, and ML 3 road miles would remain static at the existing condition (Table 3-74). Annual road maintenance and deferred maintenance costs would be expected to increase across the Project area by $4,140/year based on the increase of ML 2 roads resulting from the realignment of NFS road 696 (Table 3-75).

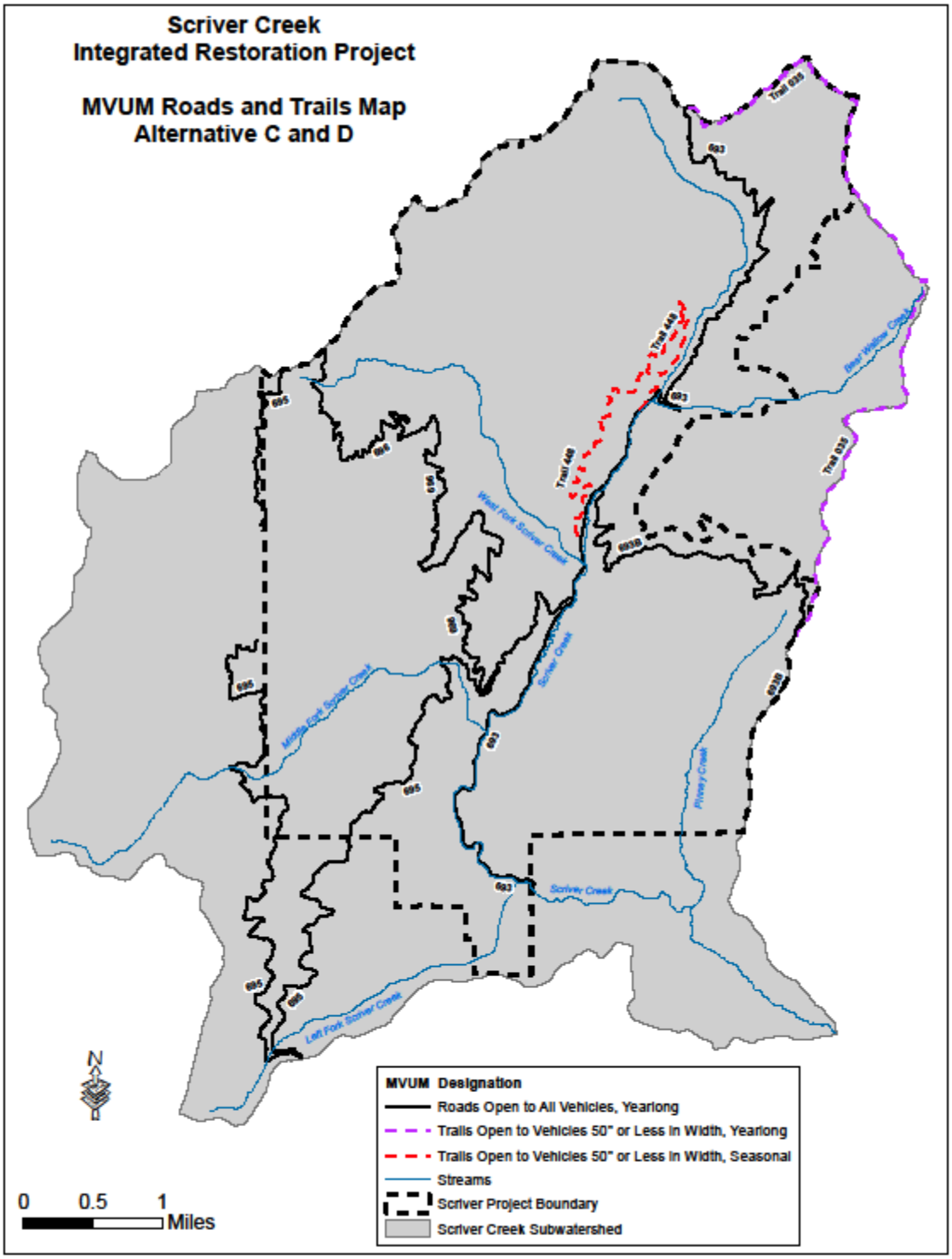


**Figure 3-60. National Forest Service Roads and Trails Designated for Motorized Use under Alternatives C or D**

### 3.12.1 Environmental Consequences of Alternative D

#### 3.12.1.1.1 Direct and Indirect Effects

The effects of Alternative D are the same as Alternative C except that no new authorized NFS roads are proposed under Alternative D. miles of temporary road under Alternative D would be the same as Alternative C at 4.2 miles.

Under Alternative D, the miles of NFS roads in the analysis area would be reduced to 58.1 miles (Table 3-74) and the total road density in the analysis area would decrease to 3.3 mi/mi$^2$ (Table 3-76) from decommissioning authorized NFS roads and unauthorized routes. Implementation and post-Project road maintenance levels would be affected under Alternative D: 23.8 miles of roads currently in ML 1 status would be converted to ML 2 status to facilitate vegetation treatments, and then either reverted back to ML 1 following completion of those activities or decommissioned and permanently removed from the transportations system (Table 3-74). Following completion of all Project activities, miles of ML 1 road would decrease by 19.3 miles, primarily because of road decommissioning. ML 2 road miles would increase 3.8 miles from the realignment of NFS road 696, and ML 3 road miles would remain static (Table 3-74 and Figure 3-61). Annual road maintenance and deferred maintenance costs would be expected to increase across the Project area by $4,070 per year based on the increase of ML 2 roads from the realignment of NFS road 696 (Table 3-75).

### 3.12.2 Cumulative Effects Common to All Action Alternatives

#### *3.12.2.1 Past Activities*

Table B-2 in Appendix B identifies which past activities were considered for this cumulative effects analysis. The impacts of past activities have contributed to the establishment of the existing authorized transportation system and unauthorized routes in the analysis area and, therefore, are included in the affected environment discussion in section 3.11.1.

#### *3.12.2.2 Present and Ongoing Activities*

Table B-1 in Appendix B identifies which present and ongoing activities were considered for this cumulative effects analysis. Ongoing activities, such as road use and maintenance, trail use and maintenance, livestock grazing, and fire suppression, would be expected to continue within the analysis area. Recreational activities would continue as identified in section 3.12.1. These activities utilize the existing transportation system at different use levels and time periods during the year.

#### *3.12.2.3 Reasonably Foreseeable Activities*

Table B-2 in Appendix B identifies which reasonably foreseeable activities were considered for this cumulative effects analysis. Reasonably foreseeable projects and activities in the analysis area that could cumulatively impact the transportation system include the Scriver Creek Trail and Scriver Creek Snowmobile Bridge Projects. The project proposals for both of these projects are being developed and not finalized to date. The Scriver Creek Trail project could add miles of NFS trails within the analysis area designated for motorized use through a variety of means, including new trail construction, conversion of existing NFS roads (ML 1) to trail, and/or designation of NFS trail with NFS roads (i.e., dual designation). The Scriver Creek Snowmobile Bridge project would replace, in conjunction with other landowners, an existing snowmobile

bridge with a new bridge to provide access for over snow use that meets Forest Service standards. This project would not be expected to cumulatively impact the miles of NFS roads, total or open road density, and/or roads designated open to motorized vehicles. However, it could cumulatively increase annual maintenance costs in the analysis area.

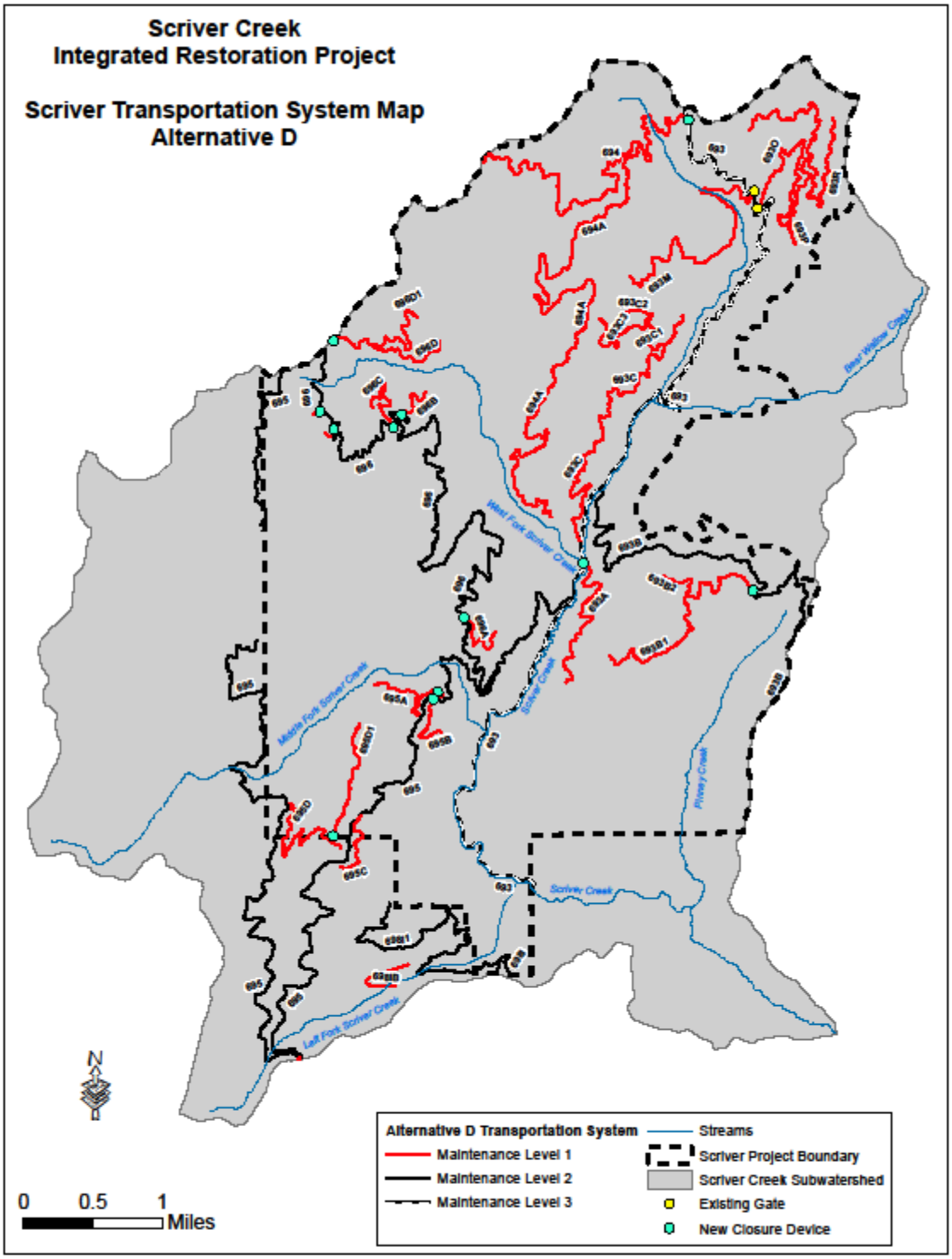


**Figure 3-61. National Forest System Roads in the Analysis Area by Maintenance Level Following Implementation of Alternative D**

## 3.13 RECREATION RESOURCES

This section incorporates by reference the Recreation Specialist's Report (available in the Project record), which contains the detailed data, methodologies, analyses, conclusions, maps, references, and technical documentation. This section discusses the effects of each alternative on recreational use, opportunities, access, and recreation opportunity spectrum (ROS).

The analysis area for recreation resources is the approximately 11,510 acre Project area. This is the relevant scale in which direct, indirect, and cumulative effects of the proposed activities on recreation resources could be effectively measured. An underlying assumption in selection of this scale is that any disruption/displacement of recreational users caused by activities in one portion of the Project area would only displace them to other, undisturbed areas within the Project area. The Project area is sufficiently large and includes multiple areas where recreational users can have similar experiences.

### 3.13.1 Recreation Resources Indicators

The indicators below were used to evaluate the measure of change between alternatives for recreational resources in the analysis area:

**Indicator: Disruption/displacement of recreational users.** This Indicator was used to evaluate disruption and/or displacement of recreational users in the analysis area as a result of proposed activities.

**Indicator: Motorized and non-motorized recreational access.** This Indicator was used to evaluate the impacts of each alternative to both motorized and non-motorized access in the analysis area. The following measures were used for this indicator:

- Miles of NFS roads designated for motorized travel
- Miles of NFS trails designated for motorized use
- Total miles of NFS roads and trails designated for motorized use
- Miles of NFS roads groomed for use in the snow season by snow machines

**Indicator: Dispersed recreation.** This Indicator was used to evaluate impacts of each alternative to inventoried dispersed recreational campsites and other dispersed recreational activities, including hunting, scenic driving, and fuelwood gathering, in the analysis area. The following measure was used for this indicator:

- Number of identified dispersed campsites accessible by roads and the percentage change from existing conditions

**Indicator**: **Recreation Opportunity Spectrum (ROS) classification.** This Indicator was used to evaluate the consistency of each alternative to the current ROS classifications as defined in the 2010 Forest Plan for MA 14—Lower Middle Fork Payette River (Forest Service 2010a, p. III-292).

### 3.13.2 Analysis Methodology

The methodology used to complete the analysis was evaluation of Project GIS data, which includes the following: dispersed recreations campsites, ROS, roads, and trails, the Motor Vehicle Use Map (MVUM), the Transportation Specialist Report, and field observations. In

addition, the proposed activities were evaluated against the analysis area's existing ROS classifications to verify consistency.

### 3.13.3 Recreational Access and Opportunities

#### *3.13.3.1 Affected Environment*

The analysis area is a backyard playground to the Crouch and Garden Valley area residents. Additionally, this area is a popular weekend destination and/or vacation home location for Treasure Valley residents (Forest Service 2010a, p. III-286). The influx of weekend visitors to these communities likely increases the recreational use of the surrounding Forest. Recent historical trends indicate the potential exists for an increase in recreational use in the analysis area as a result of population growth in southwest Idaho.

Recreational access in the analysis area is available by motorized and non-motorized means. The existing motorized transportation system in the analysis area can be attributed to past vegetation management, trail construction, and motorized route designation activities. Specific past projects considered in developing the existing conditions for recreational access and opportunities are identified in Table B.1 in Appendix B. Road and landing construction associated with past vegetation management activities has impacted the amount of motorized access and number of dispersed campsites in the analysis area. Past trail construction in the analysis area has also contributed to both motorized and non-motorized access. In addition, travel management decisions on the Emmett RD have affected motorized access by designating the roads and trails open to motorized use, as well as the types of authorized vehicles. These decisions have therefore altered the miles of roads/trails that provide motorized access for recreational users in the analysis area compared to the amount of access prior to these decisions.

The Emmett RD MVUM identifies the motorized access and type of vehicle authorized, with the exception of over snow use, on NFS roads and trails in the analysis area. About 21.2 miles of NFS roads have been designated as open to all motorized vehicles, including NFS roads 693, 693B, 695, and 696. Approximately 1.7 miles of NFS trail 035 is contained immediately within or adjacent to the analysis area and is designated as open to non-motorized access and motorized vehicles ≤50 inches. NFS trail 448 is a motorized trail designated as open to vehicles ≤50 inches with a seasonal closure from October 1 to June 30. This trail has a dual designation with portions of closed NFS roads 693Q, 693L, and 693L5. Also refer to section 3.12, "Transportation System," Figure 3-56 for a map of MVUM authorized roads and trails.

The analysis area features approximately 17.3 miles of NFS roads that are groomed and maintained as snow machine trails during the winter season. The snow machine trails are used extensively during the snow season (Forest Service 2010a, p. III-286) and are groomed through an agreement between the Idaho Department of Parks and Recreation, Forest Service, and the Garden Valley Snow Goers, a community snowmobile club (Agreement No. 11-CS-11040206-021). The analysis area also includes route 693X4 and a bridge that provides access for the snow groomer and snow machine users to this area, as well as access to the Warm Springs and Garden Mountain areas during the grooming season. This route and bridge provide access from the Terrace Lakes Resort area and is used almost as much as the main Middle Fork route. These trails are part of a larger system of groomed snow machine trails, which link the communities of Crouch and Smiths Ferry, Idaho.

No developed campgrounds occur within the analysis area; however, the analysis area receives a wide variety of dispersed recreation use, such as dispersed campsites (Figure 3-62), seasonal hunting, scenic driving, and fuel wood gathering. These activities have increased over time due to motorized access into the area and proximity to local communities. Dispersed campsites are any campsites located outside of a developed campground/campsite. In general, dispersed campsites are primitive in nature and are developed by recreational users. These sites do not have facilities such as garbage cans, toilets, and/or fire rings. Dispersed campsites in this area require the user to be self-sufficient. These dispersed sites are heavily used during hunting season and on weekends during the summer. Approximately 10 known dispersed camping sites of varying sizes are located in analysis area on the eastside of NFS road 693.

Occasional minor disruptions and/or displacements of recreational users by other uses, such as timber harvest activities, NFS road and trail activities, and livestock grazing, have occurred in the analysis area. Minor recreation access disruptions may still occur during scheduled maintenance of NFS roads and trails in the analysis area. Recreational users may encounter livestock during their visit to the analysis area depending on time of year, and the grazing rotation and routing patterns.

**Figure 3-62. Example of Dispersed Campsite in Scriver Creek Integrated Restoration Project Area**

### *3.13.3.1 Environmental Consequences of Alternative A—No Action*

#### 3.13.3.1.1 Direct and Indirect Effects

Implementing Alternative A (No Action) would have no direct or indirect effects on current recreational access or opportunities given that this alternative would maintain the existing recreational access and opportunities within the analysis area. No change would be expected in the amount, duration, and/or frequency of minor disruptions and/or displacement of recreational

users by other uses in the analysis area. Existing dispersed recreation uses, including camping, hunting, scenic driving, and fuelwood gathering, would be expected to continue in the Project area. NFS roads and NFS trails currently open to motorized use in the analysis area, as illustrated on the Emmett RD MVUM, would be expected to remain open for the designated use and season and be maintained accordingly to accommodate this use. Table 3-78 displays the existing motorized recreational access in the analysis area. Additionally, current snow machine routes would be expected to remain open and groomed for winter season use.

**Table 3-78. Summary of Motorized Vehicle Access in the Analysis Area by Alternative**

| Travel Management | Alternative A (miles) | Alternative B (miles) | Alternative C (miles) | Alternative D (miles) |
|---|---|---|---|---|
| Open to All Vehicles Yearlong (NFS roads 693, 693B. 695, and 696) | 21.2 | 25.0 | 25.0 | 25.0 |
| NFS Roads Closed to All Vehicles Yearlong | 52.4 | 39.4 | 34.3 | 33.1 |
| NFS Trails Open to Vehicles ≤50 inches in width Yearlong (NFS trail 035) | 1.7 | 1.7 | 1.7 | 1.7 |
| NFS Trails Open to Vehicles ≤50 inches in width Seasonally Closed (October 1 through June 30) (dual designation portions of NFS roads 693Q, 693L and 693L5 comprise NFS trail 448) | 4.0 | 4.0 | 4.0 | 4.0 |

#### 3.13.3.1.2 Cumulative Effects

No cumulative effects would be associated with this alternative because there are no direct or indirect effects to recreational access and opportunities that would occur as a result of implementation of Alternative A.

### *3.13.3.2 Direct and Indirect Effects of Alternative B—Proposed Action*

Alternative B (Proposed Action) would result in some disruption and displacement of recreational visitors in the analysis area, including motorized and non-motorized users, campers, and hunters during Project implementation due to noise, dust, and smoke from timber harvest and prescribed fire activities. However, recreationists would likely shift their use to nearby areas within the analysis area to maintain their recreational experience. Disturbance of recreational users may also occur with log haul activities on NFS roads. However, Design Feature TH-2 (section 2.4.2.1), prohibits log haul on weekends; major holidays; and the opening day of deer, elk and turkey general hunting seasons, which would mitigate potential conflicts between log haul operations and recreationists during times when recreational use of the area is expected to be highest. In addition, dust generated by the log haul operations could impact recreationist in the analysis area during project implementation. Timber sale contract provision C5.31# and the timber sale road maintenance plan would require dust abatement on all haul routes, which would reduce the impact to recreational visitors in the analysis area during project implementation.

Alternative B does not propose any modifications to existing dispersed camping sites in the analysis area, so this alternative would maintain the existing level of dispersed camping opportunities. Alternative B does construct new helicopter landings, which historically have been utilized for dispersed camping activities. However, these new helicopter landings would not be available for dispersed camping activities following implementation of this alternative given that

the landings would be decommissioned following harvest activities as required by Design Feature SW-10 (section 2.4.2.1).

Winter recreational activities (i.e., snow machine use) may be disrupted in the analysis area before December 15 and after March 15, if snow conditions allow for use at these times. However, Design Feature RR-1 (section 2.4.2.1) prohibits snow plowing on groomed snow machine trails and on all haul routes from December 15 to March 15. This prohibition would minimize the impact on winter recreational users in the analysis area.

Following timber harvest activities, slash piles would be available to fuelwood gatherers near roads open to public use (as identified on the MVUM map), which would result in a short-term increase in fuelwood collection. Those slash piles located further away from roads open to public motorized use would likely be utilized less.

Proposed transportation management activities would increase recreational access in the analysis area, primarily from the realignment of NFS road 696. NFS road 696 would remain designated open for motorized use. The realignment would increase the road length, thereby increasing open road miles and recreation access by about 3.8 miles (refer to section 3.12, Transportation System, Alternative B discussion). Realigning NFS road 696 includes decommissioning about 3.8 miles of the existing road, constructing 4.3 miles of new road, and relocating approximately 3.5 miles of existing road prism on NFS roads 696C, 696E, and 696E1 (section 3.12). Dispersed recreationists who used areas along the 3.8 miles of road to be decommissioned would no longer have motorized access to these areas.

New road construction and decommissioning would not change the NFS roads/trails designated open for motorized use (as displayed on the Emmett RD MVUM) since all new roads would be closed to motorized use following Project activities and all roads proposed for decommissioning are currently not designated as open to motorized use. In addition, ML1 roads used to facilitate vegetation restoration activities—including NFS roads 693A, 693D (post implementation road 693B1), 694, 695A, 695B, 695D1, 695E3 (post implementation road 696A), portion of NFS road 696 (post implementation road 696D), portion of NFS road 696B (post implementation road 696B), portion of NFS road 696B (post implementation road 696C), NFS road 696C (post implementation road 696E), and NFS road 696C1 (post implementation road 696F)—would have closure devices such as gates, barrier rock, and/or berms installed following completion of vegetation restoration and activity fuels treatments (section 2.4.2, Figure 2-4 and Appendix A, Table A-4). Closure devices are being placed on these roads to reduce or eliminate potential unauthorized use over time.

#### *3.13.3.3 Direct and Indirect Effects Common to Alternatives C and D*

The effects of Alternatives C and D would be the same as those described for Alternative B in section 3.13.3.2, except for stabilization of route 693X4 that accesses the snowmobile bridge discussed below. The additional decommissioning proposed under these alternatives are roads that are not currently authorized for use on the MVUM map, thus this activity would not change the NFS roads/trails designated open for motorized use.

Alternatives C and D would stabilize route 693X4, which accesses the snowmobile bridge and eliminate unauthorized motorized wheeled vehicle use during the snow-free season. Gates would also be installed at the junction of NFS road 693, the unauthorized route 693X4 on the north side

of Scriver Creek, and on unauthorized route 693X4 at the Forest boundary on the south side of Scriver.

#### *3.13.3.4 Cumulative Effects Common to All Action Alternatives*

##### 3.13.3.4.1 Past Activities

Table B.1 in Appendix B identifies which past activities were considered for this cumulative effects analysis. The impacts of past activities have contributed to the existing conditions for recreational access and opportunities in the analysis area and therefore are included in the affected environment discussed in section 3.13.4.1.

##### 3.13.3.4.2 Present/Ongoing Activities

Table B.1 in Appendix B identifies which present/ongoing activities were considered for this cumulative effects analysis. Ongoing activities such as road use and maintenance, trail use and maintenance, livestock grazing, and fire suppression would be expected to continue within the analysis area, with minor disruptions and/or displacement to recreational users. Minor recreational access disruptions have occurred and may continue to do so during scheduled maintenance of NFS roads and trails in the analysis area. Recreational users may encounter livestock during their visit to the analysis area depending on time of year, and the grazing rotation and routing pattern. In addition, areas could be temporarily closed to forest visitors during fire suppression activities to mitigate public health and safety hazards. Although proposed alternatives would incrementally add to the effects of present and ongoing activities, implementing the design features discussed above should prevent the proposed and present activities from substantially altering recreational experiences for visitors, particularly during the high-use periods.

##### 3.13.3.4.3 Reasonably Foreseeable Activities

Table B.1 in Appendix B identifies which reasonably foreseeable activities were considered for this cumulative effects analysis. Projects in the analysis area that could cumulatively impact recreational access and opportunities include the Scriver Creek Trail and Scriver Creek Snowmobile Bridge Projects. The proposals for both of these projects are being developed and are not finalized. The Scriver Creek Trail project could add miles of NFS trails within the analysis area. This project, in conjunction with these alternatives, could cumulatively increase the motorized and non-motorized recreational access in the analysis area. The Scriver Creek Snowmobile Bridge project would replace, in conjunction with other landowners, an existing snowmobile bridge with a new bridge to provide access for over snow use that meets Forest Service standards. It is likely that this bridge replacement would benefit the recreational access, as well as recreational experience, in the analysis area during the winter. All action alternatives may disrupt winter recreational use (i.e., snow machine use) on groomed trails in the analysis area if snow conditions allow for recreational use before December 15 or after March 15. In this case, the benefits to winter recreational use from replacing the bridge would be temporarily offset when implementing any of the action alternatives should snow conditions be favorable prior to December 15 or after March 15.

## 3.13.4 Recreation Opportunity Spectrum

### *3.13.4.1 Affected Environment*

The ROS (Forest Service 1986) is a classification system in which components of recreational settings and facilities (such as access, developed sites, activities, and experiences) are organized along a continuum or spectrum. The continuum ranges from very primitive settings and experiences to highly concentrated, urbanized ones. Each class is defined in terms of its specific combination of activities, setting, facilities, and experience opportunities.

The ROS provides a framework for defining the types of outdoor recreational settings, opportunities, and experiences that exist or could be provided in a given area. It also provides a context and tool for estimating and describing recreational resources as well as effects to those resources from alternative management strategies and actions.

There are two summer ROS classifications that occur with the analysis area: Semi-Primitive Motorized (39 acres) and Roaded Modified (11,471 acres) (Boise National Forest, Summer ROS GIS data, available in the Project Record). Winter ROS for the entire Project area is classified as Semi-Primitive Motorized (Boise National Forest, Winter ROS GIS data, available in the Project Record). The following is a brief description of ROS classes within the analysis area.

**Semi-Primitive Motorized—**Areas are at least 2,500 acres in size and provide for motorized recreational opportunities in semi-primitive settings. These areas are generally natural-appearing settings with usually only subtle or minor evidence of human-caused modifications to the landscape. With their more limited access, they offer a higher level of opportunities for solitude, remoteness, and risk, with little onsite controls and restrictions. Encounters with other users should be low; however, the sounds of other users may be evident due to motorized uses.

**Roaded Modified—**Areas provide for a range of recreational experiences that are consistent with substantially modified, motorized settings in which the sights and sounds of humans are readily evident and the interaction between users can be from low to high. Camping experiences are relatively primitive, with few onsite facilities provided. The area is accessible using numerous roads. Ample evidence of human activity includes roads, extensively logged timber stands, skid trails, and log landings. General forest visitors have a low probability of experiencing solitude and risk but a moderate chance of enjoying a sense of closeness to nature depending on the timing of their visit. Opportunities for challenge and risk are minimal.

### *3.13.4.2 Environmental Consequences of Alternative A—No Action*

#### 3.13.4.2.1 Direct and Indirect Effects

Under this alternative, no changes to the current transportation system or winter recreation use in the analysis area would occur, and therefore, no change to the ROS would be expected within the analysis area for any of the classes discussed above.

#### 3.13.4.2.2 Cumulative Effects

Because no direct or indirect effects to ROS would be anticipated with the Alternative A, no cumulative effects would be expected.

#### *3.13.4.3 Environmental Consequences Common to All Action Alternatives*

##### 3.13.4.3.1 Direct and Indirect Effects

None of the action alternatives would have direct or indirect effects to the summer or winter ROS classifications within the analysis area. Implementing any action alternative would, however, modify the long-term transportation system in the analysis area through the relocation of NFS road 696, construction of new NFS roads, and decommission of NFS roads (section 2.4.2 and Appendix A). These changes to the transportation system would occur in areas classified as Roaded Modified (Summer ROS) and would be consistent with this ROS class, as described in section 3.13.4. Additionally, none of the action alternatives propose any changes to the over snow or winter recreational use in the analysis area. Therefore, no modification of summer or winter ROS within the analysis area would be required.

##### 3.13.4.3.2 Cumulative Effects

Given that there would be no direct or indirect effects to the existing ROS classifications within the analysis area, no cumulative effects to ROS would be expected with the implementation of any action alternative.

## 3.14 CULTURAL RESOURCES

This section incorporates by reference the cultural resources specialist's report (available in the Project Record). This document contains the detailed data, methodologies, analyses, conclusions, maps, references, and technical documentation.

The National Historic Preservation Act (NHPA), as amended, requires federal agencies to consider the effects of their activities and programs on historic properties. Historic properties[56] are significant cultural resource sites that are included in or eligible for inclusion in the National Register of Historic Places[57]. The criteria for National Register eligibility and procedures for implementing Section 106 of NHPA are outlined in the U.S. Code of Federal Regulations (36 CFR Parts 60 and 800, respectively).

### 3.14.1 Methodology and Scales of Analysis

Direct and indirect effects to historic properties from proposed activities are determined by applying NHPA's criteria of effect. NHPA defines an adverse effect as one that diminishes the integrity of an historic or prehistoric site's location, design, setting, materials, workmanship, feeling, or association. Adverse effects include physical destruction, damage, or alteration to all or part of a site, and/or the introduction of visual, audible, or atmospheric elements that are out of character with the site or alter its setting (36 CFR 800.5[a][2][i-vii]). Criteria of effect are only

[56] As defined at 36 CFR 800.16(l)(1) Historic Property means any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian Tribe and that meet the National Register criteria.

[57] The term "eligible for inclusion" includes historic properties that are not included in the National Register but that the Agency considers eligible or potentially eligible for inclusion because they meet National Register criteria.

applied to those sites determined eligible for the National Register. However, as required by Forest Plan standard HPST03 (Forest Service 2010a), unevaluated cultural resource sites are also treated as significant until evaluated for National Register of Historic Places eligibility and, therefore, the criteria of effect are also applied to these sites.

If an undertaking will not alter the characteristics of an historic property that make it eligible for listing on the National Register, then a "no effect" determination may be reached. "No adverse effect" determinations are applied when the Forest Service, in consultation with the Idaho State Historic Preservation Office (SHPO), (1) determines that the effects do not meet the criteria of adverse effect or (2) the undertaking is modified or conditions are imposed to avoid adverse effects. Should the Forest Service determine that an activity will have an adverse effect on a historic property, and SHPO concurs, the agency and SHPO will stipulate measures to resolve or mitigate the adverse effect(s).

*Scale of Analysis:* The scale of analysis used for cultural resource assessments is consistent with the definition of the Area of Potential Effect (APE) found at 36 CFR 800.16(d). As defined in regulation, the APE "…means the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The area of potential effects is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking."

Factors considered in defining the APE for this Project considered the potential to effect above-ground resources (e.g., historic structures, historic districts, cultural landscapes) and archeological resources found on the surface and at depths below the surface. In the case of this Project, no above-ground resources were identified by consulting parties that would influence the APE. For archeological resources, the APE was limited to the area of direct and indirect physical disturbance resulting from proposed activities. For this Project, the APE includes the greatest extent of area that may be directly or indirectly affected by commercial or noncommercial vegetative treatments, fuel treatments, road corridor use, maintenance, reconstruction or construction, culvert replacement, and log landing locations under any of the action alternatives. The cumulative effects analysis area is the same as the APE described above, but includes how the direct and indirect effects from the proposed Project activities would incrementally add to the cultural resource effects occurring from other past, present, and reasonably foreseeable future actions identified in Appendix B.

*Methodology:* The historical record for cultural resources on the Forest and expert professional archaeologist knowledge were used to identify culturally sensitivity of lands within the APE. Culturally sensitive lands within the APE generally included areas along drainages, ridges, and slopes <20 percent that could be affected by proposed activities under any of the action alternatives. This review identified approximately 175 acres within the APE that were previously surveyed for cultural resources. An additional 17 acres of new survey was completed for this Project.

### 3.14.2 Affected Environment

Surveys completed on the 192 acres of culturally sensitive areas within the APE documented three cultural resources sites. Evaluations of these three sites determined that one is a historic property eligible or potentially eligible for listing on the National Register of Historic Places; the other two sites are not eligible under National Register criteria.

As required, specific information concerning location, character, or ownership of these historic properties has been shared with consulting the parties identified at 36 CFR 800.2. These consulting parties included the SHPO and affected tribes, including the Shoshone-Paiute Tribes of Duck Valley, Shoshone-Bannock Tribes of Fort Hall, and Nez Perce Tribe. This information is not provided in this public NEPA document due to required confidentiality regulations identified at 36 CFR 800.11.

### 3.14.3 Environmental Consequences of Alternative A—No Action

#### *3.14.3.1 Direct and Indirect Effects*

Under Alternative A, no new management activities would occur although all other ongoing activities (e.g., recreational activities, fuelwood gathering, livestock grazing, motorized travel) would continue within the APE. Additionally, wildfire suppression within the APE would be expected to continue as needed. No adverse effects to cultural resources were identified during surveys as a result of ongoing management actions.

#### *3.14.3.2 Cumulative Effects*

Because there would be no direct or indirect effects under Alternative A, no cumulative effects to cultural resources identified within the APE would occur.

### 3.14.4 Environmental Consequences of Alternatives B, C, and D

#### *3.14.4.1 Direct and Indirect Effects*

Implementing any of the action alternatives would result in No Effect to the historic property since the known historic property is located outside the APE where direct and indirect effects from proposed activities are anticipated (i.e., impact zone). Project Design Features CR-1 and CR-2 (section 2.4.2.1) require avoidance of all known historic properties and stoppage of ground-disturbing activities until a qualified archeologist is consulted should new cultural sites be encountered. These design features were included in all action alternatives to prevent adverse impacts to cultural resources within the APE. These design features ensure that Forest Plan direction (e.g., Forest Plan standards HPST01 and HPST03), that stipulates that cultural resources will be managed consistent with public laws and federal regulations, including NHPA and 36 CFR 800 would be met.

#### *3.14.4.2 Cumulative Effects*

Because implementing any of the action alternatives would not be expected to have direct and indirect effects to cultural resources within the APE, no cumulative effects would be anticipated.

## 3.15 ECONOMIC ASSESSMENT

This section incorporates by reference the Economic Specialist Report (available in the Project Record), which contains data, methodologies, analyses, conclusions, maps, references, and technical documentation. This section discusses the effects of each alternative on economic resources.

The analysis area for the economic resources is the 11,510 acre Project area, since this is the largest section which could be effectively measured in regard to the effects of the proposed activities on financial resources.

### 3.15.1 Economic Assessment Indicators

The indicators identified below were used to evaluate the measure of change between alternatives for the economic resources in the analysis area:

**Indicator: Financial assessment.** This Indicator was used to evaluate the cost and revenue projection for each alternative. The net revenue is the final value used to compare alternatives. A financial efficiency analysis is required for all timber sales in a project proposal that exceed $100,000 in advertised value (Forest Service Manual (FSM) 2432.22c).

**Indicator: Appraised value.** This Indicator was used to evaluate the potential net value (PNV) generated from removing wood products. The PNV is the value available to fund other project-related restoration items (Table 3-79). The PNV in this analysis includes the cutting, skidding, loading, hauling, brush disposal, and minimum road improvements or construction necessary to facilitate the removal of wood products. However, the PNV does not include the road-related work listed as restoration items, specifically items A, B, D, and E in Table 3-80, which should more accurately depict the cost and/or value of items identified as restorative rather than required to specifically remove wood products.

**Indicator: Restoration costs.** This Indicator was used to evaluate the estimated costs associated with specific restoration items. This value can be compared to the appraised value Indicator to determine which restoration items to fund through wood product receipts and identify what additional funding might be required to address all identified needs within the Project area.

**Indicator: Volume harvested.** This Indicator was used to evaluate the potential volume harvested for each alternative. The estimate of volume harvested has a significant effect on the projected revenue generated from individual alternatives. Volume in millions of board feet (MMBF) was used as the unit of measure for comparison of alternatives.

**Indicator: Jobs supported.** This Indicator was used to estimate the potential for both direct and indirect job creation and support. Potential job creation and support is displayed as jobs per year between both individual restoration items and commercial treatment (MMBF harvested) by alternative.

### 3.15.2 Analysis Methodology

The methodology used to complete the analysis was evaluation of Project GIS data, which includes the following: roads; harvest methods; vegetation and landings; Forest Service Manual (FSM) and Handbook (FSH) direction; stand data modeled using Forest Vegetation Simulator (FVS); Forest Service appraisal spreadsheets, worksheets, and programs, and the Transaction Evidence Appraisal (TEA) system.

### 3.15.3 Affected Environment

Table B.1 in Appendix B identifies past projects considered in developing the existing conditions for financial resources. Past vegetation management projects within the analysis area have contributed to the existing NFS road infrastructure, which affects the financial cost of harvest systems and wood products transportation to milling facilities. Past actions have contributed to the need for restoration items, such as road decommissioning and need to replace existing culverts identified as fish barriers with structures that allow for passage of aquatic organisms.

Vegetation has been altered by past vegetation management activities, creating higher densities of less valuable tree species, such as grand fir.

Non-commodity values are difficult to assess, especially on projects of this size. Rather, the full range of non-timber costs and priced benefits (as used to determine Management Area allocation) is more appropriately assessed at the Forest Plan level, given the lack of project-level information and the limited relevance of this assessment to the Project decision under consideration.

Several values and amenities occur within and adjacent to the Project area, including recreation and visual quality. Although these amenities have not been assigned monetary value and have not been included in this economic assessment, many aspects of the social environment (i.e., wildfire susceptibility and terrestrial wildlife habitat restoration) are discussed elsewhere in this document. In addition, the 2003 Southwest Idaho Ecogroup Land and Resource Management Plan's FEIS, Chapters 2 and 3, includes a comprehensive socioeconomic analysis of the effects of timber harvest on the communities in southwestern Idaho, including effects on non-commodity resources (Forest Service 2003b). The socioeconomic analysis of the Forest Plan amendments associated with the Wildlife Conservation Strategy is also discussed in the 2010 FEIS (Forest Service 2010b).

The Project area is located within Boise and Valley counties. Timber sales and their associated activities affect local communities within these counties and other nearby areas based on their impact to employment. The 2011 unemployment rate for Boise County was 9.6 percent and Valley County was 15.2 percent compared to the National rate of 8.9 percent.

The financial efficiency analysis uses the Transaction Evidence Appraisal (TEA) system to estimate the following: net sale volumes, costs, and appraised values; the effects of the alternatives on local economies; funds available to be returned to the Federal Treasury; and the total cost to implement the alternative as compared to the revenues generated. Additionally, the estimated cost of this environmental analysis is included in the financial assessment.

There is no legal or policy mandate requiring that revenues generated by an individual National Forest timber sale exceed the cost to implement that project. However, a timber sale is considered to be below cost when the Forest Service's expense to prepare and administer the sale exceeds the revenue returned to the Federal Treasury.

## 3.15.4 Environmental Consequences of Alternative A—No Action

### *3.15.4.1 Direct and Indirect Effects*

Under Alternative A, no new management activities would be implemented in the analysis area. No wood products would be removed from the analysis area, nor would submerchantable trees be thinned. Additionally, the transportation system would remain at its current level (section 3.11.2) and fire and fuels conditions would remain on current trajectory (section 3.4.2). This alternative would have no effect on employment opportunities in Boise and/or Valley County. No expenses would be incurred for sale preparation, contract administration, thinning operations, prescribed burning activities, culvert replacement (AOP), or road decommissioning. Given the incurred cost for this NEPA analysis (Table 3-79), this alternative would be considered "below cost" by approximately $435,100. The values associated with summer and winter recreation and visual quality would remain at current levels.

#### *3.15.4.2 Cumulative Effects*

No cumulative effects would be associated with this alternative since there would be no direct or indirect effects to the economic resources with implementation of Alternative A.

**Table 3-79. Summary of Financial Assessment by Alternative**

| Action | Alternative A ($) | Alternative B ($) | Alternative C ($) | Alternative D ($) |
|---|---|---|---|---|
| **Commercial Cost** | | | | |
| Net Volume (MMBF) | 0 | 20.8 | 24.8 | 20.4 |
| Potential Net Value | $0 | +$1,024,900 | +$1,925,700 | +$622,700 |
| Projected NEPA Cost | –$435,100 | –$435,100 | –$435,100 | –$435,100 |
| Projected Sale Preparation Cost | $0 | –$117,500 | –$128,700 | –$128,700 |
| Projected Contract Administration | $0 | –$99,800 | –$118,900 | –$98,000 |
| **Commercial Treatment Cost** | –$435,100 | –$652,400 | –$682,700 | –$661,800 |
| **Net Revenue (PNV—Costs)** | –$435,100 | +$372,500 | +1,243,000 | –$39,100 |

**Table 3-80. Summary of Supplemental Funding Needs by Alternative**

| Action | Restoration Item # | Alternative A ($) | Alternative B ($) | Alternative C ($) | Alternative D ($) |
|---|---|---|---|---|---|
| **Potential Net Value (PNV)** | N/A | $0 | +$1,024,900 | +$1,925,700 | +$622,700 |
| **Restoration Expenditures** | | | | | |
| Realignment of NFS road 696. | A | $0 | –$230,700 | –$230,700 | –$230,700 |
| Road Maintenance | B | $0 | –$135,900 | –$127,300 | –$127,300 |
| Road Decommissioning—RCA roads | C | $0 | –$73,000 | –$73,000 | –$73,000 |
| Application of new surface aggregate at perennial road/stream crossings | D | $0 | –$75,100 | –$75,100 | –$75,100 |
| Road Reconstruction—Upgrade of road surface to aggregate | E | $0 | –$225,300 | –$304,500 | –$304,500 |
| Road Decommissioning—Roads outside of RCAs | F | $0 | –$125,000 | –$162,000 | –$162,000 |
| Installation of road closure devices on ML 1 roads | G | $0 | –$13,200 | –$15,600 | –$15,600 |
| Noncommercial thinning of plantations[a] | H | $0 | –$78,000 | –$78,000 | –$78,000 |
| Thinning of noncommercial trees following commercial harvest[a] | I | $0 | –$320,000 | –$350,400 | –$350,400 |
| Activity Fuels Treatment (PVG 2)—Underburn | J | $0 | –$72,200 | –$72,200 | –$72,200 |
| AOP Culvert—NFS road 693/Scriver Creek | K | $0 | –$115,000 | –$115,000 | –$115,000 |
| AOP Culvert—NFS road 693A/Scriver Creek | L | $0 | –$166,100 | –$166,100 | –$166,100 |
| AOP Culvert—NFS road 695/MF Scriver Creek | M | $0 | –$199,200 | –$199,200 | –$199,200 |
| AOP Culvert—NFS road 693B/Scriver Creek | N | $0 | $0 | –$127,800 | –$127,800 |
| AOP Culvert—NFS road 693/WF Scriver Creek | O | $0 | $0 | –$74,000 | –$74,000 |
| Stabilization and gates on unauthorized route that accesses snowmobile bridge | P | $0 | $0 | –$25,400 | –$25,400 |
| **Subtotal Restoration Cost** | | **$0** | **–$1,828,700** | **–$2,196,300** | **–$2,196,300** |
| **Supplemental Funding Needs (PNV—Restoration Costs)** | | **$0** | **–$803,800** | **–$270,600** | **–$1,573,600** |

[a]Nonessential KV expenditure Environmental Consequences of Alternative B—Proposed Action

### *3.15.4.1 Direct and Indirect Effects*

Alternative B would remove an estimated 20.8 MMBF of wood products and generate a potential net value (PNV) of approximately $1,024,900 (Table 3-81). Wood products and work associated with implementation of restoration items under this alternative would help sustain economies in Boise and Valley counties and adjacent areas. Job creation and support under Alternative B would directly and indirectly benefit local economies. According to Lippke and Mason (2005), the estimated direct annual employment rate for forest products is 7.84 jobs/MMBF; the indirect employment rate is 26.73 jobs/MMBF (Table 3-81). The estimate for job creation for the American Recovery and Reinvestment Act of 2009 was that $92,000 of government spending created 1 job/year; 64 percent of the jobs created was in direct or indirect effects (Table 3-82). Only job creation and support in the private sector was considered for this analysis. Therefore, the total estimated jobs created and supported under Alternative B would be 732 (Table 3-81 and Table 3-82). Given the PNV and estimated Forest Service costs identified in Table 3-79, this alternative would be considered "above cost" by approximately $372,500. A cost is associated with restoration items and activities (Table 3-80). The cost of all restoration items exceeds the PNV (revenue generated from timber sale receipts and available for funding restoration items) by about $803,800. Therefore, supplemental funding would be necessary to fund all restoration items in Table 3-80 and the 12.1 jobs/year supported under Alternative B by restoration activities (Table 3-82).

**Table 3-81. Summary of Volume, Appraised Value, and Jobs Supported by Alternative for Commercial Treatment**

| Measure | Alternative A | Alternative B | Alternative C | Alternative D |
|---|---|---|---|---|
| Volume (MMBF) | 0 | 20.8 | 24.8 | 20.4 |
| Potential Net Value | $0 | $1,024,900 | $1,925,700 | $622,700 |
| Jobs Supported | 0 | 720 | 858 | 706 |

**Table 3-82. Summary of Project Cost and Job Support by Alternative for Restoration Activities**

| Restoration Item # | Alternative A | | Alternative B | | Alternative C | | Alternative D | |
|---|---|---|---|---|---|---|---|---|
| | Project Cost ($) | Jobs | Project Cost ($) | Jobs | Project Cost ($) | Jobs | Project Cost ($) | Jobs |
| A | 0 | 0 | 230,700 | 1.6 | 230,700 | 1.6 | 230,700 | 1.6 |
| B | 0 | 0 | 135,900 | 0.9 | 127,300 | 0.9 | 127,300 | 0.9 |
| C | 0 | 0 | 73,000 | 0.5 | 73,000 | 0.5 | 73,000 | 0.5 |
| D | 0 | 0 | 75,100 | 0.5 | 75,100 | 0.5 | 75,100 | 0.5 |
| E | 0 | 0 | 225,300 | 1.6 | 304,500 | 2.1 | 304,500 | 2.1 |
| F | 0 | 0 | 125,000 | 0.9 | 162,000 | 1.1 | 162,000 | 1.1 |
| G | 0 | 0 | 13,200 | 0.1 | 15,600 | 0.1 | 15,600 | 0.1 |
| H | 0 | 0 | 78,000 | 0.5 | 78,000 | 0.5 | 78,000 | 0.5 |
| I | 0 | 0 | 320,000 | 2.1 | 350,400 | 2.3 | 350,400 | 2.3 |
| J | 0 | N/A | 72,200 | N/A | 72,200 | N/A | 72,200 | N/A |
| K | 0 | 0 | 115,000 | 0.8 | 115,000 | 0.8 | 115,000 | 0.8 |
| L | 0 | 0 | 166,100 | 1.2 | 166,100 | 1.2 | 166,100 | 1.2 |
| M | 0 | 0 | 199,200 | 1.4 | 199,200 | 1.4 | 199,200 | 1.4 |
| N | 0 | 0 | 0 | 0.0 | 127,800 | 0.9 | 127,800 | 0.9 |
| O | 0 | 0 | 0 | 0.0 | 74,000 | 0.5 | 74,000 | 0.5 |
| P | 0 | 0 | 0 | 0.0 | 25,400 | 0.2 | 25,400 | 0.2 |
| Total | 0 | 0 | 1,828,700 | 12.1 | 2,196,300 | 14.6 | 2,196,300 | 14.6 |

## 3.15.1 Environmental Consequences of Alternative C

### *3.15.1.1 Direct and Indirect Effects*

Alternative C would remove an estimated 24.8 MMBF of wood products and generate a PNVof approximately $1,925,700 (Table 3-81). Wood products and work associated with implementing restoration items under this alternative would help sustain economies in Boise and Valley counties and adjacent areas. Job creation and support under Alternative C would directly and indirectly benefit local economies; the total estimated jobs supported would be 873 jobs. Given the PNV and estimated National Forest System costs identified in Table 3-79, this alternative would be considered “above cost” by approximately $1,243,000. A cost is associated with the restoration items and activities (Table 3-80). The cost of all restoration items exceeds the PNV by about $270,600. Therefore, supplemental funding would be necessary to fund all restoration items in Table 3-80 and the 14.6 jobs/year supported under Alternative B by restoration activities Table 3-82.

## 3.15.2 Environmental Consequences of Alternative D

### *3.15.2.1 Direct and Indirect Effects*

Alternative D would remove an estimated 20.4 MMBF of wood products and generate a PNV of approximately $622,700 (Table 3-81). Wood products and work associated with implementing restoration items under this alternative would help sustain economies in Boise and Valley

counties and adjacent areas. Job creation and support under Alternative D would directly and indirectly benefit local economies; the total estimated jobs supported would be 721 jobs. Given the PNV and estimated National Forest System costs identified in Table 3-79, this alternative would be considered "below cost" by approximately $39,100. A cost is associated with restoration items and activities (Table 3-80). The cost of all restoration items exceeds the PNV by about $1,573,600. Therefore, supplemental funding would be necessary to fund all restoration items in Table 3-80 and the 14.6 jobs/year supported under Alternative B by restoration activities (Table 3-82).

#### *3.15.2.2 Cumulative Effects*

**Past Activities**

Table B.1 in Appendix B identifies which past activities were considered for this cumulative effects analysis. No past activities in the analysis area that, when combined with this alternative, would cumulatively impact the financial assessment or revenue generated by this alternative. No past activities have been identified that would cumulatively impact the level of jobs or economic activity in Boise and/or Valley counties or surrounding communities.

**Present/Ongoing Activities**

Table B.1 in Appendix B identifies which present/ongoing activities were considered for this cumulative effects analysis. Ongoing activities such as road use and maintenance, trail use and maintenance, livestock grazing, and fire suppression would be expected to continue within the analysis area. Recreational activities would continue as identified in section 3.12.1. These activities would have no cumulative impact on the financial assessment or revenue generated by this alternative. No present/ongoing activities have been identified that would cumulatively impact the level of jobs or economic activity in Boise and/or Valley counties or surrounding communities.

**Reasonably Foreseeable Activities**

Table B.1 in Appendix B identifies which reasonably foreseeable activities were considered for this cumulative effects analysis. Reasonably foreseeable projects and activities in the analysis area that could cumulatively impact the transportation system include the Scriver Creek Trail and Scriver Creek Snowmobile Bridge Projects. Neither project is anticipated to cumulatively impact the financial assessment or revenue generated by this alternative. Neither project would cumulatively impact the level of jobs or economic activity in Boise and/or Valley counties or surrounding communities.

## 3.16 SCENIC ENVIRONMENT

The scenery visible to people visiting the Forest and, more specifically, the Project area constitutes the scenic environment addressed in this section. Scenery is described as the general appearance or features of a place or landscape. The visual condition varies by location and is dependent on human developments and natural features such as geology, vegetation, and landforms.

This section discusses the existing conditions and characteristics of the scenic environment in the Project area, as well as the effects of the various alternatives on those resources. The Forest Plan provides specific direction as to how the scenic resource is to be managed when accomplishing other, multiple-use objectives, including timber harvest, road construction and reconstruction. A

key forestwide standard, SCST01, states that all projects shall be designed to meet the adopted Visual Quality Objectives (VQOs) as identified in Management Area direction and represented on the Forest VQO map.

The Project falls within Management Area (MA) 14 identified in the Forest Plan. Within MA14, Standard 1462 states that all actions must meet the VQOs as represented on the Forest VQO Map, (Forest Service 2010a, MA 14, page III-294) and as viewed from visually sensitive routes, including NFS trail 035.

In addition to meeting VQOs identified on the Forest map for the Project area, the following VQOs need to be met within the foreground[58], middleground[59], and background[60] viewsheds from NFS trail 035:

- Foreground, Sensitivity Level 2[61], Variety Class B[62]: Partial retention
- Middleground, Sensitivity Level 2, Variety Class B: Modification
- Background, Sensitivity Level 2, Variety Class B: Modification

## 3.16.1 Scale of Analysis and Methodology

### *3.16.1.1 Analysis Area*

The analysis area consists of the 11,510-acre Project area and the area within the Bear Wallow IRA between the eastern boundary of the Project area to the ridgeline where NFS trail 035 is located (Figure 3-63). The proposed management activities will be evaluated on their ability to meet VQOs represented on the Forest VQOs Map for the Project area, as well as the VQOs for the foreground (≤0.5 miles from trail), middleground (≤5 miles from trail) and background (>5 miles from trail) of the western viewsheds from NFS trail 035 back into the Project area.

[58] Foreground = The detailed landscape found within 0–0.25 to 0.5 miles from the observer (Forest Service Handbook 462, Volume 2).

[59] Middleground = The space between the foreground and the background in a landscape. The area located from 0.25–0.50 to 3–5 miles from the observer (Forest Service Handbook 462, Volume 2).

[60] Background = The space beyond the middleground in a landscape, the visual distance zone relating to the distant portion of the landscape, and/or the area located from 3 to 5 miles and greater from the observer (Forest Service Handbook 462, Volume 2).

[61] Sensitivity Level 2 = Includes all areas visible from primary travel routes, use area and water bodies where <one-quarter of the Forest visitors have a major concern for scenic qualities (Forest Service Handbook 462, Volume 2).

[62] Variety Class B = Areas where features contain a variety of form, line, color, and/or texture, but which tend to be common throughout the character type and are therefore not /unique in visual quality.

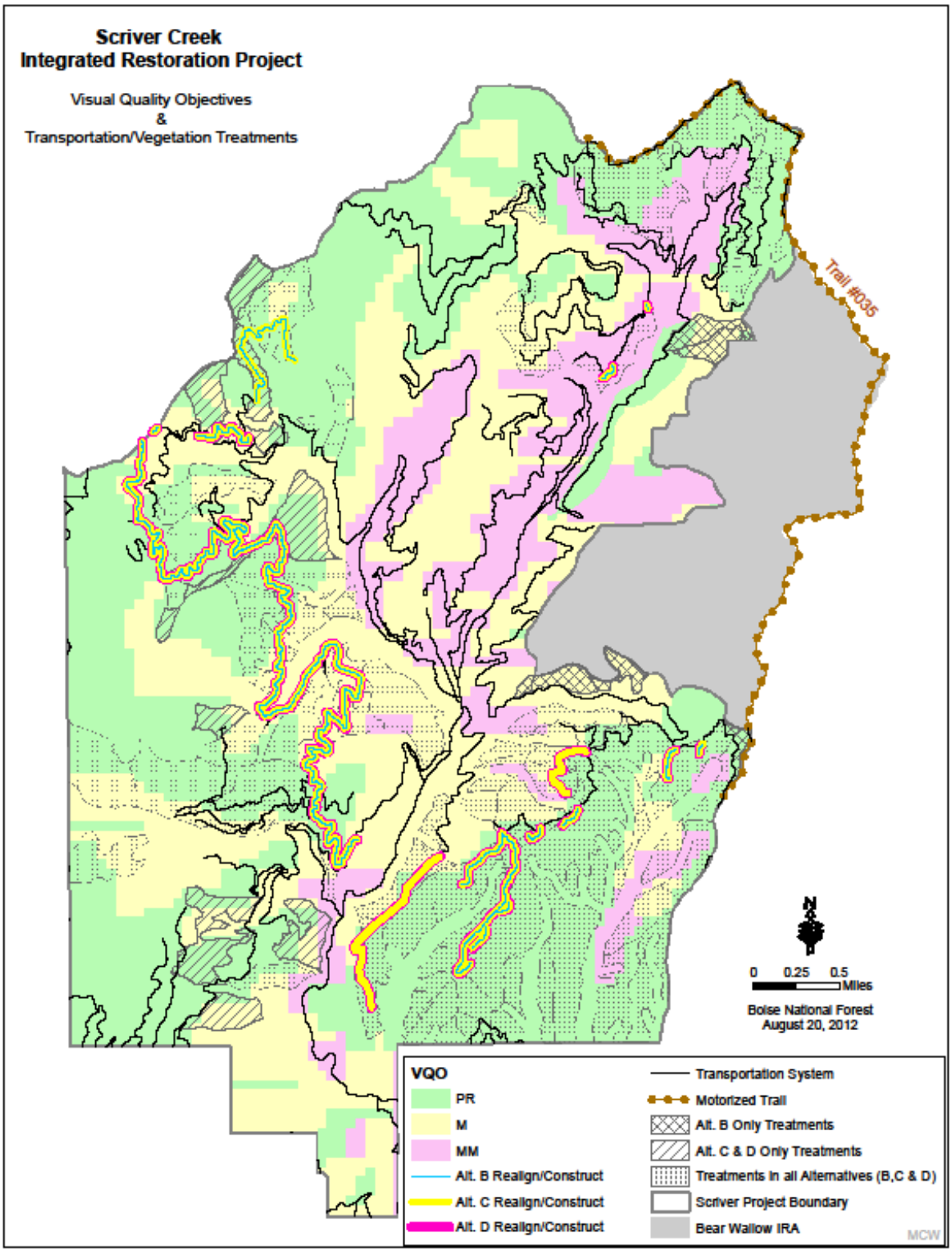


**Figure 3-63. Visual Quality Objectives for the Scriver Creek Integrated Resource Management Project Area**

Data sources

- Guidance for analyzing the visual quality/scenery of the Project was taken from the National Forest Landscape Management System (FSH 462, Volume 2, Chapter 1) and the Forest Plan (Forest Service 2010a). Existing conditions were determined by reviewing maps, project descriptions, and written reports for vegetation, transportation, and recreation. VQOs were identified and mapped (using GIS data taken from the Forest Plan) then used to illustrate the overlap between specific VQOs and Project activities.
- Viewshed scene layers for sensitive routes (i.e., NFS trail 035) were constructed using ESRI software (ArcGIS Desktop version 10). The viewshed tool available with this software determines the raster surface locations visible to a set of observer points. These observer points are identified by the specialist completing the visual analysis using a 10 meter digital elevation model (DEM) from the U.S. Geological Survey and field knowledge. The resulting dataset shows polygons that are either visible or not visible from the observer points. The analysis assumes that no obstructions (e.g., trees) would obscure the view from the observer point. Where obstructions occur, their effect is discussed qualitatively.

#### *3.16.1.2 Methodology*

Assessments of the scenic environment determine whether proposed road and vegetation management activities will meet the VQOs displayed in Figure 3-63 for the general Forest, as well as viewed from sensitive routes (i.e., NFS trail 035). Requirements that pertain to the three VQOs that occur within the Project area are as follows:

**Partial Retention (PR) -** Management activities remain visually subordinate to the characteristic landscape. Management activities should repeat form, line, color, or texture common to the characteristic landscape; however, structures can introduce form, line, color, or texture that are found infrequently or not at all in the characteristic landscape. Reduction in form, line, color, and texture to meet Partial Retention should be accomplished as soon after Project completion as possible or, at a minimum, within the first year after Project completion.

**Modification (M) -** Management activities may visually dominate the original characteristic landscape; however, activities of vegetative and landform alteration must borrow from naturally established form, line, color, or texture so completely and at such a scale that its visual characteristics are those of natural occurrences within the surrounding area or character type. Additional parts of these activities, such as structures and roads, must remain visually subordinate to the proposed composition.

**Maximum Modification (MM) -** Management activities of vegetative and landform alterations may dominate the characteristic landscape; however, when viewed as background, the visual characteristics must be those of natural occurrences within the surrounding area or character type. When viewed as foreground or middleground, they may not appear to completely borrow from naturally established form, line, color, or texture. Alterations may also be out of scale or contain detail that is incongruent with natural occurrences as seen in foreground or middleground.

In assessing whether management activities will result the desired outcomes as defined above for each respective VQO, the following were assumed:

- A characteristic landscape is assumed to be that which is characteristic for the fire regime affected. The vegetative patch and pattern discussion in section 3.2 provides the basis for determining whether an alteration resulting from a proposed management activity repeats form, line, color and texture common to a characteristic landscape (e.g., size of patches, configuration of patches, density of patches, and tree species composition that affects the visual texture within a landscape).
- Short term effect = one to two growing seasons
- Long term effect = three or more growing seasons
- NFS trail 035 is the only sensitive travel route with viewsheds that look into the Project area

### 3.16.2 Affected Environment

While most NFS lands can be viewed from high vista points or from aircraft, the esthetic concern varies by the type of user and their expectation, and the overall importance of esthetics depends on the types of viewers, number of viewers, and the view duration. For example, motorized trail users are typically moving through a landscape at speeds of 5–30 mph on ATVs or motorcycles and the view duration in any one location is short, providing little time to discern detail beyond the foreground areas. In comparison, nonmotorized users along hiking trials have a long view duration, allowing these users to discern greater changes in the middleground and background.

During Forest Planning, visual quality objectives (VQOs) were established for various landscapes based on esthetic concerns, type of user in an area, and the user's overall expectation for visual quality within an area. The landscape specialist and Responsible Official used public comments made during the planning process and historical patterns of use and associated interest in aesthetics in an area to help define VQOs. The resulting VQOs assigned across the Forest indicate allowable levels of induced change on the landscape (Forest Service 2003a,b,c).

The 11,510-acre analysis area occurs within the Lower Middle Fork Payette River (MA 14). In addition to general VQOs for the Project area, the Forest Plan identifies visually sensitive travel routes or use areas within this management area and identifies specifies VQOs for viewsheds from these routes. NFS trail 035 was the only visually sensitive travel route or use area identified within the Project area or with segments out of the Project area (i.e., within the Bear Wallow IRA) that would have middleground and background viewsheds within the Project area. The general Forest Plan VQOs for the Project area are displayed in Figure 3-63. The breakdown for the VQOs within the 11,510 acre Project area are as follows:

- Partial Retention = 5,460 acres
- Modification = 4,330 acres
- Maximum Modification = 1,720 acres

The Forest Plan characterizes the NFS trail 035 as designated for motorized wheeled vehicles ≤50 inches, as a Sensitivity Level 2 route (average sensitivity), with a Variety Class B scenery (common scenery), and with the VQOs identified as PR in the foreground and M in both the middleground, and background (Forest Service 2010a, p. III-294).

Figure 3-64 displays the areas within the Project area that can be seen from NFS trail 035, assuming no tree cover would screen the view. However, as shown in Figure 3-65, large segments of the trail are screened by tree cover, and thus middleground and background viewsheds within the Project area shown in Figure 3-64 would only be visible at points along the trail where there are breaks in tree cover. In addition, because this is a motorized trail, motorized recreation users would pass by these breaks in tree cover at speeds that would limit their ability to see much detail, with the amount of detail observed decreasing as the view progresses from the foreground to the middleground/background.

The existing viewshed within the Project area has been heavily influenced by past management activities. As shown in Appendix B, the Project area has had multiple timber harvest and road management activities since the mid-1900s. Combinations of various logging systems have been used and their resulting pattern on the landscape is generally consistent with M and MM VQOs. The effects of past management activities on PR VQO areas have diminished over time, becoming visually subordinate to the characteristic landscape and allowing the uncharacteristic forms and lines of the past to soften through revegetation.

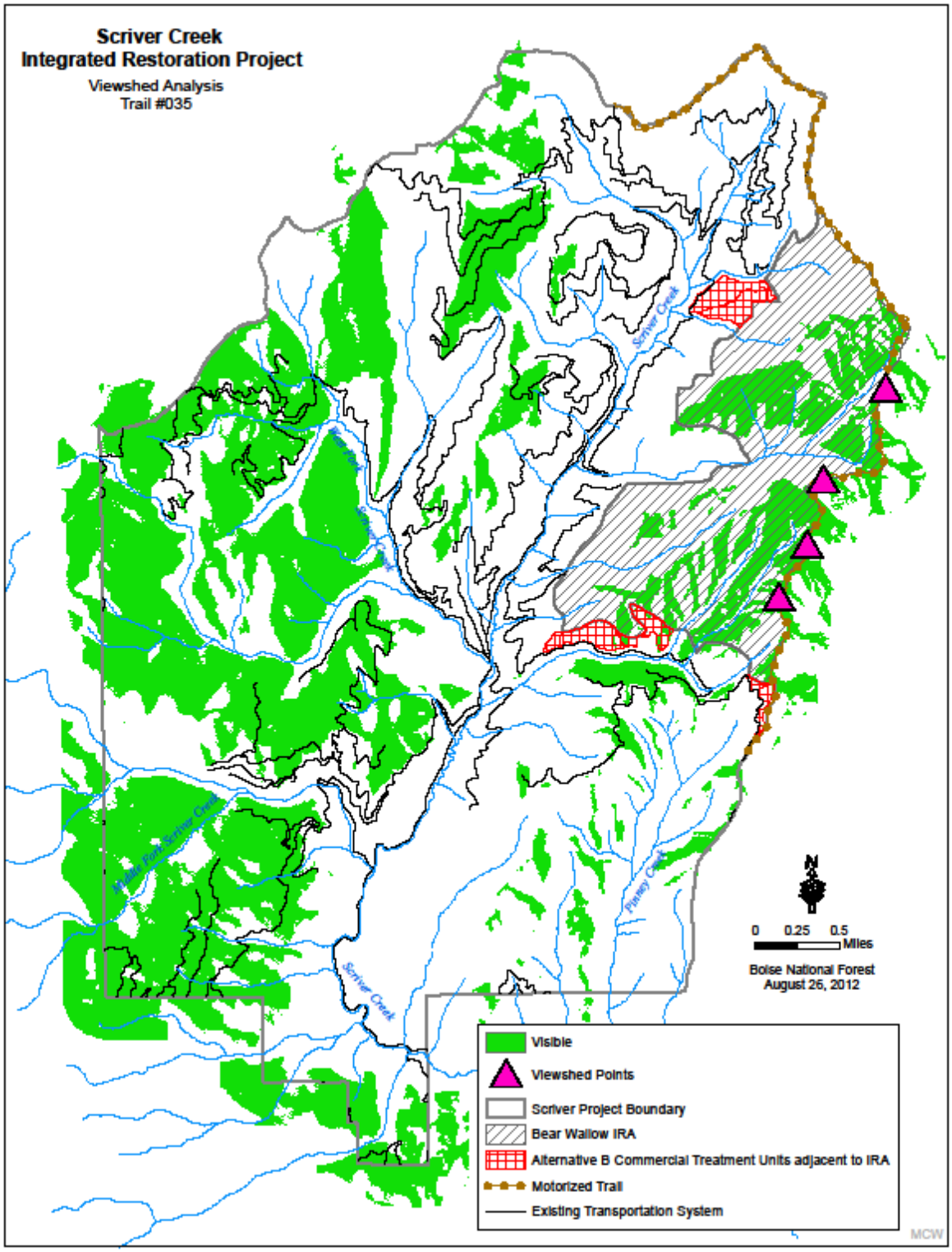


**Figure 3-64. Viewshed from National Forest System trail 035—Foreground, Middleground, and Background**

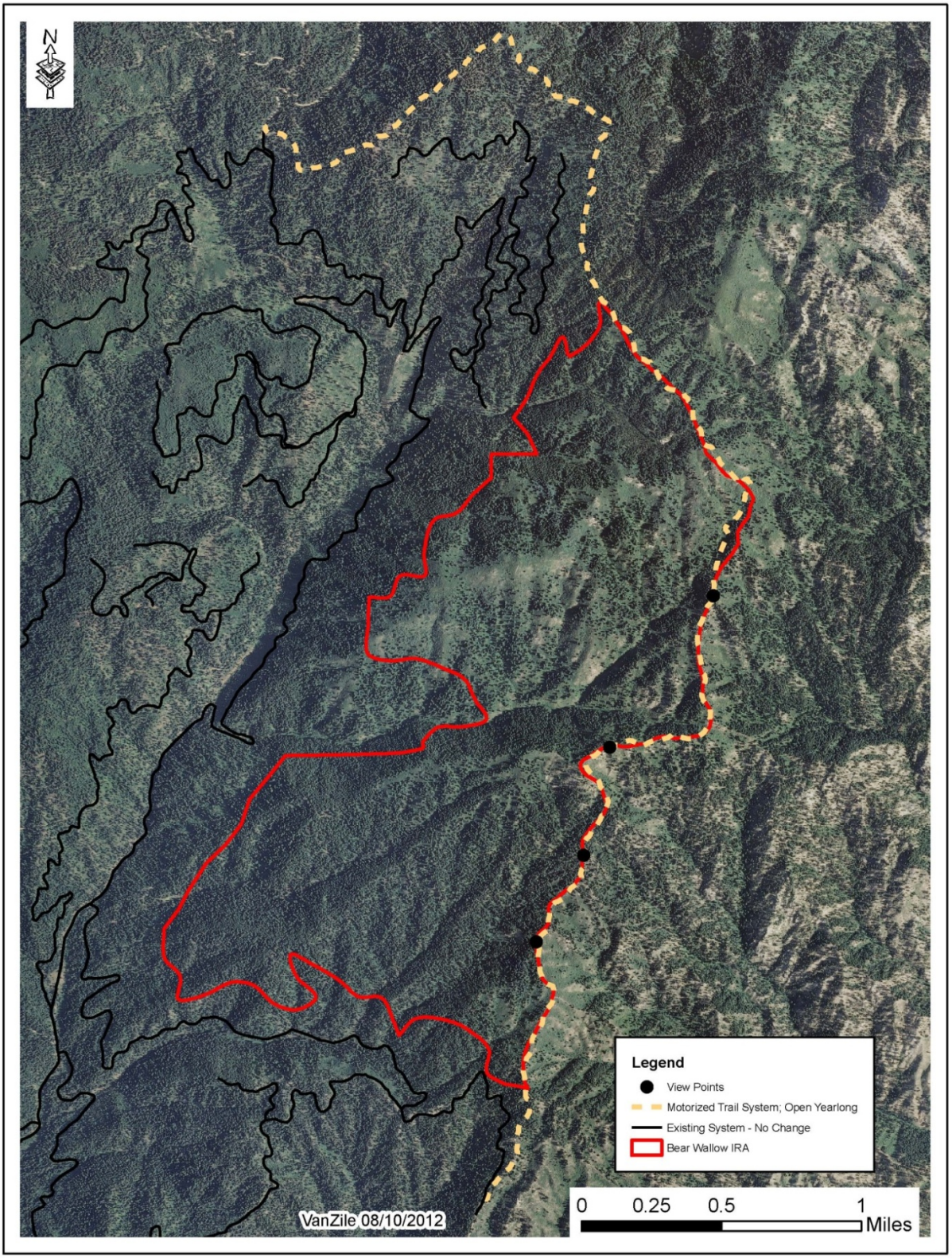


**Figure 3-65 Aerial View of the Tree Cover Along National Forest System Trail 035 that may Screen Views from the Trail**

Current landscape form, line, color, and texture are more typical of a characteristic landscape (Figure 3-65) than compared to a decade ago. However, some old tractor/jammer roads (now unauthorized roads) and cable corridors are still visible from roads open to public use within the Project area (identified on the Emmett Ranger District MVUM map as NFS roads 693 and 696 and NFS trail 035), and they introduce form and line conditions that are less typical of a characteristic landscape.

## 3.16.3 Environmental Consequence of Alternative A—No Action

### *3.16.3.1 Direct and Indirect Effects*

Alternative A does not propose any new management activities, so no management-induced changes to the scenic environment would occur. Several past vegetation treatment and road management activities have influenced the scenic environment as seen by users traveling through or recreating within the Project area, or those looking back into the Project area from NFS trail 035 (refer to Appendix B, Figure 3-64). Evidence of previous disturbances would continue to diminish as trees increase in size and density and line and form conditions (from past road activity and cable corridors) diminish in appearance. Absent an uncharacteristic disturbance event, subtle changes in the vegetative structure and composition from natural processes would generally be unnoticeable to visitors and would meet the assigned VQOs within the analysis area.

### *3.16.3.2 Cumulative Effects*

Because no direct or indirect effects to the scenic environment would be expected with implementation of this alternative, there would be no cumulative effects.

## 3.16.4 Environmental Consequences of Alternative B, C, and D

### *3.16.4.1 Direct and Indirect Effects*

Each of the action alternatives propose activities that could impact the scenic environment, including commercial and noncommercial vegetation treatments and some road management activities. The degree of disturbance by a commercial vegetation treatment depends on what type of logging system is being used. While changes in tree density and structure would be similar in units with similar silvicutural prescriptions, those that are logged using a helicopter would result in less ground disturbance than skyline/cable, and skyline/cable generally results in less ground disturbance than tractor logging (i.e., typically less cable corridors than tractor unit skid trails). Table 3-83 displays how the various vegetation treatments (by logging system), overlap the established Forest VQOs as displayed in Figure 3-63. In addition, road management activities could also affect the scenic environment. Of the various road management activities proposed, new construction and realignment activities have the potential to result in the greatest change. Table 3-83 illustrates how these proposed road management activities overlap with established VQOs

**Table 3-83. Acres or miles of Proposed Activity which Overlap Visual Quality Objectives within the Scriver Creek Integrated Restoration Project Area**

| Activity | Partial Retention | | | Modification | | | Maximum Modification | | |
|---|---|---|---|---|---|---|---|---|---|
| | Alt B | Alt C | Alt D | Alt B | Alt C | Alt D | Alt B | Alt C | Alt D |
| **Commercial Vegetation Treatments** | **Acre** | **Acre** | **Acre** | **Acre** | **Acre** | **Acre** | **Acre** | **Acre** | **Acre** |
| Helicopter | 461 | 371 | 463 | 326 | 155 | 173 | 62 | 53 | 53 |
| Skyline/Cable | 322 | 428 | 428 | 271 | 408 | 408 | 101 | 119 | 119 |
| Tractor | 805 | 1036 | 945 | 337 | 84 | 86 | 70 | 71 | 71 |
| **Noncommercial Thinning Treatments** | **Acre** | **Acre** | **Acre** | **Acre** | **Acre** | **Acre** | **Acre** | **Acre** | **Acre** |
| Within Riparian Conservation Areas | 47 | 47 | 47 | 58 | 58 | 58 | 58 | 58 | 58 |
| Out of Riparian Conservation Areas | 293 | 293 | 293 | 371 | 371 | 371 | 176 | 176 | 176 |
| **Road Realignment and New Construction** | **Miles** | **Miles** | **Miles** | **Miles** | **Miles** | **Miles** | **Miles** | **Miles** | **Miles** |
| Realignment, National Forest System Roads 696 and 696D | 3.6 | 3.6 | 3.6 | 4.7 | 4.7 | 4.7 | 0.0 | 0.0 | 0.0 |
| New System or Temporary Roads Constructed | 3.4 | 4.5 | 3.4 | 0.0 | 0.6 | 0.6 | 0.2 | 0.2 | 0.2 |

As displayed in Table 3-83, Alternative C has the greatest number of vegetation treatment acres using tractor and cable logging systems, followed by Alternative D and then B. While all alternatives have the same number of road realignment miles, Alternative C includes more new and temporary road construction than B or C. The primary difference between Alternative B and C as to new construction is that Alternative B includes more system (i.e., permanent) road construction than Alternative D. Road effects under Alternative D would therefore be shorter term than under Alternative B because the temporary roads would be decommissioned and revegetated following completion of vegetation management activities. Alternatives D also includes 1.1 miles less of system road construction compared to Alternative C (i.e., proposed NFS road 696 D1 in the northwest portion of the Project area). Thus, from a roads perspective, the likelihood of effects would be greatest under Alternative B, followed by C, with the least effects occurring under Alternative D.

Under all action alternatives, proposed commercial thinning or improvement cut activities would result in a more open forested appearance in the units treated. The landscape seen from NFS trail 035 in the middleground and background, and the overall landscape within the Project area, would continue to convey a predominantly natural-appearing forested condition with varying ranges of tree densities within patches and configurations characteristic of the fire regime (Stand Basal Area and Canopy cover, sections 3.2.4.1.4 and 3.2.4.1.5, respectively). In some locations, visual diversity is provided by interspersed patches of natural grass/forb/shrub openings with patches of a variety of tree size classes within patch sizes and configurations consistent with historic fire regimes (Patch and Pattern, section 3.2.6). Landscape texture would be improved in the noncommercial thinning units by breaking up the uniform spacing within plantations to a more natural appearing condition of irregular spaced trees with various sizes of tree clumps.

For the first 1 to 3 years, there is likely to be evidence of harvest activity from ground and soil disturbance and harvest residues in the locations seen as foreground and middleground from open travel routes and from NFS trail 035. Harvest slash and residue treatment of burning (and

the subsequent herb/shrub/forb re-establishment) would result in ground disturbances being generally unnoticeable for 3–5 years following the residue treatment activity. The proposed vegetation management activities under each of the action alternatives that overlap M and MM VQO areas would meet the respective VQO requirements as discussed under the methodology section.

Within the PR areas viewed from NFS trail 035 (and generally within the Project area), design features RR 4 and 5 are included to provide further assurance that proposed activities in visually sensitive areas would avoid or minimize creating views that would not be consistent with the characteristic landscape in both the short and long term. These design features accomplish the following:

**RR-4**—Address VQOs associated with the scenic corridor adjacent to the NFS trail 035 by flush cutting stumps within site distance of trail (or 150 feet, whichever is greater) and mitigating visibility of slash by one or more of the following techniques: lopping to a low height, burning, physically removing material, and/or dispersing concentrations.

**RR-5**—Meet the PR VQOs in areas identified in Figure 3-63, by doing the following:

- If skyline systems are necessary in PR areas seen from travel routes open to motorized use on the MVUM map, design skyline corridors without linear edges by clearing the vegetation to promote meandering edges.
- Openings and treatment units should not be symmetrical in shape. Straight lines and right angles should be avoided. Openings should resemble the shape of those found in the surrounding natural landscape.
- Edges of vegetative treatment units should be shaped and/or feathered to avoid a shadowing effect in the cut unit.
- Widely spaced trees that are silhouetted along the skyline should be avoided.
- Treatment boundaries should extend up and over ridgelines to avoid the “mohawk” look, especially along ridgelines silhouetted against the sky from travel routes open to motorized use on the MVUM map.
- Where new access roads and skid trails meet a primary travel route open to motorized use on the MVUM map, they should intersect at a right angle and, where practicable[63], curve after the junction to minimize the length of route seen from the primary travel route.
- Cut/fill banks would be sloped to accommodate natural revegetation.
- Ensure slash is abated near landings visible from primary travel routes open to motorized use on the MVUM map by using techniques such as scattering, chipping, or burning.

[63] The term *practicable* means available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes. EPA, 2010

- Pile burning in visible foreground of primary travel route open to motorized use on the MVUM map would be expected to occur as soon as weather and fuel conditions allow and should take priority over treating slash in other less visible areas.

New temporary roads, system roads, and skid trails would be constructed to access commercial thinning and improvement cut units in the Project area. In some areas, these roads could create visible lines that are not natural appearing and could include visible cut/fill slopes that may detract from the overall scenic quality. Existing flat areas on road bends or corners and existing landings may be used during harvest operations. Some blading and brushing may occur to utilize existing landings. These activities would meet the M or MM VQOs as defined under the methodology section. Within PR areas, RM-5 (items 6–9) would provide added assurance that potential effects in these more sensitive areas would be avoided or mitigated consistent with the VQOs.

Road maintenance and culvert replacements along existing roads would not result in a measurable change to the scenic environment because the outcome of these activities result in maintaining the same or a similar visual environment as the existing situation. The 19.8 miles of road decommissioning/obliteration of existing system and unauthorized roads may result in a short-term impact to the visual environment where ground disturbance occurs to recontour and/or scarify road prisms. However, in the long term, the viewshed would be improved once these segments are fully revegetated.

#### *3.16.4.2 Cumulative Effects*

Past activities have been included in the description of the affected environment and will not be discussed here. There are no ongoing or foreseeable future vegetation or road management activities in the cumulative effects area that could add incrementally to the effects of the action alternatives on the scenic environment within the analysis area.

As discussed under direct and indirect effects for the action alternatives, treatments proposed when combined with other past activities that have affected the scenic environment would introduce some degree of additional visual change, primarily as reduced stand densities. For reasons discussed above, proposed vegetation and road management treatments would meet the required VQOs. Design Feature RM-4 and RM-5 would provide addition assurance the PR objectives are met within the Project area, as well as within the foreground, middleground, and background viewsheds from NFS trail 035, the Forest Plan identified sensitive travel route of interest for this project.

## 3.17 INVENTORIED ROADLESS AREA

Inventoried roadless areas (IRA) are inventoried tracts of NSF land characterized as having an undeveloped character. The Bear Wallow IRA is one of 42 IRAs identified on the Forest. This IRA comprises approximately 9,133 acres of the total 1,108,500 IRA acres on the Forest (Forest Service 2003b, Appendix H FEIS). The Bear Wallow IRA lies between the NFS road 698 (Middle Fork Payette River Road) and the eastern edge of the Project area (Figure 3-66). Elevation in the Bear Wallow IRA ranges from 3,200 to 6,000 feet. Slopes are steep, dissected by small streams and dominated by dense stands of conifer trees.

On October 16, 2008, the Forest Service published a final rule (36 CFR 294) that adopted state-specific management direction for designated roadless areas in the State of Idaho (i.e., the Idaho

Roadless Rule). The Bear Wallow IRA is one of these roadless areas. This final rule takes a balanced approach, recognizing both local and national interests for the management of lands within IRAs. The rule establishes permissions and prohibitions that govern the types of activities that may occur within IRAs. It does not establish management direction for areas adjacent to an IRA. Direction for management of areas adjacent to IRAs, such as the Project area, is provided in the Forest Plan (Forest Service 2010a).

About 8,400 acres of Bear Wallow IRA has been designated as Primitive and approximately 700 acres are designated as a Forest Plan Special Area under the Idaho Roadless Rule (36 CFR 294.29). The portions of the Bear Wallow IRA adjacent to the Project area are designated as Primitive. The Forest Plan Special Area designation is due to a 1.3-mile segment of the Middle Fork Payette River that is eligible for Wild and Scenic River designation (Figure 3-66; Forest Service 2008, Volume 4, p. C4-7).

The Forest Plan allocates the Bear Valley IRA to MPC 4.1c, Undeveloped Recreation: Maintain Unroaded Character with Allowance for Restoration Activities (Figure 3-66). The adjacent area immediately west of the Bear Wallow IRA, which includes the Project area, is allocated to MPC 5.1, Restoration and Maintenance Emphasis within Forested Landscapes (Figure 3-66). Refer to section 1.7 for a detailed description of MPC 5.1. MPC 4.1c applies to lands where,

> …dispersed recreation uses are the primary emphasis. Providing dispersed recreation opportunities in an unroaded landscape is the predominant objective. Both motorized and non-motorized recreation opportunities may be provided. Other resource uses are allowed to the extent that they do not compromise ROS settings. The area has a predominantly natural-appearing environment, with slight evidence of the sights and sounds of people. Species habitat and recreational uses are generally compatible, although recreation uses may be adjusted to protect TEPCS species. (Forest Service 2010a)

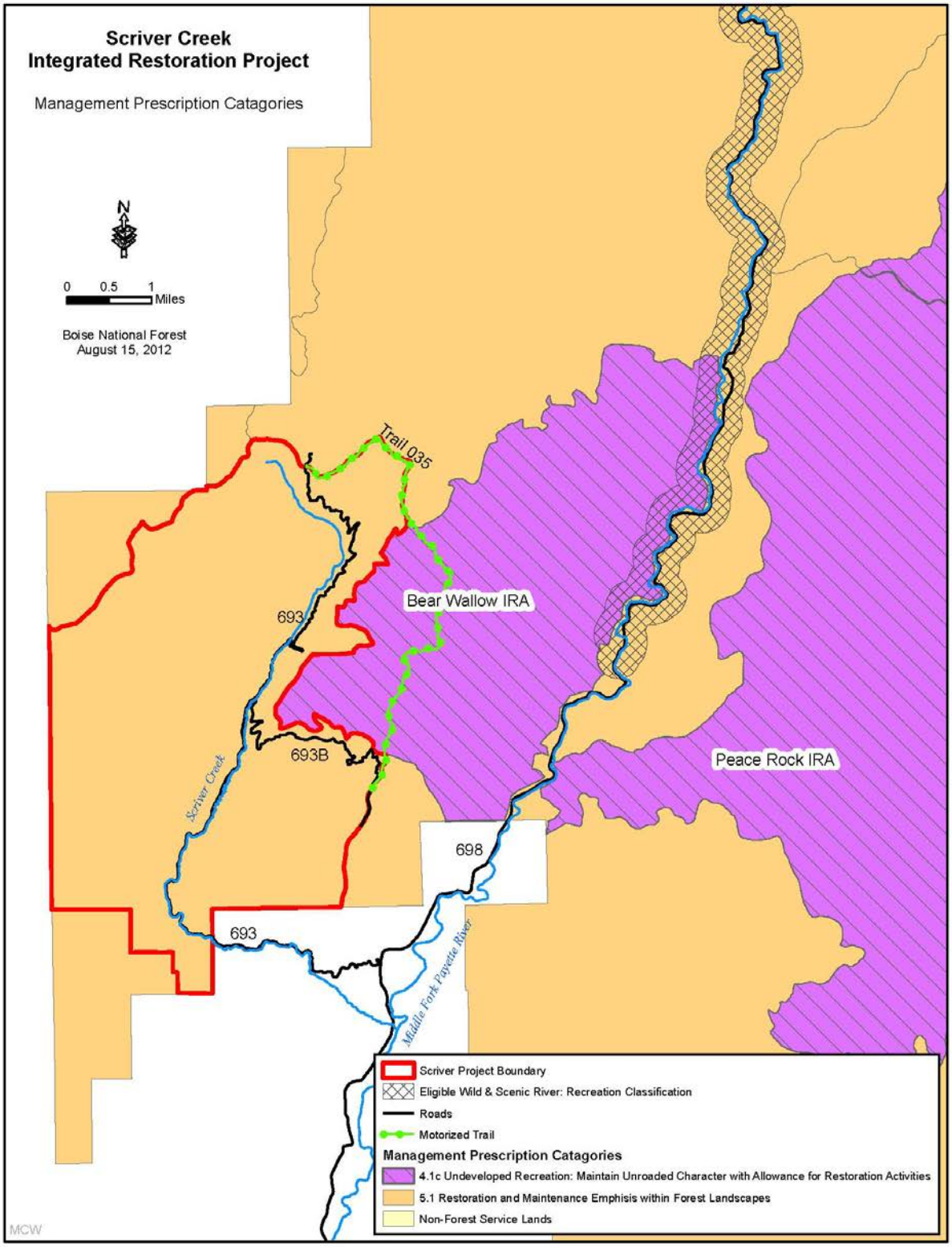


**Figure 3-66. Scriver Creek Integrated Restoration Project Management Prescription Categories**

Forest Plan direction guides what, when, where, and how management activiites may occur within the MPC 5.1 allocation yet does not specifically prohibit any management activities adjacent to IRAs, such as along the eastern boundary of the Project area (Figure 3-66; Forest Service 2010a, pages III-90 to III-91 and III-289 to III-290). The appropriateness of various management activities within this area would be evaluated relative to overall Forest Plan goals and objectives for multiple use while providing for sustainable biological and physical resource conditions. This evaluation includes considering potential indirect and cummulative effects to roadless characteristics within an IRA from management actions proposed to occur outside the IRA.

Effects evaluations for IRAs consider the effects of proposed activities on wilderness qualities or attributes and specific roadless characteristics[64]. However, none of the action alternatives proposed in this SDEIS occur within the IRA and, therefore, would not directly affect any acres within the Bear Wallow IRA, including the associated wilderness attributes. The effects disclosure below focuses on roadless characteristics of the Bear Wallow IRA and how actions proposed in the Project area adjacent to the IRA may indirectly or cumulatively effect roadless characteristics within the IRA. While the roadless characteristics typically assessed are not unique to roadless areas (i.e., may be present outside as well as within the IRA), it is believed that these characteristics often represent what defines a particular roadless area's social and ecological value (Forest Service 2010a, Appendix H, pg H-1). These characteristics include the following:

- Soil, water, and air resources
- Sources of public drinking water
- Diversity of plant and animal communities
- Habitat for Threatened, Endangered, Proposed, Candidate or Sensitive species
- Primitive and Semi-primitive recreation opportunities
- Reference landscapes for research study or interpretation
- Landscape character and integrity
- Traditional cultural properties and sacred sites
- Other locally unique characteristics (e.g., eligible Wild and Scenic River corridor)

Roadless characteristics associated with soil and water resources, public drinking water, traditional cultural properties and sacred sites, other locally unique characteristics (i.e., eligible Wild and Scenic River Corridor) would not be directly, indirectly, or cumulatively affected by proposed activities under the action alternative discussed in this SDEIS. These characteristics will not be evaluated further as described below.

**Soil and Water Resources—**All streams within the western portion of the Bear Wallow IRA drain into the Scriver Creek drainage; the benefits or impacts to water from activities within the

[64] Assessments of both wilderness attributes and roadless characteristic are discussed in detail in the Inventoried Roadless Area Resource Technical report located in the Project Record.

Project area would have no effect on water within the IRA (refer to section 3.6) because the prevailing flows are away from the IRA.

No activities are proposed within the IRA, therefore soils would not be impacted. As discussed in section 3.8 (soils), the analysis area for direct, indirect, and cumulative effects on soils does not extend within the IRA (section 3.8).

**Sources of Public Drinking Water—**As all streams within the western portion of the Bear Wallow IRA drain into the Scriver drainage; the benefits or impacts to water from activities within the Project area would have no effect on water within the IRA (refer to section 3.6) because the prevailing flows are away from the IRA.

**Diversity of Plant Communities—**Because no activities are proposed within the Bear Wallow IRA, there would be no direct, indirect, or cumulative effects to plant communities within the roadless area. The analysis areas for forested vegetation (i.e., botanical and noxious weeds) did not extend into the IRA because no direct, indirect, or cumulative effects from proposed actions within the Project area are expected to extend to plant communities within the IRA (sections 3.2, 3.9, and 3.10).

**Habitat for Threatened, Endangered, Proposed, Candidate, or Sensitive (TEPCS) Species—**Because no activities are proposed within the Bear Wallow IRA, there would be no direct, indirect, or cumulative effect to TEPCS plants or wildlife habitat within the roadless area. Diversity of animal communities that may use this habitat may be affected by actions adjacent to the IRA; therefore, these activities will be addressed under the "Diversity of Animal Communities" section below.

As identified above for water resources, all streams within the western portion of the Bear Wallow IRA drain into the Scriver drainage, the benefits or impacts to water from activities within the Project area would have no effect on water quality and associated fish habitat within the IRA, including related watershed condition indicators such as pool size, CWD, and riparian areas (refer to section 3.6).

**Reference Landscapes for Research Study or Interpretation—**No specific reference landscapes used for research or interpretation work occur within this IRA. In addition, no activities are proposed within the IRA, therefore the potential for future values within the IRA would not be altered (Forest Service 2010a, Appendix H, Description of the Bear Wallow IRA).

**Traditional Cultural Properties and Sacred Sites—**Because no activities are proposed within the Bear Wallow IRA, there would be no direct, indirect, or cumulative effects to cultural resources within the roadless area. As identified in the "Cultural Resources" section, the identified APE does not extend into the IRA (section 3.14).

**Other Locally Unique Characteristics—**The locally unique characteristic within the Bear Wallow IRA is the portion of the eligible Wild and Scenic River, the Middle Fork Payette River, that falls along the eastern boundary of the IRA (Figure 3-66). Because no activities are proposed within the Bear Wallow IRA that would alter the ORVs in the eastern portion of this IRA (i.e., recreation, scenic, and cultural) or free-flowing nature of this portion of the Middle Fork Payette River, there would be no effect (Forest Service 2010a, Appendix D).

While the following four remaining roadless characteristics would not be directly affected because no activities are proposed within the IRA, they may be indirectly or cumulatively affected by activities proposed in the adjacent Project area:

- Air resources
- Diversity of animal communities
- Primitive and Semi-primitive recreation opportunities
- Landscape character and integrity

The analysis in this section of the SDEIS will also specifically address Issue 3, identified in section 1.11.1:

- Issue 3: Commercial treatments in units immediately adjacent to the Bear Wallow IRA could impact the visual quality and detract from the natural appearance of these areas as viewed from the IRA—While the Proposed Action includes mitigation to address this concern, commenters believe that not treating these areas could result in a more natural appearance than what would occur under the mitigated Proposed Action.

### 3.17.1 Methodology and Scale of Analysis

The analysis area for direct and indirect effects to the Bear Wallow IRA includes the entire 9,133 acres in the Bear Wallow IRA and 11,510 acres of the Project area. The entire 9,133 acres of the IRA have been included because the assessment of roadless characteristics pertains to the overall IRA. The entire Project area has been included in assessments of roadless characteristics because several portions of the Project area are within the middleground and background views from points along NFS trail 035 (refer to section 3.16, Scenic Environment). In addition, roadless characteristics concerning diversity of animal communities could be indirectly affected by treatments within various sections of the Project area should they alter habitat such that they benefit or impact species distribution within the IRA. Finally, as discussed in section 3.5, air quality within portions of the IRA could be affected in various degrees and time periods during prescribed fire activities proposed within the Project area under each action alternative.

As to assessing Issue 3, the area between the western boundary of the IRA and NFS roads 693 and 693B up to NFS trail 035 within the IRA will be the focus (Figure 3-67). This area includes about 959 acres within the Project area that falls between the eastern boundary of the Project area located between NFS roads 693 and 693B and the western IRA boundary. It is within this area that commercial vegetation management activities adjacent to the western boundary of the IRA are proposed under Alternative B that have been identified as a concern by commenters. This area would be in the immediate foreground[65] viewshed of recreation users traveling near the western boundary of the IRA and the middleground[66] viewshed for those recreation users traveling along motorized NFS trail 035.

[65] Foreground = The detailed landscape found within 0–0.25 to 0.5 miles from the observer (FSH 462, Volume 2).

[66] Middleground = The space between the foreground and the background in a landscape. The area located from 0.25–0.50 to 3–5 miles from the observer (FSH 462, Volume 2).

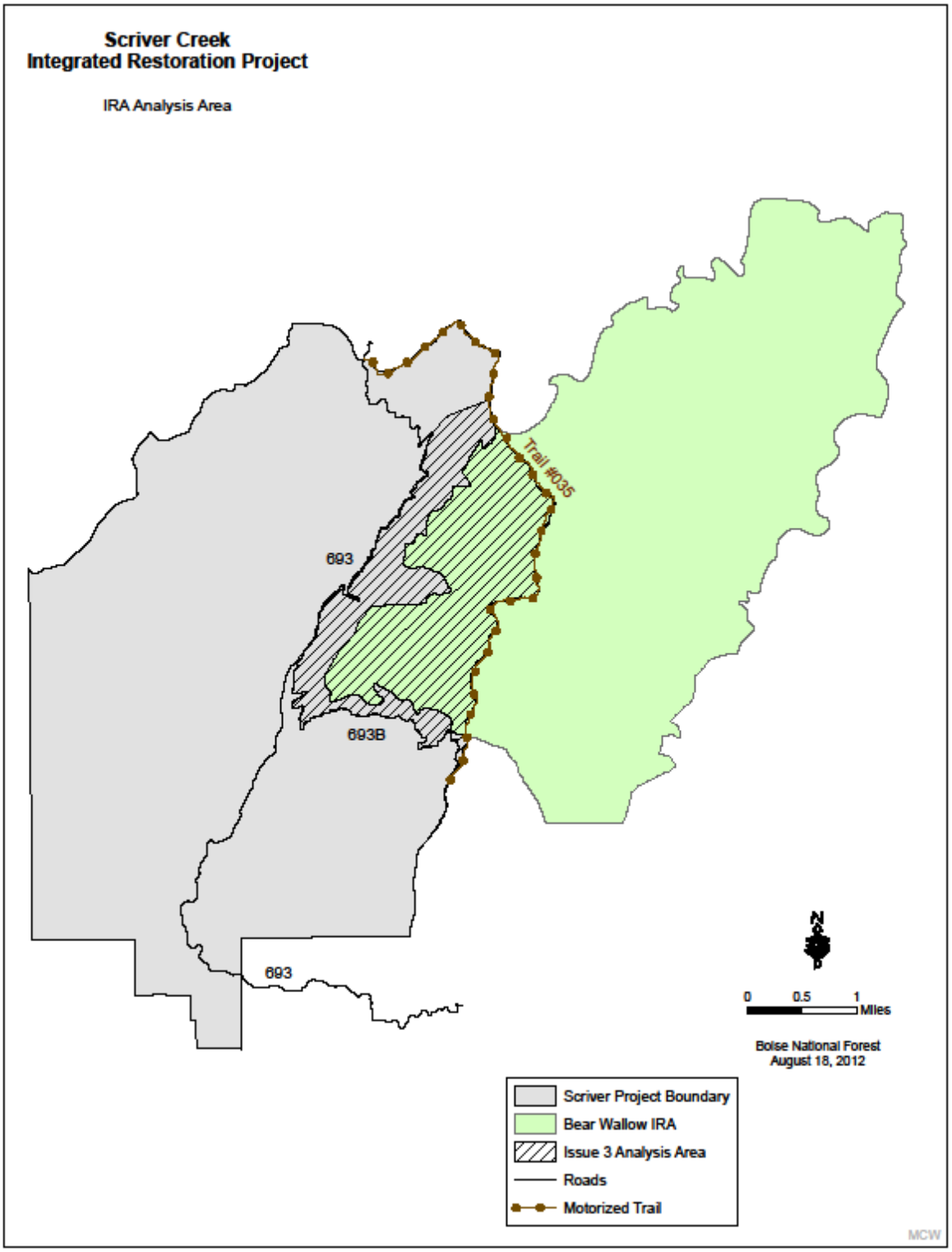


**Figure 3-67. Inventoried Roadless Area Analysis Area for Roadless Characteristics and Issue #3**

### 3.17.2 Indicators

The measures and indicators for the assessment of the three Roadless Characteristics are as follows:

#### *3.17.2.1 Air Resources*

The same indicators as used in section 3.5, "Air Quality", are used to support this analysis.

Indicator: The $PM_{2.5}$ NAAQS applicable for this project is 35 µg/m$^3$ in a 24-hour period. $PM_{2.5}$ is the standard of focus, as 80 percent of smoke combustion of woody biomass is smaller than 2.5 microns (Story and Dzomba 2005) and is more likely to affect health by lodging deeply in the lungs. Based on this standard, $PM_{2.5}$ is the Indicator used in the SIS for analyzing particulate matter impacts from prescribed burn treatments within the Project area.

Measure: Quantity of $PM_{2.5}$ as modeled by SIS and its likely dispersion over the areas within the Bear Wallow IRA.

#### *3.17.2.2 Diversity of Animal Communities*

This discussion focuses on ESA listed and Region 4 Sensitive Species. It is assumed other more common species are not at risk (see section 3.4 for general wildlife assumptions). There are no ESA listed TEPC species that utilize the Project area that may be indirectly or cumulatively affected in the adjacent IRA landscape (section 3.4, Table 3-34). Thus, the Region 4 Sensitive Species with measurable amounts of habitat within the IRA, including northern goshawk, whiteheaded woodpecker, and flammulated owl, will be the focus of this analysis. While no activities are proposed in the IRA that may directly affect habitat for these species, actions within the Project area may indirectly or cumulatively impact species distribution and use of habitat within the IRA.

Indicator: Effects of proposed activities on habitat within the Project area and the likelihood of those effects altering distribution of the three Region 4 Sensitive Species within the IRA.

Measure: Changes in habitat quantity or quality within the Project area for the three Region 4 Sensitive Species and how those changes may alter home range size and potential use of habitat within the IRA.

#### *3.17.2.3 Primitive and Semi-primitive Recreation Opportunities*

Indicator: Change in recreational opportunities or access to primary trails located within the IRA.

Measure: Change in ROS class within the IRA

Measure: Impacts to motorized trail access to NFS trail 035 within the IRA

#### *3.17.2.4 Landscape Character and Integrity and Issue #3*

Indicator**:** Landscape scenic quality and character of the area proposed to be treated under Alternative B as observed from viewpoints along the western boundary of the Bear Wallow IRA near proposed treatment areas.

Measure: **Acres** proposed to be commercially treated between IRA boundary and NFS roads 693 and 693B, by alternative.

Measure: Type of commercial treatments within the Project along the western boundary of the IRA and their anticipated impacts to the foreground viewshed[67] for dispersed recreation users who may be traveling along this western boundary.

Indicator: Landscape scenic quality and character as viewed from NFS trail 035 within the Bear Wallow IRA.

Measure: Affect to Forest Plan VQOs for area viewed in the foreground, middleground, and background of NFS trail 035 from within the Bear Wallow IRA (Forest Service 2010a, Management Area 14 direction, page III-294)

- Foreground, Sensitivity Level 2, Variety Class B: Partial Retention
- Middleground, Sensitivity Level 2, Variety Class B: Modification
- Background[68], Sensitivity Level 2, Variety Class B[69]: Modification

## 3.17.3 Air Quality within the IRA

To reduce duplication of disclosures with other sections of this SDEIS, the following section is a summary of the affected environment and direct, indirect, and cumulative effects to air quality that were disclosed earlier in this chapter. For detailed disclosures of direct, indirect and cumulative effects refer to Air Quality, section 3.5.

### *3.17.3.1 Affected Environment*

Ambient air quality for this area is likely to be good due to the lack of urban and industrial sources that are primary sources of man-made pollutants and a minimum of other pollution-generating activities. Relatively minor amounts of pollutants could come from fugitive road dust, motorized vehicles, prescribed fire and wildfire, or other rural or agricultural activities.

### *3.17.3.2 Environmental Consequences of Alternatives*

#### 3.17.3.2.1 Alternative A

Alternative A does not propose any prescribed fire activities, therefore no direct effects to air quality would occur. Air quality impacts from existing sources, such as dust and vehicle emissions, would be expected to continue in the analysis area at similar levels as occurs currently. Because there are no direct or indirect effects that would incrementally add to those effects, there would be no cumulative effects.

[67] Note, due to the heavy forested condition at the boundary between the IRA and Project area, viewed distance would not extend beyond the foreground, thus the middleground and background are not assessed.

[68] Background = The space beyond the middleground in a landscape; the visual distance zone relating to the distant portion of the landscape; typically the area located from 3-5 miles and greater from the observer (USDA Handbook 462, Volume 2).

[69] Variety Class B = Areas where features contain a variety of form, line, color, and texture or combinations thereof, but which tend to be common throughout the character type and are not outstanding in visual quality.

#### 3.17.3.2.2 Alternatives B, C, and D

As to the action alternatives, as concluded in section 3.5, smoke dispersal output generated by SIS for both the proposed underburn of activity fuels and landing pile burn treatments indicate that impacts to all sensitive areas would be in compliance with the $PM_{2.5}$ standards when combined with average ambient pollutants. For underburn treatments, SIS was used to assess the proposed underburns (about 962 acres for Alternative B and 949 acres for Alternatives C and D) to generate smoke in a single-day burn with no wind offset.

There is a slight difference when comparing the effects of Alternative B to those of Alternatives C and D; Alternative B adds approximately 13 more acres of underburn treatment. This small difference would not have a significant impact on overall $PM_{2.5,}$ so the largest number of underburn acres (Alternative B) was used in the modeling process. This situation represents the worst-case scenario for smoke conditions and $PM_{2.5}$ standards. The worst-case scenario smoke conditions, and the $PM_{2.5}$ standards for the landing pile burn treatments for all action alternatives was modeled using SIS to represent the pile type, size, material, and number of acres impacted (10 acres) to generate smoke in a single-day burn with no wind offset.

Outputs for the prescribed underburn (as well as the landing piles) indicated that within 1 mile, $PM_{2.5}$ generated would be below the 24-hour $PM_{2.5}$ NAAQS (section 3.5). SIS outputs illustrate that the landing pile burn treatments are within 24-hour $PM_{2.5}$ NAAQS at all distances from the landing pile burn activities (Table 3-48), including areas extending into the IRA.

Thus, while all action alternatives would have temporary direct impacts (1–3 days) on air quality standards, the air quality levels would be in compliance with State and federal air quality regulations and return to pre-burn conditions within a 3-day period. Additionally, the underburn activities would be implemented at a time when visitor use to the IRA would typically be at lower levels.

As to cumulative effects, Appendix B, Table B 1 of this document outlines the past, ongoing, and foreseeable actions evaluated for inclusion in this analysis. No past burning activities, when combined with proposed activities, would result in a noticeable incremental change on air quality within the IRA. Present/ongoing activities which impact air quality would be expected to continue. These impacts include dust and vehicle emissions from present and/or ongoing activities, such as recreational uses, and trail and road use and maintenance. These ongoing activities, when combined with proposed activities, would not result in a noticeable incremental change on air quality within the IRA.

Reasonably foreseeable future actions considered in this cumulative effects analysis include burning activities associated with ongoing timber sales (Frontier, Stolle 7, and Peacemaker) located to the northeast of the Project area. The fuel treatment activities with these sales would be limited to burning of landing piles. Other reasonably foreseeable future actions would include prescribed burning associated with the Rocky Canyon Prescribed Fire Project to the north and east of the Project area. Actions associated with this project would not be expected to cumulatively impact air quality when combined with the action alternatives given that burn activities because they would likely be carried out in different years and different seasons, the distance of these projects from the Project area (i.e., >1 mile), and the typical prevailing wind direction (i.e., west to east or southwest to northeast) would not cumulatively contribute to an incremental increase in smoke over the IRA.

### 3.17.4 Diversity of animal communities within the IRA

To reduce duplication of disclosures with other sections of this EIS, the following is a summary of the affected environment and direct, indirect, and cumulative effects for each of the three sensitive species within the Project area that may affect distribution of these species within the IRA, and thus overall diversity. For detailed disclosures of direct, indirect, and cumulative effects on the three sensitive species, refer to the following sections: section 3.4.4.1 (whiteheaded woodpecker); section 3.4.5.1 (flammulated owl); section 3.4.5.2 (northern goshawk).

#### *3.17.4.1 Affected Environment*

Assessment of roadless characteristics completed in support of the Forest Plan revision in 2003 identified that no ESA listed, proposed, or candidate species had any measurable amount of habitat in the Bear Wallow IRA (Forest Service 2003c, Appendix H). This finding is consistent with the wildlife analysis for this Project, which determined that there would be no effect for ESA listed species and no impact to candidate species (section 3.4, Table 3-34) relative to proposed activities in the Project area that lie directly west of this IRA.

The assessments in 2003 identified the following three Region 4 Sensitive Species that have substantial amounts of potential habitat within the IRA: northern goshawk, with 3806 acres or 42 percent of the total IRA acres; whiteheaded woodpecker, with 2,711 acres or 30 percent of the total IRA acres; and flammulated owl, with 2,506 acres or 27 percent of the total IRA acres (Forest Service 2003c, Appendix H).

#### *3.17.4.2 Environmental Consequences of Alternatives*

**3.17.4.2.1 Whiteheaded Woodpecker**

Under Alternative A, there would be a continued downward trend in source habitat for the white-headed woodpecker as changes to tree species composition trend toward shade-tolerant species and stand densities increase.

Actions under Alternatives B, C, or D would increase the amount of white-headed woodpecker source habitat immediately after harvest and into the long term in comparable amounts and average patch size; however, Alternatives C and D provide slightly lower amounts of habitat compared to Alternative B due to removal of commercial treatment units adjacent to the Bear Wallow IRA in response to Issue #3. All three action alternatives would create enough source habitat (within PVG 2 habitat types) to form a single potential home range, with all alternatives forming comparable amounts of continuous potential habitat across a home range. All three action alternatives would shift species composition toward desired tree species (ponderosa pine) and away from shade-tolerant species, essentially moving these stands back toward the expected HRV for these forest types.

Total road densities would decrease within source habitat following implementation of all three action alternatives, improving the quality of source habitat through reduced disturbance and risk of snag removal within road corridors. Large snag densities would be expected to remain within desired ranges following harvest and would increase over the long term. As a result, all three action alternatives would improve habitat attributes in the short and long term and result in more habitat for the white-headed woodpecker than would occur under Alternative A.

Under Alternative A, the lack of short-term improvement in habitat quality and quantity and the long-term downward trend in habitat in the Project area could cumulatively reduce the number of individual whiteheaded woodpeckers in areas adjacent to the IRA. This reduction in individuals could reduce the overall numbers of individuals available to distribute into the IRA, thus contributing to a potential decline in diversity of this species within the IRA over time (e.g., species richness[70], species evenness[71], and relative abundance[72]). Conversely, all action alternatives show comparable short- and long-term improvements in habitat quantity and quality of whiteheaded woodpecker habitat. Thus, the action alternatives would be more likely to support higher numbers of individual woodpeckers adjacent to the IRA that would be available to distribute into the IRA and contribute to the maintenance or improvement of overall diversity within the IRA.

#### 3.17.4.2.2 Flammulated Owl

Alternative A would improve some habitat conditions for flammulated owls as stands in the large tree size class increase over time and the lack of disturbances allows some stands to move from low canopy cover class to moderate. However, stands would continue to trend away from desired tree species composition, as shade-tolerant species would continue to replace seral ponderosa pine, and other stands would move from moderate to high canopy cover, negating the gain in preferred large tree size class and moderate canopy cover classes. In addition, under Alternative A, total road densities would remain high and continue to degrade habitat through access for removal of snags for fuelwood. The cumulative effect of this alternative, when combined with effects of ongoing and foreseeable activities within the analysis area, would be a short- and long-term decreasing trend in source habitat quantity and quality.

Alternatives B, C, or D would move vegetation toward its desired conditions within PVGs 2, 5, and 6 habitat types. As a result, source habitat for flammulated owls within PVGs 5 and 6 (mixed1 fire regime) would increase, while current source habitat within PVG 2 would decrease (nonlethal fire regime). The effects of these three alternatives sometimes had different impacts on the four habitat indicators selected for this species (refer to section 3.4.5.1). For example Alternative D results in the most source habitat immediately following harvest (1,874 acres), but Alternative C results in the largest total amount of source habitat in the long term (2,229 acres), Alternatives B, C, and D would all initially move 625 acres in PVG 2 below the preferred 40 percent threshold for canopy cover (and back into the HRV) immediately following harvest. However, Alternative C would result in the largest gain of source habitat in PVG 6 habitat types in the long-term (558 acres). Alternative C also results in the largest improvement in species composition, slightly more than Alternative B (Table 3-26). In addition, all three action alternatives would reduce total open road densities within flammulated owl source habitat, thus

[70] Species richness = is the number of different species represented in a set or collection of individuals.

[71] Species evenness = refers to how close in numbers each species in an environment are. Mathematically it is defined as a diversity index, a measure of biodiversity which quantifies how equal the community is numerically.

[72] Relative species abundance = a component of biodiversity which refers to how common or rare a species is relative to other species in a defined location or community

measurably reducing risk of snag removal through fuelwood harvest. Alternative D results in the largest long-term decrease in total road density, closely followed by Alternative C (Table 3-76).

Together, habitat indicators show that Alternative C would result in the most long-term source habitat, the largest gain in source habitat within PVG 6, and the largest improvement in species composition. In addition, Alternative C would retain the second most home ranges immediately following implementation and would maintain the most home ranges into the long term.

In the short term, habitat quality and quantity is not expected to measurably reduce diversity within the IRA under any alternative. In the long term, however, a downward trend in habitat under Alternative A is expected due to the loss of ponderosa pine. Thus, over time, this reduction in habitat quantity and quality could cumulatively reduce the number of individuals in areas adjacent to the IRA. This reduction in individuals would reduce the overall numbers available to distribute into the IRA, thus contributing to a decline in diversity of this species within the IRA over time (e.g., species richness, species evenness, and relative abundance). Conversely, all action alternatives show comparable short- and long-term improvements in habitat quantity and quality of flammulated owl habitat. Thus, the action alternatives would be more likely to support higher numbers of individual owls in the long term, adjacent to the IRA that would be available to distribute into the IRA and contribute to the maintenance or improvement of overall diversity within the IRA.

#### 3.17.4.2.3 Northern Goshawk

Alternatives B, C, or D would reduce northern goshawk source habitat abundance within the analysis area below what would be expected to occur under the Alternative A, primarily from reductions in canopy cover that move densities under 60 percent for nesting and 40 percent for forage habitat. Nesting habitat would correspondingly decrease as well under all three action alternatives. Most of the reductions in forage habitat were a result of stands in PVG 2 being moved back toward the HRV. While there were some losses of forage habitat within PVGs 5 and 6, stands that fell below canopy cover requirements for nesting habitat in these PVGs shifted to forage habitat. As a result, forage habitat remained generally the same under all three action alternatives, but increased in all cases when compared to Alternative A. Of the three action alternatives, Alternative D retains the most total northern goshawk source habitat (nesting and forage) through the modeling period (Table 3-39). Alternative D also retains the most nesting habitat through 2030.

All three action alternatives would retain sufficient quantity and distribution of source habitat to support a home range within the analysis area. In addition, all action alternatives would retain the important vegetation characteristics within the active nest stand as a result of Design Feature WL-2, would retain the quality of nesting habitat within the five other alternate/replacement nest stands, and would retain overall source habitat quality within the PFA. While the differences between the alternatives are relatively small with respect to effects within the potential home range, Alternative D would retain the most nesting habitat within the potential home range throughout the modeling period, and would retain more of the PFA above 60 percent canopy cover than Alternatives B and C.

Average habitat patch size for northern goshawk would be less in Alternatives B, C or D than Alternative A throughout the modeling period for all action alternatives. However, all three action alternatives would reduce total road densities compared to Alternative A, thus reducing

risk to snag removal through fuelwood harvest. Alternative D results in the largest decrease in total road densities into the long term. Snags are an important habitat feature to goshawk prey species.

Overall, the habitat indicators show that Alternative D would retain the most source habitat and the most nesting habitat throughout the modeling period compared to other action alternatives, would retain the most nesting habitat within the home range, would maintain more of the PFA above the 60 percent canopy cover threshold, and would result in the largest long-term reduction of total road density within source habitat. The quality and quantity of source habitat within the home range would be maintained closest to the existing condition under Alternative D.

Thus, relative to overall diversity within the IRA, Alternative A and all three action alternatives would retain sufficient quantity and distribution of source habitat within the Project area to support a home range. All action alternatives would also retain the important vegetation characteristics within the active nest stand as a result of Design Feature WL-2, would retain the quality of nesting habitat within the five other alternate/replacement nest stands, and would retain overall source habitat quality within the PFA. While the differences between the alternatives are relatively small and the action alternatives generally result in small reductions in overall habitat, with respect to effects within the existing goshawk home range, all alternatives would be expected to continue to support numbers of individual goshawks in the short and long term as currently exist. Thus, individuals available to distribute into the IRA from the Project area would be similar to what currently exists, and none of the alternatives should measurably affect the current diversity of this species within the IRA (e.g., species richness, species evenness, and relative abundance).

### 3.17.5 Primitive and Semi-primitive Recreation Opportunities within the Inventoried Roadless Area

To reduce duplication of disclosures with other sections of this EIS, the following is a summary of the affected environment and direct, indirect, and cumulative effects for the indicators used to assess effects of proposed activities within the Project area on Primitive and Semi-primitive recreation opportunities within the Bear Wallow IRA. For detailed disclosures of direct, indirect, and cumulative effects to ROS classifications and trail access refer to sections 3.13.13 (Recreational Access and Opportunities) and 3.13.4 (Recreational Opportunity Spectrum).

#### *3.17.5.1 Affected Environment*

The Bear Wallow IRA has a low-to-moderate capability rating for apparent naturalness, solitude, and opportunities for challenge and adventure. The small size provides limited opportunities for solitude; however, vegetation screens some management activities outside the IRA. Opportunities for primitive recreation are low because of the relatively small size and extent of management activities visible from within the IRA.

The summer ROS classifications in the Bear Wallow IRA include Semi-Primitive Motorized (5,505 acres), Roaded Modified (1,700 acres), and Roaded Natural[73] (1,928 acres). The majority

[73] Roaded Natural ROS is not visible on Figure 3-66 because it occurs within the eastern portion of the IRA that is not displayed in this Figure.

of the Bear Wallow IRA along the southern and western margins of the IRA that are adjacent to the Project area have been classified as Roaded Modified Summer ROS and a small portion classified as Semi-Primitive Motorized ROS (Figure 3-68).

There are two summer ROS classifications that occur with the Project area—Roaded Modified (11,471 acres) and Semi-Primitive Motorized (39 acres) (Figure 3-68). The 39 acres of Semi-primitive motorized is immediate adjacent to the western boundary of the Bear Wallow IRA.

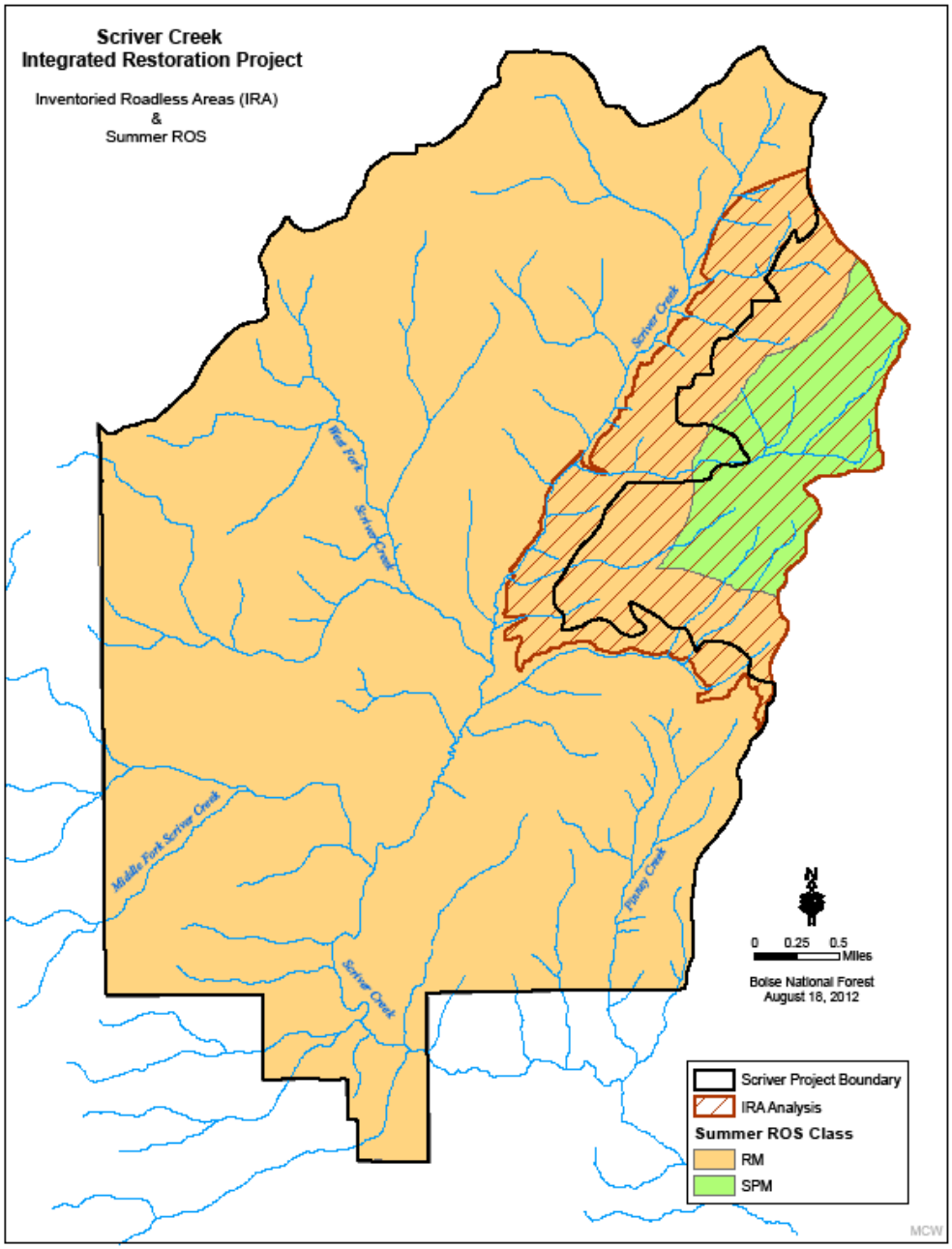


**Figure 3-68. Summer Recreation Opportunity Spectrum (ROS) Classification within the Bear Wallow Inventoried Roadless Area for Roaded Modified (RM) and Semi-primitive Motorized (SPM) Class**

The winter ROS classifications in the IRA include Semi-Primitive Motorized (8,853 acres) and Roaded Natural (281 acres). All of the Bear Wallow IRA area along the southern and western margins of the IRA that are adjacent to the Project area has been classified as Semi-Primitive Motorized winter ROS (Figure 3-69). Winter ROS for the entire Project area is classified as Semi-Primitive Motorized (Figure 3-69).

Designated trails within the IRA include approximately 3 miles of NFS trail open to motorcycles only, and 4 miles open to vehicles ≤50 inches wide, including NFS trail 035 in the western portion of the IRA. Motorized recreation use on this NFS trail system is the predominant recreational use in the IRA, primarily facilitating big-game hunting, dispersed camping, and fishing. Approximately 1.7 miles of NFS trail 035 is contained immediately within or adjacent to the northern and southern boundaries of the Project area that are adjacent to the Bear Wallow IRA (Figure 3-70). NFS trail 035 is designated as open to non-motorized access and motorized vehicles ≤50 inches both inside and outside of the IRA.

Minor disruptions and/or displacements of recreational users by other uses, such as past timber harvest activities, NFS road and trail maintenance activities, and livestock grazing have occurred in the Project area in the past and can affect trail use within the Bear Wallow IRA due to access points to trailheads occurring outside the IRA (Figure 3-70). Minor recreation access disruptions are likely to continue as a result of scheduled maintenance of NFS roads and trails in and immediately adjacent to the Project area.

#### *3.17.5.2 Environmental Consequences of Alternatives:*

Under Alternative A, no changes to the current transportation system or winter recreation use in the analysis area would occur and, therefore, no change to the ROS would be expected within the analysis area for any of the classes discussed above. Because no direct or indirect effects to ROS would be anticipated with the Alternative A, no cumulative effects would be expected.

None of the action alternatives would have direct or indirect effects to the summer or winter ROS classifications within the Project area. Alternatives C and D could slightly reduce potential noise disruptions to the semi-primitive motorized experience within the adjacent Bear Wallow IRA compared to Alternative B as a result of eliminating the helicopter harvest units along the western boundary of the IRA. However, because the ROS within this western portion of the IRA is Semi-primitive Motorized, the intermittent noise from the logging operations would not be inconsistent with expectations of many of the users who are traveling through the IRA on ATVs or motorcycles. None of the action alternatives propose any changes to the over snow or winter recreational use in the analysis area. Logging and road activity would typically not occur between December 15 and March 15 due to design feature RR-1, which prohibits snowplowing during this period on all haul routes. Therefore, there would be no modification of summer or winter ROS within the Project area or the Semi-primitive Motorized ROS within that portion of the Bear Wallow IRA adjacent to the Project area. Given there would be no measurable direct or indirect effects to the existing ROS classifications under any alternative, no cumulative effects to ROS would be expected.

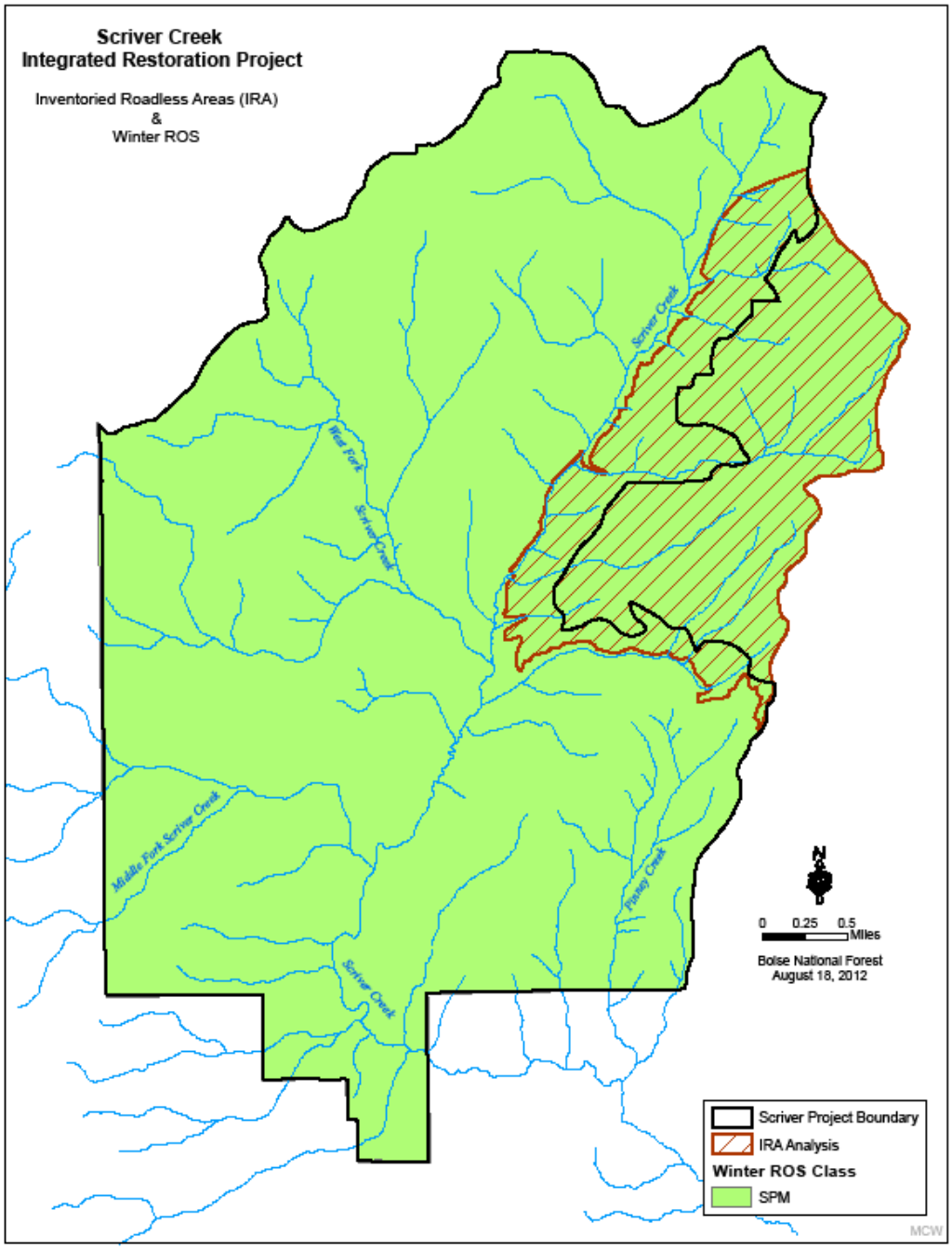


**Figure 3-69. Winter Recreation Opportunity Spectrum (ROS) Classification within the Bear Wallow Inventoried Roadless Area for Semi-primitive Motorized (SPM) Class**

Implementing Alternative A (No Action) would have no direct or indirect effects on current recreational access or opportunities given that existing recreational access and opportunities within the analysis area would be maintained. No change would be expected in the amount, duration, and/or frequency of minor disruptions and/or displacement of recreational users by other uses in the analysis area. No cumulative effects would be associated with this alternative because there are no direct or indirect effects to recreational access and opportunities that would occur as a result of implementation of Alternative A.

Alternatives B, C, and D, would result in some disruption and displacement of recreational visitors in the Project area, including motorized and non-motorized users, campers, and hunters during Project implementation due to noise, dust, and smoke from timber harvest, and prescribed fire activities. However, recreationists would likely shift their use to nearby areas within the analysis area to maintain their recreational experience. Disturbing recreational users may also occur with log haul activities on NFS roads. However, Design Feature TH-2 (section 2.4.2.1), prohibits log haul on weekends; major holidays; and the opening day of deer, elk and turkey general hunting seasons. This prohibition would mitigate potential conflicts between log haul operations and recreationists during times when recreational use of the area is expected to be highest. In addition, dust generated by the log haul operations could impact recreationist in the analysis area during Project implementation. Timber sale contract provision C5.31# and the *Timber Sale Road Maintenance Plan* would require dust abatement on all haul routes, which would mitigate the impact to recreational visitors in the analysis area during Project implementation.

As discussed above, disruption and displacement of recreational visitors in the Project area may cause some users to shift their use to nearby areas to maintain their recreational experience. However, most of these users would be expecting an experience more consistent with the Roaded Modified ROS classification, rather than the Semi-primitive Motorized ROS which occurs in the Bear Wallow IRA immediately adjacent to the Project area. While some disruptions may occur to users accessing trailheads to NFS trail 035, these disruptions would be expected to be short term. The sights and sounds of the logging operation (i.e., chainsaws, helicopters, and road traffic) may result in a reduced experience to those using NFS trail 035 within the IRA. However, because this trail is motorized, these additional noises should not measurably alter the expected Semi-primitive Motorized experience. In summary, proposed activities under any action alternative would likely result in similar levels of disruption to users of NFS trail 035, but these disruptions should not measurably change the Semi-primitive Motorzied recreational experience compared to what is currently available.

### 3.17.6 Landscape Character and Integrity within the Inventoried Roadless Area and Issue #3

To reduce duplication of disclosures with other sections of this SDEIS, the following is a summary of the affected environment and direct, indirect, and cumulative effects on the scenic environment within the Project areat and how those effects may directly or cumulatively effect the landscape character and integrity as viewed from within the Bear Wallow IRA. For detailed disclosures of direct, indirect, and cumulative effects to the scenic environment, refer to section 3.16.

#### *3.17.6.1 Affected Environment*

The Forest Plan characterizes NFS trail 035 as designated for motorized wheeled vehicles ≤50 inches, as a Sensitivity Level 2 route (average sensitivity), with a Variety Class B scenery (common scenery), and with the VQOs identified as PR in the foreground and M in both the middleground and background (Forest Service 2010a, p. III-294, MA14 Standard 1462). Figure 3-64 (section 3.16) displays the areas within the Project area that can be seen from NSF trail 035, assuming no tree cover would screen the view. However, as shown in Figure 3-65, large segments of the trail are screened by tree cover, and thus middleground and background viewsheds within the Project area shown in Figure 3-64 would only be visible at points along the trail where there are breaks in tree cover. In addition, because this is a motorized trail, motorized recreation users would pass by these breaks in tree cover at speeds that would limit their ability to see much detail, with the amount of detail observed decreasing from the foreground to the middleground and background.

The existing viewshed within the Project area has been heavily influenced by past management activities. Since the mid-1900s, the Project area has had multiple timber harvest and road management activities within the middleground of NSF trail 035 (as shown in Figure 3-70). Combinations of various logging systems have been used and their resulting pattern on the landscape is generally consistent with M and MM VQOs. The effects of past management activities on PR VQO areas have diminished over time, becoming visually subordinate to the characteristic landscape and allowing the uncharacteristic forms and lines of the past to soften through revegetation.

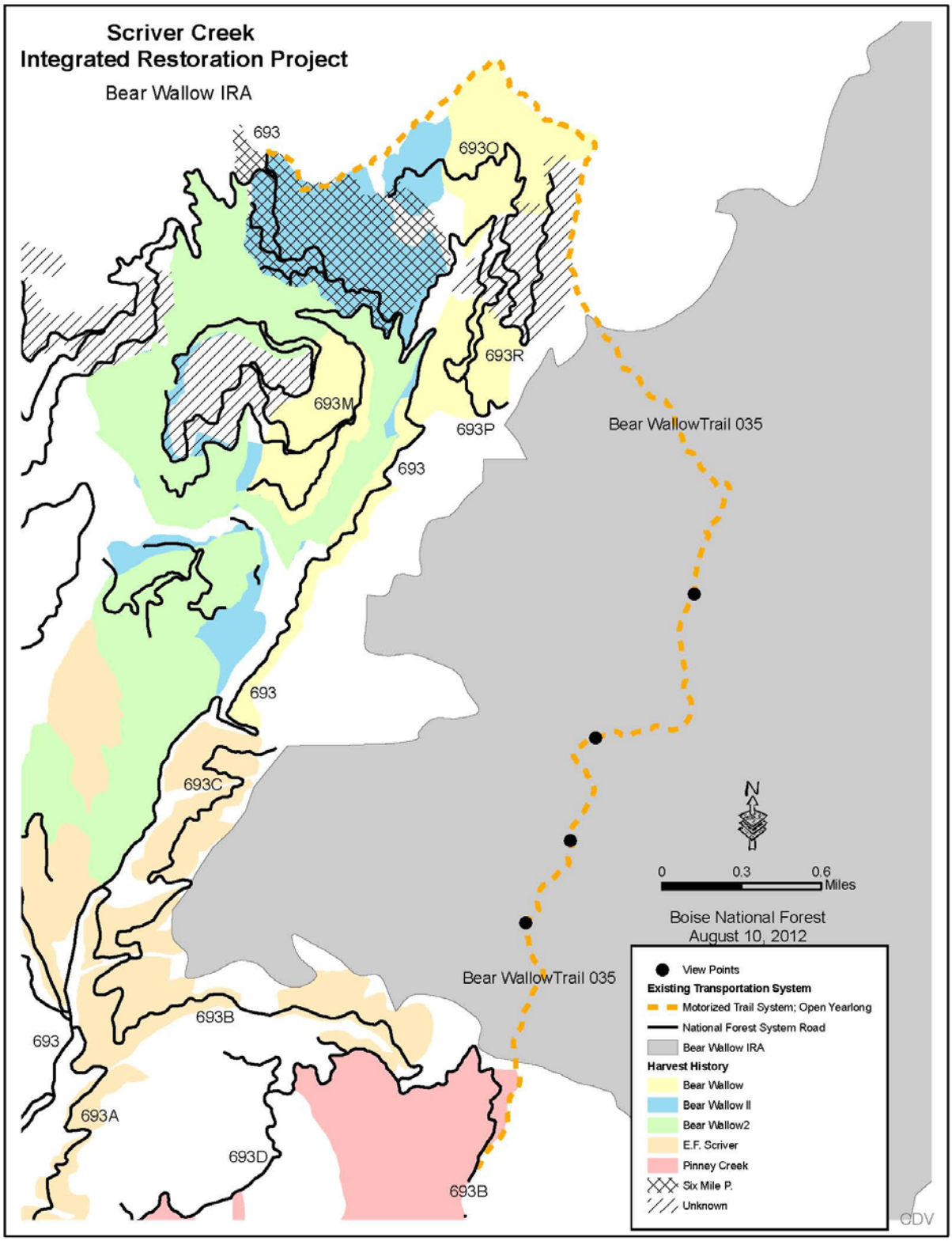


**Figure 3-70. Past Activities within the Scriver Creek Integrated Resource Management Project Area Adjacent to the Western Boundary of the Bear Wallow Inventoried Roadless Area**

*Landscape scenic quality and character of the area proposed to be treated under Alternative B as observed from viewpoints along the western boundary of the Bear Wallow IRA near proposed treatment areas.*

As shown in Figure 3-67, the western boundary of the Bear Wallow IRA follows along a mid-slope area that is heavily vegetated with tree cover. As a result of this heavy tree cover at viewpoints near proposed treatment units along the western boundary of the IRA, visibility beyond the foreground (>.5 miles) would be infrequent. As shown in Figure 3-67 Figure 3-68, the area viewed from established viewpoints along the western boundary of the IRA that are located near harvest units proposed under Alternative B would be limited, even if the tree cover was absent.

As shown on Figure 3-67, the areas proposed for treatment under Alternative B that are immediately adjacent to the western boundary of the IRA have an established VQOs of M. Under an M VQO, management activities may visually dominate the original characteristic landscape; however, activities of vegetative and landform alteration must borrow from naturally established form, line, color, or texture so completely and at such a scale that its visual characteristics are those of natural occurrences within the surrounding area or character type. Additional parts of these activities, such as structures and roads, must remain visually subordinate to the proposed composition.

#### *3.17.6.2 Environmental Consequences*

As Alternative A does not propose any new management activities, no management-induced changes to the scenic environment would occur adjacent to the western boundary of the IRA (or as viewed from NFS trail 035 within the IRA). As discussed under the affected environment, several past vegetation treatment and road management activities have influenced the scenic environment within the Project area as seen by users traveling through or recreating within the Project area, or those looking back into the Project area from NFS trail 035 (refer to Appendix B and Figure 3-70). Over time, evidence of previous disturbances would diminish as tree size increased and the appearance of density/line/form conditions from past road activity and cable corridors decreased. Absent an uncharacteristic disturbance event, subtle changes in the vegetative structure and composition from natural processes would generally be unnoticeable to Forest visitors and would meet the assigned VQOs within the analysis area. Because no direct or indirect effects to the scenic environment would be expected with implementation of Alternative A, there would be no cumulative effects.

For the first 1–3 year period following the implementation of all three action alternatives there is likely to be ground and soil disturbance and harvest residues in the Project area within the foreground and middleground as seen from NFS trail 035. In the 3–5 years following implementation, harvest slash and residue treatment of burning (and the subsequent herb/shrub/forb re-establishment) would result in ground disturbances being generally unnoticeable. The proposed vegetation management activities under each of the action alternatives that overlap M and MM VQOs areas would meet the respective VQOs (as discussed under methodology for the Scenic Environment, found in section 3.15). Within the PR areas viewed from NFS trail 035 (Figure 3-67), design features RR 4 and 5 provide further assurance that in these more visually sensitive areas, proposed activities would avoid or minimize the creation of views that would not be consistent with the characteristic landscape in both the short and long term.

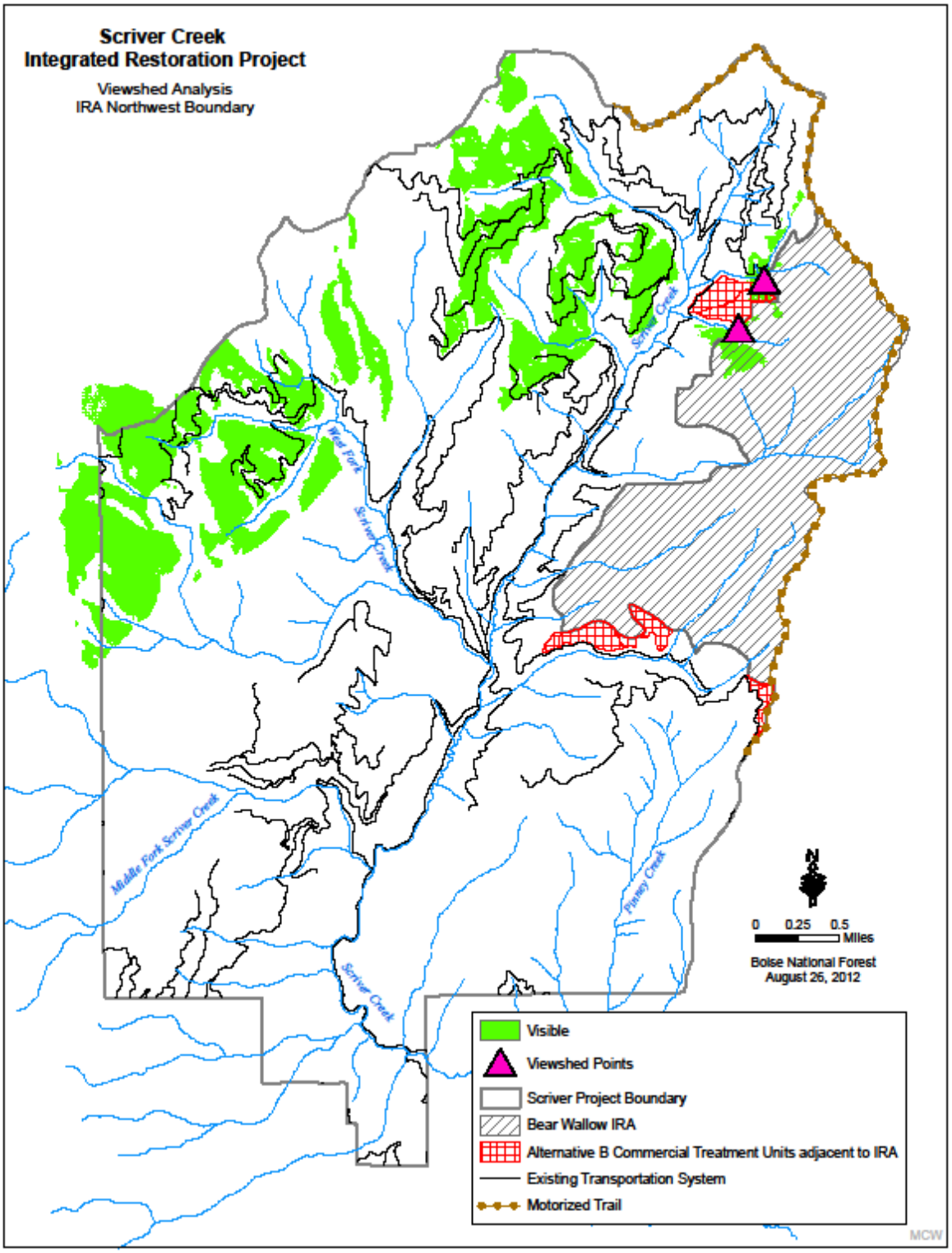


**Figure 3-71. Viewshed from the Northern Boundary of the Inventoried Roadless Area Adjacent to Proposed Helicopter Harvest Units under Alternative B**

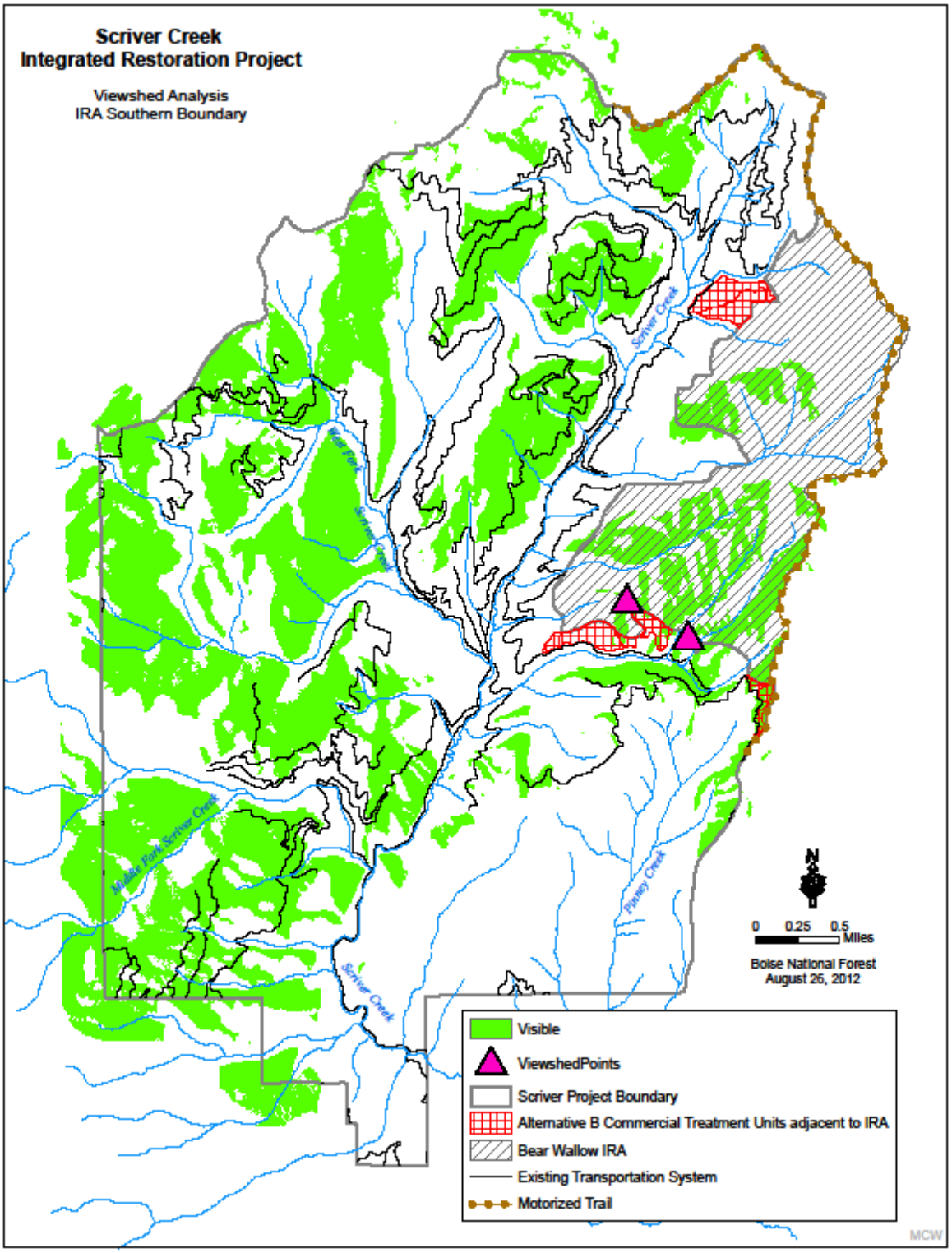


**Figure 3-72. Viewshed from the Southern Boundary of the Inventoried Roadless Area Adjacent to Proposed Helicopter Harvest Units under Alternative B**

New temporary roads, system roads, and skid trails would be constructed to access commercial thinning and improvement cut units in the Project area. In some areas, these roads could create visible lines that are not natural appearing and could include visible cut/fill slopes that may detract from the overall scenic quality. Existing flat areas on road bends or corners and existing landings may be used during harvest operations. Some blading and brushing may occur to utilize existing landings. These activities would meet the M or MM VQOs as defined under the methodology section. Within partial retention areas as viewed from NFS trail 035, RM-5 (items 6-9) would provide added assurance that, in these more sensitive visual areas, potential negative effects would be avoided or mitigated consistent with the VQOs.

Road maintenance and culvert replacements along existing roads would not result in a measurable change to the scenic environment as viewed from NFS trail 035 because the outcome of these activities results in maintaining the same or a similar visual environment as the existing situation. The 19.8 miles of road decommissioning/obliteration of existing system and unauthorized roads may result in a short-term impact to the visual environment where ground disturbance occurs to recontour and/or scarify road prisms. However, in the long term, the viewshed from NFS trail 035 would be improved once these segments are fully revegetated.

Alternatives A, C, and D do not propose any commercial treatments immediately adjacent to the western boundary of the Bear Wallow IRA, thus no management-induced changes to the scenic environment would occur from commercial treatments along the western boundary of the IRA. Over time, evidence of previous disturbances would continue to diminish as tree sizes increase and the appearance of density/ line/form conditions from past road activity and cable corridors decreased. Absent an uncharacteristic disturbance event, subtle changes in the vegetative structure and composition from natural processes would generally be unnoticeable to Forest visitors and would meet the assigned VQOs within the analysis area. Because no direct or indirect effects to the scenic environment would be expected with implementation of these alternatives, there would be no cumulative effects.

Alternative B proposes to treat 54 acres along the northern portion of the western boundary of the Bear Wallow IRA (Figure 3-71) and 64 acres along the southern portion of the boundary (Figure 3-72). Helicopters would be used to log 100 acres of these units, thus minimizing ground disturbance across the majority of these treated acres. Tractor skidding would be used on the 18 acres in the southeast corner where the IRA boundary meets the Project area boundary. Slash would be lopped on the 100 acres of helicopter logging, and prescribed underburning would occur on the 18 acres in the southeast corner.

Proposed improvement cut activities under Alternative B would result in a more open forested appearance on the 118 acres treated compared to Alternatives A, C, or D where these acres would not be treated. As displayed in a modeled depiction of the change expected between the current condition and proposed treatments under Alternative B (Figure 3-73), the foreground landscape seen from viewpoints along the western boundary of the IRA where these treatments are proposed would continue to convey a predominantly natural appearing forested condition with varying ranges of tree densities within patches and configurations characteristic of the fire regime (Stand Basal Area and Canopy cover, sections 3.2.4.1.4 and 3.2.4.1.5, respectively).

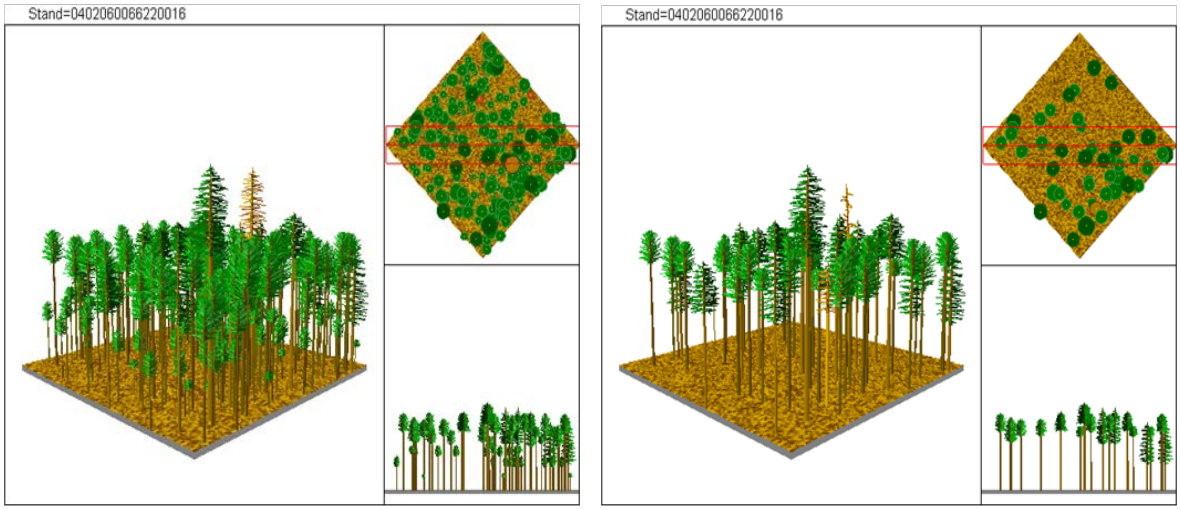


**Figure 3-73. Illustration of Existing Stand Conditions in Unit 13 (Stand 6220016) in 2010 and Stand Conditions One Year Following Treatment**

## Cumulative Effects

### Past and Present Ongoing Activities s

For the first 1-3 year period following implementation of Alternative B there is likely to be evidence of harvest activity from ground and soil disturbance and harvest residues in the locations seen in the foreground of viewpoints along the western boundary of the IRA. Harvest slash on the 100 acres not underburned would generally be unnoticeable within 3–5 years as it begins to blend with surrounding surface material. While evidence of treatment would be visible solely under Alternative B, the proposed vegetation management activities under this alternative would meet the required Modification VQOs.

While visually different than no treatment, the appearance of a similar forest stand along the IRA boundary would be expected to be maintained with implementation of proposed activities under Alternative B, given that the silvicultural prescription for these units would result in a residual density of about 80–90 $ft^2$ of basal area. With this prescription, it is anticipated there would not be a visible demarcation or edge effect between the IRA and the units/stands treated. Figure 3-73 illustrates the existing stand conditions for Unit 13 (Stand 6220016) as compared to what the stand conditions would likely look like one year following treatment in all units/stands treated adjacent to the Bear Wallow IRA.

While not specifically raised as a concern, the benefits of the 194 acres of precommercial thinning activities proposed near the IRA boundary under all action alternatives is worth noting. These treatments would be expected to put these forested stands on a trajectory toward vegetative desired conditions, creating more of a natural forest appearance. Over time, the visual quality of these areas as viewed from the IRA should improve under all the action alternatives compared to Alternative A, which would maintain a uniform tree pattern characteristic of a plantation environment that is not typical of the natural landscape. Thus, in the short- and long-term, noncommerical thinning treatments would create a more natural forested appearance along the boundary of the Project area and Bear Wallow IRA.

In summary, while there would be a visual difference between not commercially treating areas adjacent to the IRA boundary under Alternatives A, C, and D versus treating these areas under

Alternative B, all alternatives would meet the identified VQOs for the areas, blending at the IRA boundary. Commercial vegetation activities under Alternative B would borrow from naturally established form, line, color, and texture so that the visual characteristics following treatment would be those expected to occur naturally within the surrounding area, including within the IRA where change would generally occur more through natural disturbances. In addition, the precommecial treatments proposed in plantations adjacent to the IRA under all action alternatives would measurably improve the natural forest appearance of these areas compared to Alternative A. These plantation treatments would help blend these forested areas in with those in the adjacent IRA over time.

## 3.18 CLIMATE CHANGE

### 3.18.1 Affected Environment

In 2009, the Forest Service developed guidance for addressing the reciprocal relationship between NFS projects and climate change (Forest Service 2009). This guidance states that forests should consider climate change effects in regard to the type and scale of the project, and that the effects of climate change on natural resource management should be addressed at the "pre-NEPA" stage, most appropriately at the Forest Plan level. The 2010 Forest Plan (Forest Service 2010a) incorporated a strategy for responding to climate change based on the theory of an "adaptive capacity" of resistance to undesirable or extreme effects from fire, insects, and disease and encouraging "resilience," which would allow ecosystems to return to a pre-disturbance state (Millar et al. 2007). This same approach was identified in the Forest Service directives (FSM 2020) in 2011. Adaptive capacity is defined as the ability to adjust to environmental change and includes the genetic diversity of species, biodiversity, and the development of heterogeneous ecosystem mosaics. The directives define resilience as the ability of a system to absorb disturbance while retaining basic structure and function and the capacity to adapt to stress and change (FSM 2020).

According to the 2010 Forest Plan (Forest Service 2010a, page 89), the effects of climate change on projects were addressed through the development of Forest-wide desired conditions that are assumed to foster resistance and resilience to disturbance, including those associated with a changing climate. Forests with vegetative conditions similar to those found historically are more resilient to drought, insect pathogens, and severe wildfire (Fulé et al. 2009). Therefore, the desired conditions described in the 2010 Forest Plan (Forest Service 2010a, Appendix A) were founded on concepts of historical range of variability. Noss (2001) recommends adaptive strategies that align with the conservation principles described in section 3.2.8 as an additional mechanism for responding to climate change. He states that climatic change by itself was not indicated as the greatest threat to today's forests but is an additional stressor and suggests that restoration of vegetative conditions and landscape patterns within the HRV will result in more adaptable forests. Therefore, actions that move toward the desired conditions and conservation principles described in the 2010 Forest Plan respond to the potential effects of climate change.

The 2009 Forest Service guidance also addresses the effects of projects on climate change. Forests play a major role in the carbon cycle. The carbon stored in live biomass, dead plant material, and soil represents the balance between carbon dioxide ($CO_2$) absorbed from the atmosphere and its release through respiration, decomposition, and burning. Projects affect

carbon cycling, which includes carbon sequestration and the release of $CO_2$ and other greenhouse gases.

The $CO_2$ gas is constantly exchanged between forest ecosystems and the atmosphere. Tree growth accumulates $CO_2$, and ecological processes such as respiration, decomposition, and burning release it. Forest management affects the mechanisms associated with carbon gain and loss (Smith and Heath 2008). Examples of management practices that can increase $CO_2$ accumulation include afforestation, increased productivity, reduced conversion to non-forest uses, lengthening harvest rotations, and reducing the impacts of fire and insects (Smith and Heath 2008, Harmon et al. 2009). How much $CO_2$ is stored in managed forests is a function of the interval between harvests and the amount of $CO_2$ removed by disturbance (Harmon et al. 2009) as well as initial vegetative conditions (Harmon and Marks 2002). Altering species composition from slower growing to faster growing species can decrease the time it takes to reach a given level of storage capacity (Harmon et al. 2009, Millar et al. 2007). As much carbon can be stored on a site from frequent partial harvest as can be stored during the interval between complete harvest. Millar et al. (2007) stated that a warmer and potentially drier climate could lead to an increase in disturbance rates from fire, drought, and insects, which would decrease the storage capacity and increase emissions.

Harmon (2001) noted that although the mechanisms of $CO_2$ storage and release occur at fine-scales (i.e., stands), the consequences occur at broader scales (i.e., landscapes). Carbon effects must therefore be addressed at the landscape-scale to understand the net effect of storage and release (Harmon 2001, Harmon and Marks 2002). Temporal scale is also important because, although a disturbance such as wildfire can be a significant source of annual $CO_2$ emissions, $CO_2$ is recaptured on decadal timescales as vegetation regrows (Solomon et al. 2007). In complex landscapes, stands that are releasing more $CO_2$ than storing can be offset by stands that are storing more $CO_2$ than releasing. Complex multi-aged, mixed-species stands produced by disturbances or individual tree gaps that create openings, with or without older trees, generally have higher net primary production levels than even-aged stands, or younger stands resulting from stand-replacing disturbance (Turner et al. 1995, Keith et al. 2009,). The severity of wildfire effects may be decreased by removing understory (e.g., ladder fuels) that can consequently lower overall biomass combustion and allow for an increase in carbon storage (Mitchell et al. 2009). This finding is most likely correlated with forests that historically had frequent fires, whereas overall biomass levels may be uncharacteristically high in today's forests. In forests with historically long fire return intervals (e.g., ecosystems on the west side of the Cascades and Coast Range [Mitchell et al. 2009]), treatments likely do not provide the same benefit since these types of forests are less likely to be "departed" and fire severity is more often a function of weather (drought) than fuel.

Turner et al. (1995) described the carbon flux arc at the stand-level as, after stand-replacing disturbance that results in an early-seral stage, forests release more $CO_2$ than they store through decomposition of woody debris; as the canopy cover increases (mid-seral stages) the rate of storage overtakes the rate of release through growth; and in older stands (later-seral stages) there is a fluctuating relationship between release through respiration from trees due to the energy costs of maintaining a large organism and/or decreases in growth against the amount of carbon stored in dead wood. The rate of potential carbon accumulation on the same land-base is higher with a management regime than without due to the removal of carbon as wood products and the time period lands are maintained in mid-seral stages (Turner et al. 1995). Fire and woody debris

decomposition often exceeds accumulation on unmanaged lands. In the Rocky Mountain region, because the land-base is relatively stable and because both growth and harvest rates are relatively low compared to areas like the Pacific Northwest, the overall carbon flux has likely not changed much over the past several decades (Turner et al. 1995).

Although an increasing body of literature regarding the relationship between $CO_2$ storage, release, management activities, and disturbance processes is available, the 2009 Forest Service guidance does not have an accepted tool for analyzing greenhouse gases. The Forest Vegetation Simulator (FVS) can estimate total stand carbon and carbon removed over time under different management scenarios and disturbances (e.g., fire, insects and disease) but it cannot address other types of processes (e.g., decomposition or respiration) that in some ecosystems can be a major source of $CO_2$ release (Turner et al. 1995). Nor does the FVS address other mechanisms of onsite storage or account for $CO_2$ that could be produced from the removal, transportation, and processing of raw material into finished products. Though the 2009 Forest Service guidance states that the agency will continue to invest in developing analysis methods for assessing carbon storage and estimating greenhouse gas emissions, the guidance also states that because the scale of most projects (with the potential exception of oil and gas proposals) is extremely small, conducting meaningful quantitative evaluations is not possible. Therefore, alternative comparison will be limited to a qualitative discussion of the effects of climate change on the Project. The effects of the Project on climate change will not be evaluated, as allowed by the 2009 guidance.

## 3.18.2 Environmental Consequences of Alternative A—No Action

### *3.18.2.1 Direct and Indirect Effects*

Alternative A would have no direct effects on the vegetative conditions within any strata (Appendix D) that would make landscapes more resilient and resistant to disturbance, including climate change. Over time, conditions would trend away from desired conditions within the fire regimes (sections 3.2.4 and 3.2.5), allowing resistance and resilience to continue to decline. Management strategies that align with the conservation principles described in section 3.2.8 provide a mechanism for responding to climate change (Noss 2001). Alternative A would result in large tree size class patches that are smaller than the action alternatives in the nonlethal fire regime (section 3.2.6.3.1). In the mixed1 fire regime, however, the size of the large tree size class patches would be the same as the action alternatives; the species composition and structural condition of the patches would be different than desired. Alternative A would not develop heterogeneity in the plantations and, therefore would not develop within-stand patterns more indicative of historical conditions. Alternative A would develop vegetative conditions that would potentially respond uncharacteristically to disturbance regimes, including climate change.

### *3.18.2.2 Cumulative Effects*

Areas adjacent to all the strata would continue to advance successionally, trending away from desired conditions. The one exception would be the 103 acres treated by the Frontier Timber Sale. In this area, the risk of uncharacteristic disturbances would be lower. However, all the strata (in combination with adjacent, untreated areas) would develop large continuous patches that would not be at or moving toward desired conditions. The landscape would develop similar compositional and structural conditions, reducing biodiversity and, subsequently, any heterogeneity that currently exists between different types of patch mosaics. Disturbances (e.g.,

insect epidemics, stand-replacing wildfire, and climate change) would potentially produce uncharacteristic effects across large portions of the patches, which would further reduce the resilience of the landscape to disturbance and the ability of the landscape to move toward desired conditions.

## 3.18.3 Environmental Consequences of Alternative B

### *3.18.3.1 Direct and Indirect Effects*

In comparison to Alternative A, Alternative B would move vegetative conditions closer to desired conditions in the nonlethal and mixed1 fire regimes (section 3.2.6). Alternative B would develop larger, more extensive and connected patches trending towards desired conditions than Alternative A. Desired species composition, particularly for early seral ponderosa pine, and structural conditions more consistent with the historical fire regimes would be developed in the patches under Alternative B. These changes would improve resistance and resilience to disturbances that would be more consistent with these fire regimes (section 3.3.4) which would increase adaptive capacity. Alternative B would produce a larger tree size class patch in the nonlethal fire regime than Alternative A, which would further the conservation principles. In the mixed1 fire regime, though the size of large tree patches would be the same as Alternative A, the species composition of ponderosa pine would increase. Alternative B would develop heterogeneity in the plantations and, therefore, within-stand patterns would be more indicative of historical conditions. Alternative B would develop vegetative conditions within the strata that would potentially respond more characteristically to disturbance regimes, including climate change, than Alternative A.

### *3.18.3.2 Cumulative Effects*

Areas adjacent to the strata would continue to advance successionally, trending away from desired conditions. Conditions within the strata and the area treated by the Frontier Timber Sale would be more resilient and resistant to disturbance. At the landscape scale, Alternative B would produce more heterogeneous conditions (both within the treated strata themselves and in contrast to untreated areas) than Alternative A. Alternative B would produce a greater variety of groups and openings comprised of a diversity of species composition, including early seral species. Therefore, at the landscape scale, in the event of disturbance, the treated areas would be more resilient or resistant, would contribute to biodiversity within the landscape, and would provide seed and other types of propagules for reestablishing early seral species, such as ponderosa pine.

## 3.18.4 Environmental Consequences of Alternative C

### *3.18.4.1 Direct and Indirect Effects*

The effects of Alternative C would be the same as Alternative B for the strata treated in common, including the plantations as they would be treated the same under all action alternatives. The difference between Alternatives C and B are the strata treated under one alternative but not the other. Strata C would not be treated under Alternative C but would be treated under Alternative B, and Strata K and L would be treated under Alternative C but not Alternative B.

Strata C is large tree size class dominated by ponderosa pine. Although the species composition of ponderosa pine would be lower under Alternative C compared to Alternative B, Strata C has relatively high adaptive capacity, which it would maintain into the future. The adaptive capacity of Strata C would last longer under Alternative C than Alternative B (section 3.2.6.5.1).

Alternative C would improve the adaptive capacity of Strata K and Strata L much more than Alternative B. Currently these strata are some of the most departed from the desired species composition and structural conditions. Due to past timber harvest that affected these strata, grand fir dominates the overstory and understory, and structurally, groups and openings are uncommon. Therefore, conditions are departed from a historical mixed1 fire regime. Alternative C would increase ponderosa pine and improve the structural conditions, thereby increasing resilience and resistance. Though Strata C would not be treated and Strata K and L would be, the net gain of acres with improved adaptive capacity would be greater under Alternative C than Alternative B.

#### *3.18.4.2 Cumulative Effects*

Cumulative effects would be similar to Alternative B except that more acres would be improved. At the landscape scale, Alternative C would develop a greater range of biodiversity and heterogeneous mosaics within and across the landscape than Alternative B due to the juxtaposition of Strata K and Strata L with other strata that would be treated. In the event of a disturbance, this arrangement of treated areas, which contain more early seral ponderosa pine and structural conditions similar to the historical fire regime, would have a higher adaptive capacity in context to untreated areas. Treated areas would be more resilient and resistant to disturbance, which would provide some adaptive capacity to the landscape as a whole. This capacity would potentially increase the ability of the landscape to recover faster from disturbance under Alternative C than Alternatives B and A.

### 3.18.5 Environmental Consequences of Alternative D

#### *3.18.5.1 Direct and Indirect Effects*

The effects of Alternative D would be the same as Alternative C for the plantations. Although Alternative D would treat the same strata as Alternative C, the species composition of ponderosa pine would be lower in some strata and more of the canopy cover and basal area would be in the overstory than the understory (section 3.2.6.6.1). This composition would result in a structural condition in some strata that would not be consistent with the historical fire regime but, in some cases, could increase the resistance of some of the strata to wildfire by reducing the continuity of ladder fuels slightly more than Alternatives B and C (section 3.3.2.2, Table 3-32). Because Alternative D would retain all large trees of all species in the overstory and would create fewer and smaller openings for ponderosa pine, biodiversity and heterogeneity of treated patches would be lower than under Alternatives B and C. Therefore, Alternative D could result in less ponderosa pine regeneration over time. The species composition of the understory would continue to be dominated by more shade-tolerant Douglas-fir and grand fir, potentially reducing future adaptive capacity within the treated strata.

#### *3.18.5.2 Cumulative Effects*

Cumulative effects would be similar to Alternative C for the treated strata. At the landscape scale, Alternative D would develop a greater range of conditions within and across the landscape than Alternative A. However, the heterogeneity of landscape mosaics and biodiversity at the landscape scale would be less than Alternatives B and C, as the overstory of treated strata would blend in with untreated strata. Treated strata could be more resistant to wildfire, yet response to fire may be different than what would occur under the historical fire regimes (section 3.3.7.1). Ponderosa pine would not be as dominant in Alternative D as under Alternatives B and C;

therefore, re-establishing ponderosa pine into disturbed areas would be similar to Alternative A, and lower than Alternatives B and C in the short-term. Although in some strata, the proportion of ponderosa pine would increase as understory ages, the lower levels of ponderosa pine and higher levels of grand fir species composition could reduce the development of early seral communities. At the landscape-scale, Alternative D would not produce as much adaptive capacity as Alternatives B and C, and would, therefore, not be as resilient and resistant to disturbance.

## 3.19 RESOURCE COMMITMENTS

This section contains disclosures that are required by Federal law, regulation, or policy and generally apply to all of the preceding resource area effects sections in this chapter.

### 3.19.1 Unavoidable Adverse Effects

The Forest Plan, as amended in 2010, established management emphasis and direction for implementing activities on NFS lands during the planning period, such as those activities proposed under Alternatives B, C, or D of this SDEIS (Forest Service 2010a). By applying the Forest-wide, MPC, and Management Area standards and guidelines found in Chapter 3 of the Forest Plan, adverse effects from these activities would be limited in extent and duration. The design features found in Chapter 2, section 2.4.5, provide additional mitigation to minimize or avoid adverse effects. However, some unavoidable effects would result from implementing activities as proposed under Alternatives B, C, or D. These potential effects are described by resource area earlier in this chapter.

### 3.19.2 Relationship of Short-Term Uses and Long-Term Productivity

Long-term productivity refers to the capability of the land to provide resource outputs for a period of time beyond the planning period. One of the purposes of a Forest Plan, as established by federal regulation (36 CFR 219.1(b)), is to provide direction needed to manage NFS lands to sustain the multiple use of its renewable resources in perpetuity while maintaining the long-term health and productivity of the land. Management requirements are contained in Forest-wide and Management Area standards and guidelines and would be met under Alternatives B, C, and D (refer to Forest Plan consistency determination, section 1.8.6.1 and 1.8.6.2). Meeting these requirements ensure that the long-term productivity of the land is not impaired by short-term uses.

A key Forest Plan standard that directly pertains to the maintenance of long-term soil productivity pertains to requirements for total soil resource commitment (TSRC). TSRC occurs when a management activity converts a productive site to an essentially nonproductive site for a period of more than 50 years. Examples include authorized or unauthorized roads, inadequately restored haul roads, permanently designated skid roads and log landing areas, parking lots, mining dumps or excavations, dedicated recreation trails, skid trails, developed campgrounds, other dedicated facilities, and some long-term stock driveways. Forest Plan standards require the activity area assessed that encompasses these types of activities to stay below 5 percent TSRC for the total acreage. Refer to the “Glossary” for definitions of activity area.

Alternative A would have no temporary, short-, or long-term, direct, indirect, or cumulative effects on TSRC. Assuming Travel Management restrictions prohibiting unauthorized motor vehicle use off designated routes would be enforced, no new travel routes, or extensions of existing routes that would increase TSRC are expected. It is likely that livestock would continue

to trail along existing, unauthorized routes within the Project area so these features would not fully recover through natural amelioration. Alternative A would maintain the existing TSRC of 2.8 percent.

Under Alternative B (Proposed Action), there would be an interim increase from 2.8 percent to 3.7 percent in TSRC from the construction and use of log landings, skid trails, and an estimated 1.0 mile of temporary road to facilitate commercial timber harvest (Table 3-58). These temporary, direct effects are addressed through project Design Features TH-7 and SW-10 (section 2.4.2.1), which require these disturbances be reclaimed when they are no longer needed for timber harvest and essentially alleviate the increased TSRC. Constructing 2.7 miles of new specified road and realigning 4.4 miles of NFS roads 696 and 696D would slightly increase TSRC over the existing conditions by about 0.2 percent within the activity area; however, this increase would be reduced by decommissioning roughly 19.9 miles of existing system and non-system routes. As a result, at the conclusion of implementing all activities under Alternative B, TSRC would be estimated to be 2.7 percent and comply with Forest Plan Standard SWST03 (Forest Service 2010a).

Under Alternative C, there would be an interim increase from 2.8 percent to 3.8 percent in TSRC from the construction and use of log landings, skid trails, and an estimated 4.2 miles of temporary road to facilitate commercial timber harvest (Table 3-58). These temporary, direct effects are addressed through project Design Features TH-7 and SW-10 (section 2.4.2.1), which require these disturbances be reclaimed when they are no longer needed for timber harvest and essentially alleviate the increased TSRC. In addition, constructing 1.1 miles of new specified road and realigning 0.4 miles of NFS roads 696 and 696D would increase TSRC over the existing conditions by slightly more than 0.1 percent; however, there would be a net decrease in TSRC after decommissioning roughly 23.5 miles of existing system and non-system routes. As a result, at the conclusion of implementing all activities under Alternative C, the TSRC would be estimated to be 2.6 percent and comply with Forest Plan Standard SWST03.

Under Alternative D, there would be an interim increase from 2.8 to 3.8 percent in TSRC from the construction and use of log landings, skid trails, and an estimated 4.2 miles of temporary road to facilitate commercial timber harvest (Table 3-58). These temporary, direct effects are addressed through project Design Features TH-7 and SW-10 (section 2.4.2.1), which require these disturbances be reclaimed when they are no longer needed for timber harvest and essentially alleviate the increased TSRC. In addition, realigning 4.4 miles of NFS roads 696 and 696D would slightly increase TSRC over the existing conditions by 0.1 percent; however, there would be a net decrease in TSRC after decommissioning roughly 23.5 miles of existing system and non-system routes. As a result, at the conclusion of implementing all activities under Alternative D, TSRC would be estimated to be 2.6 percent and comply with Forest Plan Standard SWST03.

### 3.19.3 Irreversible and Irretrievable Commitment of Resources

Irreversible and irretrievable commitments of resources are defined in the Environmental Policy and Procedures, Forest Service Handbook 1909.15.

Irreversible commitments of resources mean the consumption or destruction of nonrenewable resources, such as fossil fuels, minerals, or cultural resources, or the degradation of resources,

such as soil productivity, that can be renewed only over long periods of time. Irreversible commitments represent the loss of future options.

Irretrievable commitments of resources result in foregone opportunities; they represent tradeoffs in the use and management of Forest resources. Irretrievable commitments of resources include expenditure of funds, loss of production, or restrictions on resource use. For example, some or all wildlife habitat in a specific area may be irretrievably lost while an area serves as a concentrated winter sports site. The habitat function that is lost is irretrievable for that period of time, but the action is not irreversible. If the use changes, the area may once again provide wildlife habitat.

Alternative A proposes no new activities; therefore, no irreversible or irretrievable commitments would result. Alternatives B, C, and D result in an irreversible commitment of fossil fuel energy resources that would be used by equipment needed to implement proposed vegetation and road management activities.

All alternatives would also result in irretrievable commitments as a result of expenditure of funds to plan, and in the case of Alternatives B, C, and D, implement these proposed activities (section 3.14, “Financial Assessment”). Commitments would also be made in the short and long term under Alternatives B, C, and D as a result of effects on soil resources. Management activities can impact soils in a variety of ways, including detrimental soil disturbance (DD) and TSRC. Refer to section 3.8 of this SDEIS for detailed effects disclosures for DD and TSRC.

DD occurs when activities detrimentally alter the natural soil characteristics, resulting in the immediate and/or prolonged degradation of onsite resources or vegetation productivity. This impact is associated with unacceptable levels of soil displacement, soil compaction, soil puddling, or severely burned soils. As discussed under the previous section, TSRC occurs when a management activity converts a productive site to an essentially nonproductive site for a period of more than 50 years. Examples include authorized or unauthorized roads, inadequately restored haul roads, permanently designated skid roads and log landing areas, parking lots, mining dumps or excavations, dedicated recreation trails, skid trails, developed campgrounds, other dedicated facilities, and some long-term stock driveways.

Under Alternative A, there would be no increase in DD within any activity area, and this alternative would be consistent with Forest Plan Standard SWST02. DD for activity areas would continue to range from 0 to 4 percent (Appendix C).

Implementing activities described under Alternative B would increase DD in each of the activity areas in the temporary and short term (0–15 years) (Appendix C, Table C-1). DD is estimated to exceed 10 percent in 2 of the 120 activity areas (tractor units 22 and 104) immediately following timber harvest activities (Appendix C). With the time lag between sequentially implemented treatments where prescribed fire occurs 1 to 3 years after timber harvest, some of the increased DD would recover to disturbed conditions as skid trails are actively reclaimed. Following implementation of the prescribed fire activities, none of the 120 activities areas would exceed 10 percent DD (Appendix C). Within 5 years of project implementation, DD in all 120 activity units would range from 1.7 to 7.1 percent (Appendix C). Additional recovery of DD in each activity unit is anticipated between 5 and 10 years following project implementation (Appendix C). The estimated increases in DD would be less than 15 percent for all activity areas, and implementing the treatments would comply with Forest Plan Standard SWST02.

Implementing the activities described under Alternative C would increase DD in each of the activity areas in the temporary and short term (0–15 years) (Appendix C, Table C-1). DD is estimated to exceed 10 percent in 1 of the 120 activity areas (tractor unit 104) immediately following timber harvest activities (Appendix C). With the time lag between sequentially implemented treatments where prescribed fire occurs 1 to 3 years after timber harvest, some of the increased DD would recover to disturbed conditions as skid trails are actively reclaimed. Following implementation of the prescribed fire activities, none of the 120 activities areas would exceed 10 percent DD (Appendix C). Within 5 years of project implementation, DD in all 120 activity units would range from 1.3 to 8.1 percent (Appendix C). Additional recovery of DD in each activity unit is anticipated between 5 and 10 years following project implementation (Appendix C). The estimated increases in DD would be less than 15 percent for all activity areas, and implementing the treatments would comply with Forest Plan Standard SWST02.

Implementing the activities described in Alternative D would increase DD in each of the activity areas in the temporary and short term (0–15 years) (Appendix C, Table C-1). DD is estimated to exceed 10 percent in 1 of the 120 activity areas (tractor unit 104) immediately following timber harvest activities (Appendix C). With the time lag between sequentially implemented treatments where prescribed fire occurs 1 to 3 years after timber harvest, some of the increased DD would recover to disturbed conditions as skid trails are actively reclaimed. Following implementation of the prescribed fire activities, none of the 120 activities areas would exceed 10 percent DD (Appendix C). Within 5 years of project implementation, DD in all 120 activity units would range from 1.3 to 8.1 percent (Appendix C). Additional recovery of DD in each activity unit is anticipated between 5 and 10 years following project implementation (Appendix C). The estimated increases in DD would be less than 15 percent for all activity areas, and implementing the treatments would comply with Forest Plan Standard SWST02.

Refer to section 3.19.2 for discussions concerning TSRC by alternative.

### 3.19.4 Energy Requirements and Conservation Potential

Energy is consumed in the administration of natural resources from the National Forests. The main activities proposed under Alternatives B, C, and D that would consume energy are restoration activities, including mechanical vegetation treatments and prescribed fire; road construction and reconstruction; and administrative activities of the Forest Service and other regulatory agencies.

Alternative A does not propose any new activities that would result in increases in energy consumption over that which currently occurs.

Several opportunities exist under all action alternatives to provide for energy conservation or conversion from less plentiful to more plentiful fuels. For example, agency personnel involved with this project are committed to carpooling and combining trips to save fuel and wear and tear on the Forest Service fleet of vehicles. Using teleconferencing and other electronic communication options, rather than scheduling meetings at one location, would save energy spent on travel. The agency would also work with contractors involved with the project to suggest opportunities to use more energy-efficient equipment for activities such as vegetation management, road construction and reconstruction, or road maintenance.

### 3.19.5 Consultation with Other Federal or State Agency or Local Government

Contact, review, and public involvement with other federal and state agencies indicate no major conflicts between the activities proposed under Alternatives B, C, or D and the goals and objectives of other federal, State, or local governmental entities. Refer to section 1.8 for a more detailed discussion concerning "Regulatory Requirements and Required Consultation."

Chapter 2, section 2.4.8, also identifies other federal, State, or local approvals/permits potentially applicable to all action alternatives. Finally, as described in section 1.1 in this SDEIS, the proposed restoration activities under the action alternatives have been designed to further the achievement of goals and objectives in the Forest Plan, as amended in 2010. The Wildlife Conservation Strategy that was integrated into the Forest Plan in 2010 has been designed to complement the Idaho Department of Fish and Game's *Idaho Comprehensive Wildlife Conservation Strategy* (IDFG 2005).

### 3.19.6 Consultation with Tribal Governments

Executive Order 13175 (65 FR 67249-67252, 2000) requires regular and meaningful consultation between federal and tribal government officials on federal policies that have tribal implications.

As described in Chapter 1 (section 1.10) and Chapter 4 of this SDEIS, regular notification and, as requested, consultation with potentially affected tribes has occurred throughout the planning process for this project. The tribal notification and subsequent consultation processes completed have not identified any adverse effects to tribal interests or rights associated with this project.

### 3.19.7 Best Available Science

The conclusions summarized in this SDEIS are based on a review of the Project Record, which considers relevant scientific information and responsible opposing views, where raised by internal or external sources, and the acknowledgement of incomplete or unavailable information, scientific uncertainty, and/or risk, where pertinent to the decision being made.

# Chapter 4—Consultation and Coordination

## 4.1 Summary of Scoping and Public Involvement to Date

This project has been listed in the Forest Schedule of Proposed Actions (SOPA) since October 2006. A scoping package describing the Proposed Action was mailed to interested individuals, agencies, and/or groups on January 17, 2007. A total of 9 interested parties responded. Respondents expressed a variety of concerns and opinions regarding the Proposed Action. The Project Record contains all written comments received during scoping and discloses how the IDT addressed those concerns. The project was scoped a second time in April 2010 since the project was postponed, partly because of a particularly challenging and extensive 2007 wildfire season followed by the salvage project in 2008. A total of 7 interested parties responded to the April 27, 2010, scoping effort. Respondents to the second scoping effort also expressed a variety of concerns and opinions regarding the Proposed Action. The Project Record contains all written comments received during the 2007 and 2010 scoping periods and discloses how the IDT addressed those concerns.

A Notice of Intent to prepare an EIS was published in the Federal Register on January 25, 2007. A second Notice of Intent, which invited comments and described the current Proposed Action, was published in the Federal Register on May 7, 2010.

A Notice of Availability of the DEIS for this project was published in the Federal Register on December 30, 2011 (FR Vol. 76, No. 251; NOA for EIS No. 20110438) and a legal notice published on December 30, 2011, in *The Idaho Statesman* announcing release of the DEIS. A summary of the DEIS outlining the alternatives and associated environmental analysis was mailed to 55 individuals, agencies, and/or groups on December 21, 2011. The entire DEIS was posted on the Forest's website, with paper and electronic copies available upon request.

Response letters, phone calls, in-person meetings, and/or e-mails were received from 11 interested parties following release of the DEIS on December 30, 2011, to the date of publication of this SDEIS. Additionally, the proposal was presented to the Valley County Commissioners at the June 14, 2010, meeting and Boise County Commissioners at the May 17, 2010, meetings. Several concerns were raised, as well as 4 issues that drove the development of two new action alternatives, Alternative C and D. Chapter 1 includes a summary of the issues identified (section 1.11.2) and other concerns raised (section 1.11.3). Comments received on the December 30, 2011, DEIS and those received in response to this SDEIS will be fully addressed and responded to in the FEIS.

An NOI to prepare this SDEIS was published on June 18, 2012. As identified in the "Introduction" in Chapter 1, the need for an SDEIS is to allow the Forest Service to clearly identify all permits, licenses, and other entitlements that were not otherwise identified in the DEIS released December 30, 2011 (FR Vol. 76, No. 251; NOA for EIS No. 20110438) that may be needed to implement the proposed activities. Specifically, an SDEIS is needed to identify that it is uncertain whether an NPDES permit may be required and comments on the SDEIS will be requested from the appropriate regulatory agencies and public to help assess whether such a permit is required (refer to section 1.9.2). Disclosure of this uncertainty in a DEIS is required at 40 CFR 1502.25(b).

Also, as identified in the June 18, 2012, Federal Register NOI to prepare an SDEIS, the Proposed Action identified in the DEIS released December 30, 2011, has been modified concerning road systems, logging systems, and watershed restoration opportunities as a result of updated field information. These updates resulted in measurable changes in the effects disclosures from those displayed in the DEIS. Finally, Alternatives C and D were developed in response to comments received on the DEIS and their respective effects disclosures have not been reviewed by the public. Thus, the Responsible Official has determined that the purpose of the act (NEPA) would be furthered by issuing an SDEIS for additional review and comment prior to the FEIS.

## 4.2 TRIBAL CONSULTATION

The federal government's trust responsibility to federal recognized tribes compels agencies to conduct their activities consistent with rights legally accruing to a tribe or tribes by virtue of inherent rights and sovereign authority, unextinguished aboriginal title, treaty, statute, judicial decisions, executive order or agreement, of which give rise to legally enforceable remedies. In carrying out their trust responsibilities, the Forest Service must assess proposed actions to determine potential impacts on treaty rights, treaty resources, or other unextinguished tribal rights and interests. Where potential impacts exist, the agencies must consult with affected tribes and explicitly address those impacts in planning documents and final decisions. Consultation with the tribes is essential in carrying out that trust responsibility.

The intergovernmental consultation process serves as the primary means for the federal agencies to carry out their trust obligations. Consultation is not a single event, but instead is a process leading to a decision; for example, the Record of Decision for this EIS. Consultation means different things to different tribes. It can be either a formal process of negotiation, cooperation, and policy-level decision-making between tribal governments and the federal government, or a more informal process. Tribal rights and interests are discussed and considered or incorporated into the decision. Consultation can be viewed as an ongoing relationship between an agency(ies) and a tribe(s), characterized by consensus-seeking approaches to reach mutual understanding and resolve issues. It may concern issues and actions that could affect the government's trust responsibilities, or other tribal interests.

Consultation minimally serves five purposes:

- to identify and clarify issues,
- to provide for an exchange of existing information and identify where information is needed,
- to identify and serve as a process for conflict resolution,
- to provide an opportunity to discuss and explain the decision, and
- to fulfill the core of the federal trust obligation.

Legal requirements for federal agencies to consult with sovereign Indian tribes have their basis in federal law, court interpretations, and executive orders.

Three federally recognized tribes have expressed tribal interests and rights on NFS lands that fall within the Forest: Nez Perce Tribe, Shoshone-Bannock Tribes, and Shoshone Paiute Tribes. Shoshone-Paiute tribal representatives were presented the project proposal at three Wings and Roots meetings occurring on March 9, 2006; September 14, 2006; and May 13, 2010. Tribal Chairpersons and representatives of both the Nez Perce and Shoshone-Bannock tribes were

mailed project proposals on January 17, 2007, and April 27, 2010, and provided notification of the DEIS on December 30, 2011. The tribal notification and/or consultation processes described above did not result in the identification of any potential impacts to treaty rights, treaty resources, or other unextinguished tribal rights and interests. Some tribal representatives identified beneficial effects to resources as a result of proposed restoration of vegetation, wildlife habitat, soil, and water resources consistent with those identified during the 2010 Forest Plan amendment process (Forest Service 2010a, section 3.6, Tribal Interest and Rights)

## 4.3 AGENCIES, ORGANIZATIONS, AND INDIVIDUALS CONTACTED AND/OR CONSULTED DURING THE PLANNING PROCESS

**Agencies**

Boise County Commissioners

Bureau of Land Management

Bureau of Reclamation

City of Cascade

City of Crouch

City of Idaho City

Idaho Department of Agriculture

Idaho Department of Environmental Quality

Idaho Department of Fish and Game

Idaho Department of Lands

Idaho Department of Parks and Recreation

Idaho Department of Water Resources

U.S. Environmental Protection Agency

U.S. Fish and Wildlife Service

Valley County Commissioners

**Organizations**

Advocates for the West

Alliance for the Wild Rockies

Blue Ribbon Coalition

C. Carlock Logging, Inc.

Center for Biological Diversity

Columbia Helicopters, Inc.

Deadwood Outfitters

Emmett Chapter of the Idaho ATV Association

Evergreen Helicopters

Fly Fishers of Idaho

Golden Eagle Audubon

Greater Garden Valley Area Chamber

Idaho ATV Association

Idaho Cattle Association

Idaho Conservation League

Idaho Outfitters and Guides Association

Idaho Rivers United

Idaho Sporting Congress

Idaho State Bowhunters

Idaho State Snowmobile Association

Idaho Timber Corporation

Idaho Whitewater Association

Idaho Whitewater Unlimited

Idaho Wildlife Council

Idaho Wildlife Federation

Idaho Woolgrowers Association

Intermountain Forest Association

National Rifle Association of America

National Wild Turkey Federation

Packer Victory Family Heritage

Rocky Mountain Elk Foundation

Sawtooth Wilderness Outfitters

Sierra Club
Silver Creek Property Owners Association
The Nature Conservancy
The Lands Council
The Wilderness Society
Treasure Valley Backcountry Horsemen
Treasure Valley Trail Machine Association
Trout Unlimited
Western Lands Project
Western Watersheds Project
Wild West Institute
Winter Wildlands Alliance

**Individuals**

Barry Eben
Bart Eben
Bobby Kupp
Charles W. Schell
Cliff Carlson
Clint Evans
C.M. Couper
Congressman Mike Simpson
Congressman Walt Minnick
Darwin Porter
Dick Artley
Donald Parks
Don Weilmunster
Dr. and Mrs. Harmon Holverson
Dr. Rodney Herr
Francis White
Frank Shirts
Gary and Sandra Hall
Gene and Carolyn Hibbard
Gerald G. Labrum
Governor L. Butch Otter
Houtz Farms
Jere Callaway
Jeffery Clark
Ken Kingslien
Mark Stubblefield
Nancy Kahler
Patricia Gardner
Pete Edmunds
Steve Dobson
Steve Ethington
Susan Buxton
Thomas Blackburn (Trust)
Thomas Pope
Vern Davis
Vivian O'Loughlin
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# Glossary

**activity area**—The smallest logical land area where the effect that is being analyzed or monitored is expected to occur. The area may vary in size depending on the effect that is being analyzed or monitored, because some effects are quite localized and some occur across landscapes. Activity areas are to be specifically described when used in planning and project implementation documents.

- **Snags**—The activity area for snags is the specific site affected by actions listed below, whether effects are positive or negative. Actions affecting activity areas that need to be assessed include timber harvest, site-preparation reforestation, timber stand improvement, and prescribed fire. The activity area reflects the scale at which to plan projects that provide for maintaining or improving trends in snag amounts.
- **coarse woody debris**—The activity area is the same as for snags above. However, this may also parallel the activity area for detrimental disturbance. See below.
- **detrimental disturbance**—The activity area is the specific area where proposed actions may have detrimental soil impacts, such as harvest units within a timber sale area, an individual pasture unit within a grazing allotment, or a burn block within a prescribed burn Project area. Existing designated uses such as classified roads and trails, developed campgrounds, and buildings, are not considered detrimental disturbance within an activity area. See the definition for detrimental disturbance for more information.
- **total soil resource commitment**—Effects are generally measured across an all-inclusive activity area, like a timber sale area, a prescribed burn area, or a grazing allotment, where effects to soil commitment could occur or are occurring. Effects include both proposed actions and existing uses, such as roads (classified and non-classified), dedicated trails and landings, administrative sites, parking lots, and mine excavations. See the definition for total soil resource commitment for more information.

**adverse effect**—For Forest Plan revision, “adverse effect” is used in the context of the Endangered Species Act relative to effects on TEPC species. Definitions are from Final Endangered Species Consultation Handbook; NMFS/USFWS, 1998. They include both “likely to adversely affect” and “not likely to adversely affect”. Both of these definitions are needed to clearly understand the intent of the phrase “adverse effect” when applied to Forest-wide and Management Area direction involving TEPC species. The definition of “take” is also included below to help clarify intent.

- **Likely to adversely affect**—the appropriate finding in a biological assessment (or conclusion during informal consultation) if any adverse effect to listed species may occur as a direct or indirect result of the proposed action or its interrelated or interdependent actions, and the effect is not discountable, insignificant, or beneficial (see definition of “not likely to adversely affect”). In the event the overall effect of the proposed action is beneficial to the listed species, but is also likely to cause some adverse effects, then the proposed action is “likely to adversely affect” the listed species. If incidental take is anticipated to occur as a result of the proposed action, an “is likely to adversely affect” determination should be made. A “likely to adversely affect” determination requires the initiation of formal Section 7 consultation.

- **Not likely to adversely affect**—the appropriate conclusion when effects on listed species are expected to be discountable, insignificant, or completely beneficial. Beneficial effects are contemporaneous positive effects without any adverse effects to the species. Insignificant effects relate to the size of the impact and should never reach the scale where take occurs. Discountable effects are those that are extremely unlikely to occur. Based on best judgment, a person would not: (1) be able to meaningfully detect, measure, or evaluate insignificant effects; or (2) expect discountable effects to occur.
- **Take**—to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct [ESA §3(19)]. Harm is further defined by FWS to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering. Harass is defined by FWS as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering (50 CFR § 17.3).

**air quality**—The composition of air with respect to quantities of pollution therein; used most frequently in connection with "standards of maximum acceptable pollutant concentrations.

**allotment (grazing)**—Area designated for the use of a certain number and kind of livestock for a prescribed period of time.

**Alternative**—In an Environmental Impact Statement (EIS), one of a number of possible options for responding to the purpose and need for action.

**aquatic ecosystem**—40 CFR 230.3 - Waters of the United States that serve as habitat for interrelated and interacting communities and populations of plants and animals. FSM 2526.05 - The stream channel, lake or estuary bed, water, biotic communities and the habitat features that occur therein.

**background (bg)**—The visual distance zone relating to the distant part of a landscape, generally located from 3 to 5 miles to infinity from the viewer.

**beneficial use**—Any of the various uses that may be made of the water of an area, including, but not limited to: (1) agricultural water supply; (2) industrial water supply; (3) domestic water supply; (4) cold water biota; (5) primary contact recreational use; (6) secondary contact recreational use; (7) salmonid spawning, overwintering, emergence, and rearing; and (8) warm water biota.

**Best Management Practices (BMPs)**—Practices determined by the State of Idaho Division of Environmental Quality to be the most effective and practical means of preventing or reducing the amount of pollution generated by non-point sources.

**big game**—Large wild animals that are hunted for sport and food. This hunting is controlled by state wildlife agencies. Big game animals found on this Forest include deer, elk, and moose.

**biological diversity (or biodiversity)**—The variety and abundance of life and its processes. Biological diversity includes all living organisms, the genetic differences among them, and the communities and ecosystems in which they occur. Biological diversity also refers to the compositions, structures, and functions of species and habitats and their interactions.

**board foot**—A measurement of wood equivalent to a board 1 foot square and 1 inch thick. Usually expressed in terms of thousand board feet (MBF) or million board feet (MMBF).

**broad-scale**—A regional land area that may include all or parts of several states; typically millions of acres or greater. An example of a broad-scale assessment is the Interior Columbia Basin (ICB) Ecosystem Management Project.

**browse**—Twigs, leaves, and shoots of trees and shrubs that animals eat.

**candidate species**—Plant and animal species being considered for listing as endangered or threatened, in the opinion of the U.S. Fish and Wildlife Service (FWS) or the National Marine Fisheries Service (NMFS). Category 1 candidate species are groups for which the FWS or NMFS has sufficient information to support listing proposals; category 2 candidate species are those for which available information indicates a possible problem, but that need further study to determine the need for listing.

**canopy cover**—Total non-overlapping cover of all trees in a vegetative unit excluding the seedling size class. Trees in the seedling size class are used to estimate canopy cover only when they represent the only structural layer on the site.

**classified road**—Roads wholly or partially within or adjacent to national Forest System lands that are determined to be needed for long-term motor vehicle access. Classified roads can include state roads, county roads, privately owned roads, National Forest System roads, and other roads authorized by the Forest Service.

**Clean Air Act**—An Act of Congress established to protect and enhance the quality of the Nation's air through air pollution prevention and control.

**Clean Water Act**—An Act of Congress which establishes policy to restore and maintain the chemical, physical, and biological integrity of the Nation's waters.

**coarse filter (conservation) approach**—Used to assess the conservation value of ecosystems and landscapes. The intent of this approach is to maintain and where needed restore representative ecosystems and their inherent disturbance processes in order to conserve the majority of species without the necessity of considering them individually.

**coarse woody debris (CWD)**—Pieces of woody material having a diameter of at least 3 inches. Logs are a subset of coarse woody debris.

**Cohesive Strategy (Current) Condition Classes**—The Cohesive Strategy for the National Fire Plan defines three current condition classes as follows:

- **Condition Class 1**—Fire regimes are within an historical range, and the risk of losing key ecosystem components is low. Vegetation attributes (species composition and structure) are intact and functioning within an historical range.
- **Condition Class 2**—Fire regimes have been moderately altered from their historical range. The risk of losing key ecosystem components is moderate. Fire frequencies have

departed from their historical frequencies by one or more return intervals (either increased or decreased). This results in moderate changes to one or more of the following: fire size, intensity and severity, and landscape patterns. Vegetation attributes have been moderately altered from their historical range.

- **Condition Class 3**—Fire regimes have been significantly altered from their historical range. The risk of losing key ecosystem components is high. Fire frequencies have departed from historical frequencies by multiple return intervals. This results in dramatic changes to one or more of the following: fire size, intensity, severity, and landscape patterns. Vegetation attributes have been significantly altered from their historical range.

**composition (species)**—The species that make up a plant or animal community, and their relative abundance.

**connectivity**—The arrangement of habitat that allows organisms and ecological processes to move across the landscape. Patches of similar habitats are either close together or connected by corridors of appropriate vegetation (or live stream channels). Opposite of fragmentation.

Sites in a landscape are "connected" if there are patterns or processes to link them in some way. These links arise either from static patterns (e.g., landforms, soil distributions, contiguous forest cover) or from dynamic processes (e.g., dispersal, fire). A particular landscape may have radically different degrees of connectivity with respect to different processes. Connectivity usually involves corridors and networks and describes how patches are connected in the landscape.

**corridor (landscape)**—Landscape element that connects similar patches of habitat through an area with different characteristics. For example, streamside vegetation may create a corridor of willows and hardwoods between meadows or through a conifer forest.

**cover type**—The current or existing vegetation of an area, described by the dominant vegetation.

**critical habitat**—Endangered Species Act - Designated by the FWS or NMFS, specific areas, within a geographical area occupied by a threatened or endangered species, on which are found physical or biological features essential to conservation of the species. These areas may require special management consideration or protection, and can also include specific areas outside the occupied area that are deemed essential for conservation.

**cultural resources**—Cultural resources include sites, structures, or objects used by prehistoric and historic residents or travelers. They are non-renewable resources that tell of life-styles of prehistoric and historic people. Cultural resources within the Forests are diverse and include properties such as archaeological ruins, pictographs, early tools, burial sites, log cabins, mining structures, guard stations, and fire lookouts.

**cumulative effects**—Impacts on the environment that result from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time.

**denning habitat or sites**—Habitat and locations used by mammals during reproduction and rearing of their young, when the young are highly dependent on adults for survival.

**Desired Future Condition (DFC)—**Also called desired condition, a portrayal of the land, resource, or social and economic conditions that are expected in 50-100 years if management goals and objectives are achieved. A vision of the long-term conditions of the land.

**detrimental soil disturbance**—Detrimental soil disturbance (DD) is the alteration of natural soil characteristics that results in immediate or prolonged loss of soil productivity and soil-hydrologic conditions. At least 85 percent of an activity area should be in a non-detrimentally disturbed condition. Stated another way, no more than 15 percent of an activity area should have detrimentally disturbed soil after the management activity is completed. DD can occur from soil that has been displaced, compacted, puddle, or severely burned. Determination of DD excludes existing or planned classified transportation facilities, dedicated trails, and landings, mining dumps or excavations, parking areas, developed campgrounds, and other dedicated facilities. However, the impacts of these actions are considered total soil resource commitment (TSRC - see definition in this glossary). DD is represented by any or all of the four characteristics described below.

**Detrimental Soil Displacement**—Areas of 1 meter by 1 meter or larger that exhibit detrimentally displaced soil as described below:

- The loss of either 5 cm or half of humus-enriched top soil (A horizon), whichever is less, or
- The exceeding of the soil loss tolerance value for the specific soil type.

**Detrimental Soil Compaction**—Soil compaction is generally evaluated from 5 to 30 centimeters below the mineral soil surface. Specific depths for measurement are dependent upon soil type and management activities. Detrimental soil compaction is increased soil density (weight per unit volume) and strength that hampers root growth, reduces soil aeration, and inhibits water movement. Measurements of potential detrimental soil compaction may be qualitative or quantitative. Refer to the Region 4 Soil Quality Handbook for methods related to measuring/determining soil compaction.

**Detrimental Soil Puddling**—Puddling is generally evaluated at the mineral soil surface. Visual indicators of detrimental puddling include clearly identifiable ruts with berms in mineral soil, or in an Oa horizon of an organic soil. Detrimental puddling may occur in conjunction with detrimental compaction. The guidelines for soil compaction are to be used when this occurs. Detrimentally puddled soils are not always detrimentally compacted. Infiltration and permeability are affected by detrimental soil puddling. Puddling can also alter local groundwater hydrology and wetland function, and provide conduits for runoff.

**Severely Burned Soil**—Severely burned soil applies to prescribed fire and natural fires that are managed for resource benefits. Severely burned soils are identified by ratings of fire severity and the effects to the soil. A severely burned soil is generally soil that is within a High Fire Severity burn as defined by the Forest Service Burned Area Emergency Rehabilitation Program (FSH 2509.13) and Debano et al. (1998). An example of a High Fire Severity rating is provided below. Soil humus losses, structural changes, hydrophobic characteristics, and sterilization are potential effects of severely burned soil.

- **Example of High Fire Severity Rating**—High soil heating, or deep ground char occurs where the duff is completely consumed and the top of the mineral soil is visibly reddish or orange on severely burned sites. Color of the soil below 1 cm is darker or charred from organic material that has heated or burned. The char layer can extend to a depth of 10 cm or more. Logs can be consumed or deeply charred, and deep ground char can occur under slash concentrations or under burned logs. Soil textures in the surface layers are changed and fusion evidenced by clinkers that can be observed locally. All shrub stems are consumed and only the charred remains or large stubs may be visible. Soil temperatures at 1 cm are greater than 250 C. Lethal temperatures for soil organisms occur down to depths of 9 to 16 cm.

  Standards for detrimentally disturbed soils are to be applied to existing or planned activities that are available for multiple uses. These standards do not apply to areas with dedicated uses such as mines, ski areas, campgrounds, and administrative sites.

**developed recreation**—Recreation that requires facilities that in turn result in concentrated use of an area; for example, a campground or ski resort.

**dispersed recreation**—Recreation that does not occur in a developed recreation setting, such as hunting, scenic driving, or backpacking.

**disturbance regime**—Any recurring event that influences succession, such as fire, insects, ice storms, blow down, drought, etc.

**down log**—A portion of a tree that has fallen or been cut and left on the forest floor.

**ecosystem**—A naturally occurring, self-maintained system of living and non-living interacting parts that are organized into biophysical and human dimension components that are linked by similar ecological processes, environmental features, environmental gradients and that form a cohesive and distinguishable unit.

**effective ground cover**—Effective ground cover consists of vegetation, litter, and rock fragments larger than three-fourths inch in diameter. It is expressed as the percentage of material, other than bare ground, covering the land surface. It may include live vegetation, standing dead vegetation, litter, cobble, gravel, stones, and bedrock. The minimum effective ground cover, following the cessation of disturbance in an activity area, should be sufficient to prevent detrimental erosion. Minimum amounts of ground cover necessary to protect the soil from erosion are a function of soil properties, slope gradient and length, and erosivity (precipitation factor), and must be determined locally. Rock fragments, litter, and canopy might be treated independently, depending on the model used to estimate erosion hazard ratings.

**endangered species**—Designated by the FWS or NMFS, an animal or plant species that has been given Federal protection status because it is in danger of extinction throughout all or a significant portion of its natural range.

**Endangered Species Act (ESA)—**An act passed by Congress in 1973 intended to protect species and subspecies of plants and animals that are of "aesthetic, ecological, educational, historical, recreational, and scientific value". It may also protect the listed species' critical habitat, the geographic area occupied by or essential to the species. The FWS (USFWS) and NOAA Fisheries share authority to list endangered species, determine critical habitat, and develop species' recovery plans.

**fg (foreground)**—The visual distance zone relating to the detailed landscape found within 0 to 0.25 to 0.5 mile from the viewer.

**family—**A collection of focal species that share similarities in source habitats, with the similarities arranged along major vegetative themes.

**fine filter (conservation) approach**—Focuses on individual species that are assumed to be inadequately protected under the coarse-filter or meso-filter conservation approach. Typcially this includes threatened or endangered species under the Endangered Species Act (ESA) or those considered Regionally sensitive by the Intermountain Regional Forester.

**fine scale**—Used to define a landscape area varying in size from a 6th-field HU to a combination of 5th-field HUs, approximately 10,000 to 100,000 acres.

**fire-adapted ecosystem**—An ecosystem with the ability to survive and regenerate in a fire-prone environment.

**fire regimes**—The characteristics of fire in a given ecosystem, including factors such as frequency, intensity, severity, and patch size. The terms used for the different fire regimes are: Nonlethal, Mixed1, Mixed2, and Lethal. Nonlethal fires are generally of lowest intensity and severity with the smallest patches of mortality, while lethal fires are generally of highest intensity and severity with the largest patches of mortality. The others fall in between.

**fire intensity**—The effects of fire on the above-ground vegetation generally described in terms of mortality.

**fire severity**—Fire effects at and below the ground surface. Describes the impacts to organic material on the ground surface, changes to soils, and mortality of below-ground vegetative buds, roots, rhizomes, and other organisms.

**focal species—**Species that represent the varying characteristics of a landscape's attributes that must be represented in the landscape (Lambeck 1997).

**forage**—Plant material (usually grasses, forbs, and brush) that is available for animal consumption.

**forbs**—Broadleaf ground vegetation with little or no woody material.

**forest stand or stand**—A contiguous group of trees sufficiently uniform in age class distribution, composition and structure, and growing on a site of sufficiently uniform quality, to be a distinguishable unit, such as mixed, pure, even-aged, and uneven-aged stands. A stand is the functional unit of silviculture reporting and recordkeeping. Stand may be analogous to Activity Area. In the Intermountain Region, contiguous groups of trees smaller than 5 acres are not recorded or tracked. (Definitions, FSH 2470, 08-13-2004.)

**fragmentation**—The splitting or isolation of habitat into smaller patches because of human actions. Habitat can be fragmented by management activities such as timber harvest and road construction, and changes such as agricultural development, major road systems, and reservoir impoundments.

**Geographic Information System (GIS)**—A GIS integrates hardware, software, and data for capturing, managing, analyzing, and displaying all forms of geographically referenced information.

**habitat**—A place that provides seasonal or year-round food, water, shelter, and other environmental conditions for an organism, community, or population of plants or animals.

**Historical Range of Variability (HRV)**—The natural fluctuation of healthy ecosystem components over time. In this document, HRV refers to the range of conditions and processes that likely occurred prior to settlement of the area by people of European descent (around the mid 1800s), and that would have varied within certain limits over time.

**Hydrologic Unit Code**—A hierarchal coding system developed by the U.S. Geological Service to map geographic boundaries of watersheds of various sizes.

**intermittent stream**—A stream or portion of a stream that flows only in direct response to precipitation or seasonal run-off, and that receives little or no water from springs or other permanent sources. Unlike ephemeral streams, an intermittent has well-defined channel and banks, and it may seasonally be below the water table.

**Inventoried Roadless Area (IRA)**—An area that:

- is larger than 5,000 acres or, if smaller, contiguous to a designated wilderness or primitive area;
- contains no improved roads maintained for travel by standard passenger-type vehicles;
- is characterized by a substantially undeveloped character; and
- has been inventoried by the Forest Service for possible inclusion in the Wilderness Preservation System.

These areas include those identified in a set of IRA maps—contained in the Forest Service Roadless Area Conservation Final EIS, Volume 2 (November 2000), and held at the National headquarters of the Forest Service—or any update, correction, or revision of those maps. Refer to Table C-5 in Appendix C to the Forest Plan Revision Final EIS for a listing of IRAs, their location, and acreage.

**Key Ecological Functions (KEF)**— The set of ecological roles performed by a species in its ecosystem (Marcot and Vander Heyden 2004). These ecological roles are the main ways organisms use, influence, and alter their biotic and abiotic environments.

**Key Environmental Correlates (KEC)**—Biotic or abiotic habitat elements that species use on the landscape to survive and reproduce.

**ladder fires**—Consume material between low-level vegetation and tree canopies, such as small trees, downed logs, and vines.

**ladder fuels (or a fuel ladder)**—A firefighting term for live or dead vegetation that allows a fire to climb up from the forest floor into the tree canopy.

**landscape**—Heterogenous land area composed of a cluster of interacting ecosystems that are repeated in similar form throughout. When defined for landscape scale assessment, the spatial extent should be large enough to allow natural disturbance processes to operate.

**landslide prone area**—An area with a tendency for rapid soil mass movements typified by shallow, non-cohesive soils on slopes where shallow translational planar landsliding phenomena is controlled by shallow groundwater flow convergence. The initiation is often associated with extremely wet periods, such as rain-on-snow events. It does not include slow soil mass movements that include deep earth-flows and rotational slumps, nor snow avalanche or rock fall areas. Translational slides have been documented as the dominant form of landslides for the majority of the Forest.

**landtype**—A portion of the landscape resulting from geomorphic and climatic processes with defined characteristics having predictable soil, hydrologic, engineering, productivity, and other behavior patterns.

**landtype associations**—A grouping of landtypes similar in general surface configuration and origin.

**legacy trees**—Defined as older trees that have survived recent disturbances and are a relic of historical communities. These trees are important in that they exhibit definitive characteristics and contribute to ecosystem function in a different manner than younger trees (Forest Service, 2010a, Glossary, page 438). Legacy trees often develop as open grown or are dominant/co-dominant through stand development and as a consequence, generally have larger crowns than other trees. Other characteristics include deep bark fissures, wide bark plates, altered bark color, flattened or rounded crowns, distinguishing branching characteristics, dead tops, and diverse crown form that generally develop as trees get older and larger. Characteristics for ponderosa pine and western larch are described in the *Legacy Tree Guide for the Boise National Forest* (Forest Service, 2011) and characteristics for Douglas-fir and grand fir are described in Van Pelt 2008.

**long-term effects**—Effects that last 15 years or longer.

**Management Indicator Species (MIS)**—Representative species whose habitat conditions or population changes are used to assess the impacts of management activities on similar species in a particular area. MIS are generally presumed to be sensitive to habitat changes.

**Management Prescription Category (MPC)—**Management prescriptions are defined as, "Management practices and intensity selected and scheduled for application on a specific area to attain multiple use and other goals and objectives" (36 CFR 219.3). MPCs are broad categories of management prescriptions that indicate the general management emphasis prescribed for a given area. They are based on Forest Service definitions developed at the national level, and represent management emphasis themes, ranging from Wilderness (1.0) to Concentrated Development (8.0). The national MPCs have been customized during Forest Plan revision to better fit the needs and issues of the Southwest Idaho Ecogroup Forests.

**middleground (mg)—**The visual distance zone between the foreground and the background in a landscape, located from 0.25—0.5 mile to 3-5 miles from the viewer.

**mitigate**—To avoid, minimize, reduce, eliminate, rectify, or compensate for impacts or degradation that might otherwise result from management actions.

**National Environmental Policy Act (NEPA)—**The National Environmental Policy Act of 1969 requires environmental analysis and public disclosure of Federal actions.

**National Historic Preservation Act (NHPA)—**A Federal Act, passed in 1966, which established a program for the preservation of additional historic properties throughout the nation and for other purposes, including the establishment of the National Register of Historic Places, the National Historic Landmarks designation, regulations for supervision of antiquities, designation of the State Historic Preservation Offices (SHPO), guidelines for federal agency responsibilities, technical advice, and the establishment of the Advisory Council on Historic Preservation.

**noxious weed—**A state-designated plant species that causes negative ecological and economic impacts to both agricultural and other lands within the state.

**nutrient cycling**—Circulation or exchange of elements such as nitrogen and carbon between non-living and living portions of the environment. Includes all mineral and nutrient cycles involving mammals and vegetation.

**Off Highway Vehicle (OHV)—**Any motorized vehicle designed for or capable of cross-country travel on or immediately over land, water, snow, ice, marsh, swampland, or other natural terrain. These include common vehicles such as motorcycles, ATVs, snowmobiles, 4-wheel drive vehicles, and trail bikes.

**old forest habitat**—Old forest habitat is a component of the Large Tree Size Class, with the following general characteristics: a variability in tree size that includes old, large trees with signs of decadence, increasing numbers of snags and coarse woody debris, canopy gaps, and understory patchiness. There are two broad types of old forest habitat —single-storied and multi-storied. Single-storied old forest habitat is characterized by a single canopy layer of large or old trees. These stands generally consist of widely spaced, shade-intolerant species, such as ponderosa pine and western larch, that are adapted to a nonlethal, high frequency fire regime. Multi-storied old forest habitat is characterized by two or more canopy layers, with large or old trees in the upper canopy. These stands can include both shade-tolerant and shade-intolerant species, and are typically adapted to a mixed regime of both lethal and nonlethal fires. Because old forest characteristics have been aggregated into two basic categories, it is generally easier to identify, monitor, and compare the characteristics of these old forest types with desired vegetative conditions than it is with "old growth." Refer to Appendix E of the Forest Plan for a more detail discussion concerning old forest habitat.

**old growth—**As a result of commitments made by the Region 4 Regional Forester to implement the 2003 Interior Columbia Basin Ecosystem Management Project (ICBEMP) Memorandum of Understanding and Strategy, the term old forest habitat, instead of old growth, was adopted for the Forest Plan. On the Boise, old forest habitat better represents the desired habitat condition for those species of conservation concern than of old growth. This distinction is important on the Boise National Forest since many old growth definitions exclude forests with fire influences, even where fire is a part of the historical disturbance regime. In other cases, such disturbance is incorporated in the old growth concept. Many definitions of "old growth" are based on climax or near climax communities that have successfully developed in the absence of disturbance. Across the Forest, "old" trees were historically common, but were often in vegetative communities that resulted from disturbance rather than the absence of disturbance. Refer to Appendix E of the Forest Plan for a more detail discussion concerning old forest habitat.

**Partial Retention (PR)—**A category of Visual Quality Objective (VQO) where human activities may be evident to the casual Forest visitor but must remain subordinate to the characteristic landscape.

**patches** —In landscape ecology, patches are spatial units at the landscape scale. Patches are areas surrounded by matrix, and may be connected by corridors. Patch size can affect species habitat, resource availability, competition, and recolonization. Patch shape and orientation also play an important ecological role. Interpatch distance refers to the distance between two or more patches

**pattern, or spatial pattern**—The spatial arrangement of landscape elements (patches, corridors, matrix) that determines the function of a landscape as an ecological system.

**perennial stream—**A stream that typically maintains year-round surface flow, except possibly during extreme periods of drought. A perennial stream receives its water from springs or other permanent sources, and the water table usually stands at a higher level than the floor of the stream.

**Potential Vegetation Group—**A group of habitat types that share similar environmental characteristics, site productivity, and disturbance regimes.

**professional judgment—**Intuitive conclusions and predictions dependent upon training; interpretation of facts, information, observations, and/or personal knowledge.

**prescribed fire**—Any fire ignited by management actions to meet specific objectives.

**proposed action**—A proposal made by the Forest Service or other federal agency to authorize, recommend, or implement an action to meet a specific purpose and need.

**Recreation Opportunity Spectrum (ROS)**—A framework for stratifying and defining classes of outdoor recreation environments, activities, and experience opportunities. The settings, activities, and opportunities for obtaining experiences are arranged along a continuum or spectrum divided into six classes—primitive, semiprimitive nonmotorized, semiprimitive motorized, roaded natural, rural, and urban.

**resilient, resiliency—**The ability of a system to absorb disturbances before changing to a state or trajectory that is entirely new to the system. The ability to absorb disturbances depends on the health of states, functions and processes that facilitate recovery. Resiliency is one of the properties that enable the system to persist in many different states of successional stages. In human communities, refers to the ability of a community to respond to externally induced changes such as larger economic or social forces.

**restoration**—Management actions or decisions taken to restore the desired conditions of habitats, communities, ecosystems, resources, or watersheds. For soil, water, riparian, or aquatic resources, restoration may include any one or a combination of active, passive, or conservation management strategies or approaches.

**restore**—For biological and physical resources, restore means to repair, re-establish, or recover ecosystem functions, processes, or components so that they are moving toward or within their range of desired conditions.

**restoration—**Management actions or decisions taken to restore the desired conditions of habitats, communities, ecosystems, resources, or watersheds. For soil, water, riparian, or aquatic resources, restoration may include any one or a combination of active, passive, or conservation management strategies or approaches.

**Riparian Conservation Areas (RCAs)—**Portions of watersheds where riparian-dependant resources receive primary emphasis, and management activities are subject to specific goals, objectives, standards, and guidelines. RCAs include traditional riparian corridors, perennial and intermittent streams, wetlands, lakes, springs, reservoirs, and other areas where proper riparian functions and ecological processes are crucial to maintenance of the area's water, sediment, woody debris, nutrient delivery system, and associated biotic communities and habitat.

**risk**—The danger that damage or loss will occur; for example, for landslides and other mass soil movements, risk is a measure of the socio-economic consequences (susceptibility to losses) of slope failure (Prellwitz 1994).

**river segment**—For Wild and Scenic River studies, a portion of the river area, which has been delineated for evaluation and planning purposes, that usually breaks at a change in river character, land status, or classification.

**road decommissioning—**Activities that result in the stabilization and restoration of unneeded roads to a more natural state (36 CFR 212.1, FSM 7703).

**road maintenance—**The ongoing upkeep of a road necessary to retain or restore the road to the approved road management objective (FSM 7712.3).

**road reconstruction—**Activity that results in improvement or realignment of an existing classified road as defined below:

- Road Improvement—Activity that results in an increase of an existing road's traffic service level expansion of its capacity, or a change in its original design function.
- Road Realignment—Activity that results in a new location of an existing road or portions of an existing road and treatment of the old roadway (36 CFR 212.1).

**scoping—**The process the Forest Service uses to determine, through public involvement, the range of issues that the planning process should address.

**sensitive species—**A Forest Service or BLM designation, sensitive plant and animal species are selected by the Regional Forester or the BLM State Director because population viability may be a concern, as evidenced by a current or predicted downward trend in population numbers or density, or a current or predicted downward trend in habitat capability that would reduce a species' existing distribution. Sensitive species are not addressed in or covered by the Endangered Species Act.

**sensitivity level—**A measure of the degree of visitor sensitivity to the visual environment that is used as a component for the determination of Visual Quality Objectives under the Visual Management System. Three sensitivity levels are employed, each identifying a different level of user concern for the visual environment:

- Level 1—Highest Sensitivity
- Level 2—Average Sensitivity
- Level 3—Lowest Sensitivity

**source habitat**—Source habitats are those characteristics of macrovegetation (i.e., cover types and structural stages) that contribute to stationary or positive population growth for a species in a specified area and time (Wisdom 2000).

**short-term effects—**Effects lasting from 3 to 15 years in duration.

**site potential tree height—**For delineating RCAs, a site potential tree height is the height that a dominant or co-dominant tree within a stand is expected to attain at an age of 200 years. Outside of RCAs, a site potential tree height is the average height that the dominant or co-dominant tree within a stand will attain within 100 years.

**source environment**—The composite of all environmental conditions that result in stationary or positive population growth for a species in a specified area and time (Wisdom 2000). Source habitats contribute to source environments (Pulliam 1988, Pulliam and Danielson 1991).

**structure**—The size and arrangement, both vertically and horizontally, of vegetation.

**subwatershed—**An area of land that drains to a common point. A subwatershed is smaller subdivision of a watershed but is larger than a drainage or site. Subwatersheds are often synonymous with sixth-field hydrologic units, which are nested within larger watersheds (fifth-field units), and are comprised of smaller drainages, sites, and stream reaches.

**succession**—The replacement in time of one plant community with another. The prior plant community (or successional stage) creates conditions that are favorable for the establishment of the next stage. These changes often occur in a predictable order. More specifically, the gradual and natural progression in composition and structure of an ecosystem toward a climax condition or stage.

**suited land**—Forest land designated in the Forest Plan to be managed for timber production on a regulated basis.

**temporary effects**—Effects lasting from 0 to 3 years in duration.

**temporary road**—Roads authorized by contract, permit, lease, other written authorization, or emergency operation, that are not intended to be a part of the forest transportation system, and that are not necessary for long-term resource management.

**threatened species**—Designated by the FWS or NMFS; a plant or animal species given federal protection because it is likely to become endangered throughout all or a specific portion of its range within the foreseeable future.

**Total Maximum Daily Load (TMDL)**—TMDL is the sum of waste load allocations for point sources, non-point sources, natural background, and a margin of safety. A TMDL specifies the amount of a pollutant that needs to be reduced to meet water quality standards set by the state. TMDL is used in a process to attain water quality standards that (1) identifies water quality problems and contributing pollutant sources, (2) allocates pollution control responsibilities among sources in the watershed, and (3) provides a basis for taking actions needed to restore a water body.

**Total Soil Resource Commitment (TSRC)**—The conversion of a productive site to an essentially non-productive site for a period of more than 50 years. Examples include classified or unclassified roads, inadequately restored haul roads, designated skid roads, landing areas, parking lots, mining dumps or excavations, dedicated trails (skid trails also), developed campgrounds, other dedicated facilities, and some stock driveways. Productivity on these areas ranges from 0 to 40 percent of natural.

Standards for detrimentally disturbed soils are to be applied to existing or planned activities that are available for multiple uses. These standards do not apply to areas with dedicated uses such as mines, ski areas, campgrounds, and administrative sites.

**tree size class**—The categorization of trees for a vegetative unit to a descriptive class based on the largest trees that meet a set of criteria. Classes are Grass/Forb/Shrub/Seedling (GFSS), sapling, small, medium or large.

**variety class**—A measure of the degree of variety within a visual landscape. There are three variety classes that identify the degree of variation of the natural landscape:

- Class A—Distinctive
- Class B—Common
- Class C—Minimal

**Visual Management System (VMS)**—A system for the management of scenery resources instituted by the Forest Service in 1974. It provides criteria for identification and classification of scenic quality on National Forest System lands. Scenic quality objectives are expressed in terms of Visual Quality Objectives (VQOs) that define the extent of allowable alteration of the natural-appearing landscape character. VQOs are determined based on a combination of natural landscape features and human use zones as expressed by Variety Class and Sensitivity Level.

**Visual Quality Objective (VQO)**—Categories of acceptable landscape alteration measured in degrees of deviation from the natural-appearing landscape. The categories include Preservation, Retention, Partial Retention, Modification, and Maximum Modification.

**vulnerability**—Refers to lack of animal security during the hunting season. Vulnerability can be affected by conditions such as road density, road closures, openings, and hunting pressure. Also means "Increased susceptibility to hazards." The hunting season definition seems too narrow and only applicable to species that are hunted rather than affected by humans or activities in other ways.

**Watershed Condition Indicator (WCI)**—WCIs are an integrated suite of aquatic (including biophysical components), riparian (including riparian–associated vegetation species), and hydrologic (including uplands) condition measures that are intended to be used at a variety of watershed scales. They assist in determining the current condition of a watershed and should be used to help design appropriate management actions, or to alter or mitigate proposed and or ongoing actions, to move watersheds toward desired conditions. WCIs represent a diagnostic means to determine factors of current condition and assist in determining future conditions associated with implementing management actions or natural restoration over time.

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**winter range**—An area or areas where animals (usually ungulates such as elk, deer, bighorn sheep) concentrate due to favorable winter weather conditions. Conditions are often influenced by snow depth, and the availability or forage and thermal cover.

**xeric**—Dry conditions. Can refer to a habitat characterized by, or a species adapted to dry conditions, rather than hydric (wet) or mesic (moderate) moisture conditions.

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