Hazard Creek Fuels

Environmental Assessment

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1.0 Introduction

1.1 Background: The Hazard Creek project area is dominated by open stands of medium sized ponderosa pine, with Douglas-fir more prevalent on moister sites. Approximately 10 percent of the area is heavily stocked in smaller diameter mixed conifer trees with a higher concentration of surface fuel loadings. A few large diameter ponderosa pine trees remain on the steeper slopes. The understory is predominantly grasses, brush and pine litter. Douglas-fir regeneration is starting to encroach on these pine stands. Surface fuel loading is moderate, but increasing, while ladder fuels continue to increase as the young trees advance toward the canopy.

The BLM acquired the eastern portion of the project area in 1993. Most of these stands were logged in the 1970s, and again in the early 1990s. Logging practices were predominantly commercial thin treatments. The western portion was logged in the 1960s or 1970s. The BLM has conducted several small salvage sales to address Ips bark beetle and western pine beetle mortality on or adjacent to the project area over the past 20 years. Some stands of smaller diameter ponderosa pine have been precommercially thinned.

1**.2 Proposed action summary**: The BLM proposes to conduct mechanical fuels reductions treatments on 60 acres and maintenance prescribed burning on 551 acres of ponderosa pine dominated stands.

1.3 Location: The project area is located approximately 15 miles north of New Meadows, Idaho in the Hazard Creek drainage, north of Hazard Creek.

T21N R01E Section 1 (NW ¼, N½SW¼, NE ¼) and Section 2 (E½NE¼, N½SE¼)

2.0 Purpose and Need

2.1 Need:

There exists a fuel hazard and potential for stand-replacement wildfire in the wildland-urban interface in the Hazard Creek drainage. Historically, most of the project area was dominated by open stands of fire resistant ponderosa pine. With the exclusion of fire on the landscape, surface and ladder fuels continue to accumulate leading to the potential for more intense fire behavior. In the absence of disturbance, the encroachment of shade-tolerant Douglas-fir and grand fir will lead to overstocked conditions with increased ladder fuels.

The forest vegetation communities are not within the appropriate fire regime condition class (FRCC) due to past fire suppression practices. The FRCC refers to the degree of departure from the natural fire regime and its subsequent effect on vegetation composition and structure on a landscape scale. Approximately 46 percent of the project area is FRCC 2 and 54 percent FRCC 3. An FRCC 2 is a moderate departure from the natural (historical) regime of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated disturbances. An FRCC 3 is defined as having high departure from the natural (historical) regime of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and predispose the system to high risk of loss of key ecosystem components.

The *Idaho County Revised Wildland-Urban Interface Wildfire Mitigation Plan* recommended objectives and fuels treatment strategies that the BLM would apply to the Hazard Creek Fuels Project. The project area is located in the treatment areas south of Pinehurst along the highway 95 corridor. Goals and objectives of the plan include protection of people and structures, and increase firefighter safety by reducing the risk factors surrounding high risk communities in the WUI of Idaho County (Idaho County 2009).

2.2 Purpose:

The purpose of this project is to:

1. Reduce the hazard and potential for stand-replacement fire in the wildland-urban interface (WUI)
2. Maintain or return vegetative communities to historic fire regimes (Fire Regime Condition Class 1)
3. Manage for forest health and/or habitat diversity in the Little Salmon River for desired future conditions, emphasizing the retention of large tree size ponderosa pine and/or Douglas-fir in dry conifer sites.

3.0 BLM Decision to be Made

The Cottonwood Field Manager will decide which types of treatments to implement pursuant to 43 CFR § 5003.

4.0 Land Use Plan Conformance

The proposed action is in conformance with the 2009 Cottonwood Resource Management Plan (RMP). As described and analyzed in this EA, the proposed fuels treatments are consistent with the following decisions from the Cottonwood RMP.

Wildland Fire Management (WF)

Objective WF-1.2—Reduce hazard and the potential for stand-replacement fire in areas identified as wildland-urban interface (WUI) and/or in municipal watersheds as follows (as identified in the fire management plan, community wildfire protection plans, or other hazard/risk assessment).**Action WF-1.2.2—**Use prescribed fire and fire managed for resource benefit in WUI where risks to public and firefighter safety can be mitigated or are low.

Action WF-1.2.5—Design, develop and implement hazardous fuels reduction projects identified in or consistent with the goals of community wildfire protection plans.

Action WF-1.2.6—Initiate maintenance and hazard fuels reduction activities to

1. reduce the potential for high severity, stand-replacement fires, regardless of FRCC or historic fire regime; and
2. reduce potential fire size in areas where large, stand-replacement fires might cause adverse effects to WUI and adjacent resources.

Action WF-1.3.1—Increase the use of prescribed fire and fire managed for resource benefit activities in frequent fire regime groups (I, II, and III).

Vegetation – Forests (VF)

Action VF-1.1.2-To the extent practicable, emphasize retention of large tree size ponderosa pine (*Pinus ponderosa*), western larch (*Larix occidentalis*), and/or Douglas-fir (*Pseudotsuga menziesii*) in dry conifer sites.

Aquatic Resources, Fish, and Special Status Fish (AF)

Objective AF-1.1—Provide for diverse and healthy aquatic habitats that contribute to the recovery of listed fish species and conservation of BLM sensitive fish species.

Action AF-1.1.1—Ensure that all ongoing and new BLM management actions support or do not retard or preclude recovery for federally listed fish (Endangered Species Act), designated critical habitat, and important aquatic habitats (supporting spawning, incubation, larval development, rearing, migration corridors, and aquatic habitats for forage species) (see Appendix F, Federally Listed and Candidate Species Management, Conservation, and Restoration Measures). Federally listed fish currently occurring in streams and rivers flowing through or adjacent to BLM lands include the sockeye salmon (Oncorhynchus nerka), fall Chinook salmon (O. tshawytscha), spring/summer Chinook salmon (O. tshawytscha), steelhead trout (O. mykiss); and bull trout (Salvelinus confluentus)

Action AF-1.1.2—Ongoing and new activity or project review will be conducted to assess effects to Essential Fish Habitat (Section 305[b][2] of the Magnuson-Steven Act). The BLM will consult with National Marine Fisheries Service on any action that will adversely affect Essential Fish Habitat for Chinook or Coho salmon (O. kisutch) and will implement appropriate measures to avoid, mitigate, or minimize adverse effects.

Action AF-1.1.3—Do not undertake management activities that will cause long-term degradation or will retard or preclude restoration and conservation for special status and desired native fish species, and aquatic habitats

Objective AF-1.2—Manage aquatic, riparian, and wetland habitats to provide diverse and healthy conditions for aquatic species.

Action AF-1.3.1—Activities within RCAs will be designed to minimize or avoid adverse impacts on the riparian and aquatic habitat(s) through implementation of specific standards and guides in the Aquatic and Riparian Management Strategy (Appendix D, Aquatic and Riparian Management Strategy]).

Action AF-1.3.2—For each new project, compile, develop, and implement appropriate species and/or habitat-specific BMPs to avoid or minimize adverse impacts on aquatic and riparian habitats. Compile and develop CFO programmatic-level activity BMPs that may be used as needed for ongoing projects or for new project development to avoid or minimize potential for adverse effects.

Action AF-1.3.3—Manage three watersheds as Conservation Watersheds (subwatersheds where watershed processes and functions that occur in a relatively undisturbed and natural landscape setting) and 25 watersheds as Restoration Watersheds (subwatersheds where biological and physical processes and functions do not reflect natural conditions because of past and long-term land disturbances) (Appendix B, Conservation and Restoration Watersheds).

Action AF-1.3.4—Conduct implementation and effectiveness monitoring commensurate with the level of on-the-ground activities. The appropriate implementation and effectiveness monitoring will be identified during project development and assessment. Adaptively change management direction to contribute to recovery or conservation of special status fish.

Wild and Scenic Rivers (WR)

Action WR-1.2.1—For the four segments determined preliminarily suitable on Lolo, Lake, Hard, and Hazard Creeks, for congressional designation into the NWSRS, until a final congressional decision on designation or nondesignation is made, the BLM will, to the extent of the BLM's authority (which is limited to BLM lands within the corridor), maintain the free-flowing character, preserve or enhance the outstandingly remarkable values, and allow no activities within the river corridor that will alter the tentative classification

Action WR-1.2.2—Do not recommend the preliminarily suitable 1.55-mile Hazard Creek segment for congressional designation in the NWSRS. Idaho Department of Water Resources completed the Comprehensive Water Plan—Part B on the Little Salmon River Basin in October 2001 (Idaho Department of Water Resources 2001). The comprehensive state water plan designated Hazard Creek as a Recreational River. The BLM will coordinate management on this river segment with Idaho Department of Water Resources and Forest Service in accordance with the Memorandum of Understanding with Forest Service and State of Idaho (1991), and Comprehensive Water Plan (Idaho Department of Water Resources 2001).

The BLM will coordinate management of the segment with the Idaho Department of Water Resources and protective management will be provided on the BLM administered lands in accordance with the following guidelines:

- Approve no actions altering the free-flowing nature of the suitable segment through impoundments, diversions, channeling, or installing riprap.
- Approve no actions that will measurable diminish the stream segment's identified outstandingly remarkable value(s).

Approve no actions that will modify the setting or level of development of the suitable river segment to a degree that will change its identified Recreational classification.

5.0 Scoping and Issues

5.1 Public Involvment: Scoping for preparation of this EA included publishing information on the Idaho BLM NEPA website in June 2014, and sending letters requesting comments from various groups and the public. The BLM received substantive comments from one individual and one organization were considered in the development of the proposed action and identification of issues for analysis.

5.2 Issues: The following issues were identified for analysis during internal and external scoping:

5.2.1. Vegetation: Without maintenance, existing forest stands will convert to less desirable species composition and making these stands more susceptible to insect, disease, and wildfire mortality.

5.2.2. Fuels: Without periodic maintenance, buildup of fuels will lead to increased potential for uncharacteristic or stand replacing wildfire. This is the primary need for this project.

5.2.3. Air Quality: Prescribed burning and other proposed operations could affect air quality.

5.2.4. Soil and Water Resources: Proposed actions have the potential to cause erosion and impact soils and water resources. Proposed actions have the potential to impact slope stability.

5.2.5. Fisheries, Aquatic Habitats, and Special Status Fish Species: Proposed actions have the potential to cause erosion and sediment delivery to streams within the project and analysis area; which would potentially impact spawning, rearing, and foraging habitats for federally listed and BLM sensitive fish species. Proposed actions have the potential to impact riparian and aquatic habitats.

5.2.6. Special Status Plant Species: Proposed actions such as prescribed burning have the potential to adversely impact BLM sensitive plants; particularly if such activities occur during the active spring growing season.

5.2.7. Wildlife and Special Status Wildlife: Proposed actions have the potential to disturb or displace or cause injury or mortality to wildlife species. Proposed actions have the potential to adversely alter wildlife habitats.

5.2.8. Invasive Species: Removal of vegetation and soil disturbance from the proposed treatments could result in the spread of invasive species.

5.2.9. Recreation: The proposed action could adversely impact recreational use of the area.

5.2.10. Travel Management: The proposed action could affect use of roads and access to/through the project area.

5.2.11. Wild and Scenic Rivers: The proposed action could impact the outstandingly remarkable values of two stream segments that have been found suitable for inclusion in the National Wild and Scenic Rivers System.

5.2.12. Livestock Grazing: Changes to the vegetation and use of prescribed fire could affect livestock grazing on the Hard Creek Allotment.

5.3 Issues Eliminated from Further Analysis:

Cultural Resources – Disturbance or damage to cultural resources was a preliminary issue, but BLM's inventory found no cultural resources in the project area. Therefore cultural resources would not be affected and this issue was eliminated from detailed analysis.

6.0 Alternatives

6.1 Alternative A (Proposed Action):

The proposed action is to treat 551 acres through the use of prescribed fire (see map). Prior to burning, 60 acres of dense stands would be mechanically thinned and pruned by chainsaw. Such treatments would include primarily the removal of small trees (generally less than 8-inch diameter) and brush, as well as pruning of lower branches up to approximately 8 feet high. The slash would be hand piled along with existing fuels and the piles would be burned. Some thinning and piling would occur within Riparian Conservation Areas (RCAs).

The prescribed burn area would be broken into smaller units to aid burning activities that may be conducted over a period of 3 to 5 years. Existing road and trails would be used for access and as control lines with additional handline constructed along property lines and ridges (see map). Control line preparation may require the removal of concentrations of fuel including small trees and brush to create a 50-100 foot wide clearing. Hand line construction would entail exposing mineral soils on a 1.5 to 2 foot wide strip. Additional prescribed burn treatments would be conducted periodically, as needed to maintain desired fuel conditions.

BLM managed project area roads would be maintained to provide for adequate drainage; which would include maintaining or constructing rolling dips, cleaning culverts, blading, brushing, and cleaning ditches. Two small stream crossings (non-fish-bearing) would be improved to prevent adverse erosion and adequately handle high (100-year) flow events .Two undersized and plugged/paratially plugged culverts (non-fish bearing stream) would be replaced with 30-inch diameter culverts One small stream crossing ford (non-fish bearing stream) would be reconstructed and maintained to prevent adverse erosion and prevent the stream from running down the road.

6.1.1 Design Features

Forest Vegetation

- Silvicultural prescriptions will be written for each unit, in accordance with the Cottonwood RMP guidance in Appendix C, Desired Future Conditions for Forest Vegetation/Wildlife Habitat (BLM 2009). This includes slash treatment and burn guidelines to meet desired stand conditions of species composition and structure and watershed sediment guidelines. These prescriptions emphasize retention of large early seral ponderosa pine, western larch and Douglas-fir where practicable.
- Prescribed burning will be designed and implemented with the intent of limiting tree mortality to less than 10 percent of the overstory.

Air Quality (Smoke Management)

- Cooperate with other land managers, including the State of Idaho, and the IDEQ to minimize air quality impacts from smoke on local communities and individuals.
- Conduct prescribed fires in accordance with the procedures outlined in the *Montana/Idaho State Airshed Group Operating Guide* (http://www.fs.fed.u/r1/fire/nrcc/smoke.html, August 2003).
- Apply management techniques to minimize smoke production and to enhance dispersion, including burning under optimum weather conditions, expanding the burning season, using backfires where applicable, burning small blocks, etc. These techniques are described in the Prescribed Fire Smoke Management Guide, published by the National Wildfire Coordinating Group (NFES No. 1279, PMS 420-1; 1985).
- Monitor weather and the burning and smoke dispersion conditions to assure air quality impacts remain within prescribed smoke management levels. A smoke monitoring system has been established that determines the need for restrictions on prescribed burning. If the monitoring unit forecasts ventilation problems, burning is either restricted by elevation or curtailed until good ventilation conditions return. The IDEQ uses the monitoring data to inform the public of high levels during burns, wildland fires, and other activities.

Soils and Water Resources

- Prescribed burning should be of low enough severity to insure adequate duff retention to limit surface erosion. Only light low severity underburning on high landslide hazard areas would occur.
- Management activities within RCAs for the Hazard Creek watershed will be conducted in accordance with the Cottonwood RMP, Action VR-1.1.4, page 24 and Appendix D, Aquatic and Riparian Management Strategy (BLM 2009). Mechanical treatments will be buffered. Prescribed fire will not be ignited within a RCA, but may back into these areas under conditions where fire severity will be low and burning will result in very low potential for mortality to overstory trees and reduction of canopy cover or exposure of bare soil in these RCA buffer areas.

Invasive, Non-Native Species

- Treat existing weed infestations along access roads prior to project implementation.
- Disturbed areas should be inventoried for new weed introductions and treatment implemented one year post project and preferably two.
- Post project monitoring of vegetation would occur to assess achievement of treatment goals/objectives and survey for invasive plants. If any invasive plants were found during survey they would be treated as described in the record of decision for the *Cottonwood Integrated Weed Treatment Program*, DOI-BLM-ID-C020-2011-0017-EA, 12/06/2012.

Aquatic and Riparian Habitat

- As described for Soil and Water Resources, apply RMP guidance to landslide prone areas; and streamside and wetland RCAs.
- No fuel storage~~,~~ equipment maintenance, or fueling would be authorized within RCAs.
- Thinning would not occur within any riparian habitats or 25 feet (whichever is larger) of any intermittent or perennial non-fish-bearing stream or within 300 feet of any fish bearing stream (Hazard Creek).
- Within the mechanical treatment areas no slash piling and burning would occur within 50 feet of streams.
- Control line preparation occurring within RCAs would be limited to a width not exceeding 25 feet and would be coordinated with the Cottonwood Field Office Fisheries Biologist
- Ignition would not occur within the RCAs, but fire would be allowed to back down into the RCAs.
- BLM managed project area roads would be maintained or improved to provide for adequate drainage and to minimize potential for adverse erosion/sediment.
- The culvert replacement projects occur in an intermittent non-fish bearing stream, and culvert installation would occur during a summer or fall no-flow periods. The ford improvement project includes pulling back the ford berms and reshaping the ford crossing with an excavator to insure that high flow events stay in the stream channel. As needed, all stream crossing improvement projects would have appropriate erosion/sediment measure to prevent adverse erosion (i.e., seeding desirable species and mulching). Culvert and ford re-construction specifications include design measures to handle a 100-year flow event.

6.2 Alternative B (No Action):

Under the No Action alternative, no mechanical fuels reduction treatments or prescribed burning activities would occur.

6.3 Mitigation Measures:

Within the mechanical treatment areas (60 acres) no thinning would occur from April 1 to July 15. This recommended mitigation would reduce potential for disturbance, displacement, injury, or mortality to nesting birds.

Mitigation measures are actions that may reduce, avoid, or compensate for effects of the Alternatives. Actions are only termed mitigation measures if they have not been incorporated into the Proposed Action or Alternatives (not design features). While the EA must identify potential mitigation, and describe the effects of implementing (or not) such mitigation, the Field Manager will decide whether or not to implement these measures in the Decision Record.

6.4 Alternatives Considered but Eliminated from Detailed Analysis:

6.4.1 Variable Retention Logging: During public scoping the BLM received a comment letter proposing the use of variable retention logging to reduce impacts. However, the proposed action does not include any logging as this would not achieve the fuels reduction purpose and need. Therefore this alternative was eliminated from detailed analysis.

6.3.3 Close Illegal Trails: The BLM also received a suggestion to consider implementation of closures of illegally constructed motorized vehicle trails with this project. While this may be important, it is not part of the purpose and need for this proposed action. Also, the CFO will be initiating developing a travel management plan (TMP) for this area in the near future, and this TMP will address designation or closure of all existing trails on BLM lands in the area. Therefore, this alternative was eliminated from detailed analysis.

7.0 Affected Environment and Environmental Effects

7.1 Scope of Analysis

7.1.1 *General Setting*

The project area is located in the Hazard Creek watershed which flows into the Little Salmon River at river mile 19.5, approximately air miles south of Riggins. The project area is comprised of 551 acres of BLM lands located in the lower portion of the Hazard Creek watershed. The project area is bounded by Hazard Creek on the south and east boundaries, State lands on the north, and the watershed divide ridge on the west. Elevations range from 3,200 feet near the mouth of Hazard Creek to 4,500 feet and topography is moderate to steeper sloped areas.

The Little Salmon River basin is characterized by warm, dry summers and cold, moist winters. Most of the precipitation falls as snow with the greatest amounts of snow occurring on the eastern side of the basin. Climate varies with altitude. The lower elevations (i.e. the area near Riggins) are semi-arid while the higher elevations are sub-humid (IWRB 2001). Average annual precipitation ranges from less than 20 inches at Riggins to more than 50 inches at Brundage Mountain. Annual runoff averages 18

inches (BLM 2000). The Southern Forested Mountains ecoregion where the project lies has drought-prone granitic soils (IDEQ 2008).

The project area is dominated by grand fir and Douglas-fir habitats and includes 3 small perennial and intermittent streams which flow into Hazard Creek. The project area is bordered by Hazard Creek along the southern boundary.

7.1.2 *Related Past, Present, and Reasonably Foreseeable Actions*

As defined by NEPA regulations (40 CFR 1508.7), "Cumulative impacts result from the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions."

Human caused and natural events have had varying levels of impacts on the resources and values affected by the proposed vegetation project. There are currently no ongoing or planned projects on the Payette National Forest or state lands adjacent to or in proximity to the project area. The BLM had conducted small scale salvage removal of trees on or adjacent to the Hazard Creek project area. Slash cleanup from these small sales was primarily by machine pile and burn. Within the Hazard Creek drainage, the BLM is currently implementing the Bally Mountain Vegetation Management project (which includes two timber sales and landscape burning) and is in the preliminary stages of planning vegetation and fuels management activities across the Little Salmon River drainage. The majority of past timber harvest and road building that occurred on BLM lands occurred during the 1960s. Approximately 180 acres within the project area had had some timber harvest and road building prior to the acquisition by the BLM in 1993. Additionally, some local landowners continue to reduce the fuels on their property and surrounding their private structures. Timber harvest and road building has occurred on private lands (private timber company) and State of Idaho lands located south of the project area. U.S. Highway 95 borders the project area on the west, and is the primary north/south highway through this part of Idaho.

The 1994 Corral wildfire occurred in upper Hazard Creek and upper Hard Creek, impacting the larger streams and riparian areas. The project is located in the BLMs Hard Creek Allotment which is currently leased for domestic sheep grazing. The project area occurs within the Limited OHV Use area where vehicular travel is restricted to designated routes although unauthorized OHV use continues to occur in and around the project area.

7.1.3 *Analytical Assumptions*

Wildfire: A high severity wildfire would be more likely to occur under the No Action Alternative

7.2 Vegetation:

7.2.1 Affected Environment:

Habitat types within the 551 acre proposed project area are primarily Grand fir/pinegrass (*Abies grandis/calamagrostis ruecens*) or Douglas-fir/ninebark Pseudotsuga menziesii/ *Physocarpus malvaceus)* with approximately half of the Douglas fir types in the ponderosa pine (*Pinus Ponderosa*) phase (current dominant overstory is Ponderosa Pine) according to Steele et al, (1981).

The understory is dominated by ninebark (*Physocarpus malvaceus*), pinegrass (Calamagrostis rubescens), and oceanspray (*Holodiscus discolor*), with lesser amounts of snowberry (*Symphoricarpus albus*), mountain maple (*Acer glabrum*), and mockorange (*Philadelphus lewisii*) as the primary species.

Table 7.2.1 identifies primary Forested Potential Vegetation Groups (PVG) found within the project area. PVG-2 (Warm, Dry Douglas-fir/Moist Ponderosa Pine) represents warm, mild environments at low to middle elevations but may extend upward to 6,500 feet on dry, south-facing slopes. Ponderosa pine, particularly at lower elevations, or large ponderosa pine mixed with smaller size classes of Douglas-fir are the dominant cover types in this group. Historically, frequent nonlethal fire maintained stands of large, park-like ponderosa pine. Douglas-fir occurred on moister aspects, particularly at higher elevations. Understories are mostly graminoids—such as pinegrass and elk sedge—with a cover of shrubs, such as common snowberry, white spirea, and mallow ninebark.

PVG-5 (Dry Grand Fir) is found throughout the distribution of grand fir; and at elevations ranging from 4,300 to 6,400 feet, often on drier, upper slopes and ridges. Ponderosa pine and Douglas-fir are common cover types that appear to have been maintained by fire regimes that were historically nonlethal to mixed in micro-sites. In many areas, this group may have resembled PVG 1 (Dry Ponderosa Pine/Xeric Douglas-fir) and PVG 2 (described above), with open, park-like stands of large ponderosa pine. Mixed species stands were likely restricted to small micro-sites that burned less frequently. Understories are similar to PVG 2; pinegrass, elk sedge, and white spirea are common.

Table 7.2.1 Potential Vegetation Groups in the Hazard Creek project area.

Potential Vegetation Group	**Acres within Project Area**	**Percent of Project Area**
PVG-2 Warm Dry Douglas-fir/Moist Ponderosa Pine	121	22%
PVG-5 Dry Grand Fir	430	78%
Project Area Total	**551**	

Stand Conditions

Based on stand-level data analyzed using Forest Vegetation Simulator (FVS), the overstory species composition within the project area is comprised ponderosa pine (56%), Douglas-fir (26.5%), and grand fir (16.5%). The majority of stands are a mixture of Ponderosa pine and Douglas-fir with small pockets of almost pure Ponderosa pine on south and southwest aspects. Grand fir is primarily an understory component but is increasing in the project area especially on north and northeast aspects.

The project area contains a mixture of even-aged and multi-aged stands. The stands range in average age from 64 to 84 years old with an overall average age of 74. This

dominant age is interspersed with young trees and a small component of large trees across the project area.

Table 7.2.3. Displays average stand conditions for the project area based on Forest Vegetation Simulator Analysis (FVS) (Dixon, 2011).

Average Stand Conditions for Hazard Creek Project Area					
Trees per Acre	Stand Age	Basal Area* (square feet)	Quadratic Mean Diameter**	Height	Species Composition
286	74	131	9.6	92	PP (56.5%) DF (26.5%) GF (16.5%)

**Basal area is the cross-sectional area of a single stem, including the bark, measured at 4 ½ feet above the ground. **The Quadratic Mean Diameter is the diameter of the average basal area per tree.*

Stands within the project area are best described as a mixture of densities and structures shaped by environmental factors (soil type, slope, aspect, elevation, etc), past forest management practices, and fire exclusion. These stands have had no measureable natural or prescribed fire event other than pile burning for several decades and show varied levels of increase in ground, surface and canopy vegetation. Although no recorded fire events have been identified, fire scars on large trees throughout the project area appear to be 80-90 years old. The lack of fire in this fire-dependent ecosystem is slowly altering the historic species composition and stand structure in portions of the project area as shade intolerant, early seral ponderosa pine and Douglas-fir is converting to dense stands of shade tolerant, climax grand fir (Naficy et al, 2010).

All stands within the project area have seen some level of past management including harvest within the last several decades. Some stands have had understory thinning treatments applied in 2004 and 2006 which treated a total of 30 acres. The stands that have seen more recent thinning treatments are relatively open with light to moderate densities of conifer regeneration or brush.

Approximately 60-80 acres within the project area consist of high density patches with abundant advanced regeneration or dense brush. The higher density stands exhibit abundant shade tolerant regeneration in the understory (Grand fir) and early seral regeneration in openings.

Table 7.2.2. Stand structure averaged for all stands within the project area.

Average Structure for all Stands within Project Area			
Understory	**Tree Diameter Size Class**	**Percent of Trees Per Acre**	**Trees Per Acre**
Seedling/ Sapling	< 5 inches DBH	55% of TPA	158
Overstory	**Tree Diameter Size Class**	**Percentage of Size Class***	**Trees Per Acre**
Small Trees	5.0 – 11.9 inches DBH	50%	64
Medium Trees	12.0 – 19.9 inches	38%	49

	DBH		
Large Trees	>20 inches DBH	12%	15
TOTAL		100%	286

** Note that the percent of size class is averaged for all stands and are distributed across the project area due to the multi-aged structure found in the majority of the project area.*

There is a scattered overstory component of older large diameter trees composed primarily of Ponderosa Pine that are approximately 20 inches in diameter at breast height (DBH) or greater interspersed throughout portions of project area. It appears that past management in the area allowed for some retention of large diameter trees within harvest areas as accessible high value large diameter trees are found next to large stumps. Patches within the project area meet some elements of old growth characteristics with widely spaced large diameter trees (> 20 inches DBH). However, these patches do not meet the definition of Old Growth criteria of Hamilton (1993) in terms of minimum acres, habitat type, or down woody debris, as identified in the Cottonwood RMP (2009). These pockets of large trees add up to approximately 12 % scattered across the overall project area and the retention and restoration of this component is included in the primary goals, objectives, and actions for forest vegetation management in the Cottonwood RMP (2009).

7.2.2 Environmental Effects from Alternative A (Proposed Action):

The Proposed Action would affect a 551 acre total footprint with prescribed burning and 60 acres of mechanical treatment (manual cut and pile). The mechanical treatments are needed in some areas to facilitate low severity understory burning which would occur after the cut material is piled and burned. The proposed mechanical treatments will help to facilitate the use of prescribed fire across the entire project area.

Mechanical reduction of ladder fuels with chainsaws would result in localized effects to understory vegetation through an approximately 80-90% reduction in understory trees (< 8 inches DBH) and brush concentrations within the proposed 60 acre mechanical treatment units. These effects would be beneficial to forest vegetation overall as thinning areas with overstocked conditions decreases competition for limited resources (such as light, nutrients, and water), while increasing growth, vigor, and resistance to insect and disease outbreaks.

Another benefit of the mechanical fuel reduction would be the cutting of late seral grand fir saplings and poles that have increased through fire exclusion and could eventually replace the shade intolerant early seral species within portions of the project area if not treated.

Overall changes to overstory vegetation expected from the proposed action would be limited to small-scale and localized effects such as heat damage to tree cambium and/or root damage. Understory effects from prescribed burning are expected to be variable with areas of desirable seedling/sapling mortality depending on multiple factors including fuel moisture, fuel loading, ignition patterns and weather conditions. The

proposed treatments work toward lowering the risk of high severity wildfire and insect and disease outbreaks by reducing fuel loading and stand density in the understory.

The proposed reintroduction of fire as a disturbance process will contribute to moving stands within the project area toward Desired Future Conditions through the maintenance and enhancement of large diameter (> 20 inches DBH) early seral species as described in the Cottonwood RMP (2009).

7.2.3 Environmental Effects from Alternative B (No Action):

The No Action alternative would have no short term effect on forest vegetation, including species composition and stand structure because current conditions would persist and the stands within the project area would continue to grow over time in the absence of a high severity disturbance event. However, a high severity wildfire would be more likely under the No Action Alternative and would result in partial or wide-spread impact to current vegetative structure, composition, and overall ecosystem function. In a high severity, stand replacement event all size classes from seedlings to the large diameter trees would likely see high mortality rates, and soil damage could prevent vegetative reestablishment in some areas. High mortality areas would likely be replanted and while immature, these small diameter trees with thin cambium and low crown base heights would be vulnerable to subsequent wildfires.

Under the no action alternative (no reintroduction of low severity fire) some of the stands within the project area would likely see a successional shift from current species composition marked by dominance of early seral Ponderosa Pine and Douglas-fir to an increased dominance of the late seral Grand fir component. This change toward late seral species dominance would be counter to the Desired Future Conditions for species composition as described in the Cottonwood RMP (2009).

The No Action alternative would not maintain or enhance the current resiliency and resistance to disturbance that exists in portions of the project area that are within or moving toward desired future conditions for species and size class distribution as identified in the Cottonwood RMP (2009).

7.2.4 Cumulative Effects:

Cumulative effects combine the effects of the proposed action with conditions within and in the vicinity of the project area created by past, present and reasonably foreseeable actions.

The existing condition of forest vegetation within the Hazard Creek Project area is largely the result of human activities that took place over the last hundred years with logging and increased fire suppression. The Majority of the project area was thinned during the early 1980's while in private ownership and was acquired by the BLM in the early 1990's. Since that time the BLM applied small scale thinning treatments and associated pile burning in 2004 and 2006 for a combined total of 30 acres. Treatments in the vicinity of the project area currently underway include the Bally Mountain Project immediately south of the project area, and current and recent vegetation management

treatments on adjacent Private land (Potlatch Corporation), State (Idaho Department of Lands), and National Forest (Payette NF) lands. These combined treatments in adjacent areas could reduce the risk of a wildfire or beetle infestation that could spread to the Hazard Creek area depending on the severity and scale of the event.

The proposed action in combination with these more recent and future foreseeable vegetation and prescribed fire treatments in surrounding areas would have a cumulative beneficial effect on the forest health and structure. These combined actions would reduce the density of forest stands across a larger area and could help to alleviate some of the conditions that have resulted from past logging practices and fire suppression. The proposed action, along with past and future actions would cumulatively affect the forested vegetation component by either maintaining or moving it toward the desired conditions described in the Cottonwood RMP (2009).

7.3 Fuels

7.3.1 Affected Environment:

The project area is dominated by open dry conifer stands comprised mainly of medium sized ponderosa pine, with Douglas-fir more prevalent on moister sites. A few large diameter ponderosa pine trees remain scattered throughout the project area. Historically, these dry open forests were maintained by a frequent (0-35 years or longer), low to mixed severity fire regime (See Table 7.3.1). The mean fire return interval was about 15-23 years (Graham and Jain 2005). Due to the past century of management activities and fire suppression, fire has been excluded from most of these stands for five or more return intervals, which is outside the historic range of variability.

Table 7.3.1 Historic Fire Regimes of the Hazard Creek project area (LANDFIRE data).

Fire Regime	Description	Acres	Percent of Area
1	0-35 years, low and mixed severity	261	47%
2	0-35 years, replacement	67	12%
3	35-200 years, low and mixed severity	165	30%
4	35-200 years, replacement	49	9%
5	200+ years, replacement	1	0%
Other	not classified/riparian	8	1%

Fire Behavior Fuel Models

Scott and Burgan (2005) categorized 40 standard fuel models based on a variety of fuel loadings and distribution that lead to predicted fire behavior outcomes. Fire behavior, such as flame length, surface fire spread, or fire intensity, is dependent on such characteristics as fuel type (e.g. grass, grass-brush, brush, timber litter, timber understory, slash) and fuel loading (size, amount, and distribution). Heavier fuels loadings, such as concentrations of logs or small trees and shrubs, contribute to more intense fire behavior and higher flame lengths. Ladder fuels, in the form of brush and

young trees in the understory as well as low branches on less fire-resistant species, provide an avenue for surface fire to move upward into the forest canopy thus involving crown fuels.

Fire behavior not only effects the vegetation, but also the ability of firefighting resources to effectively manage or suppress the fire. Flame length of 4 feet is considered the threshold for firefighters on the ground to effectively and safely fight fire. Flame lengths above 4 feet require mechanized or aerial firefighting resources. Flame lengths above 8 feet are considered difficult for any firefighting resources to be effective.

Fuel conditions in the project area have been classified into seven of the 40 fire behavior fuel models (LANDFIRE 2008; See Map 2). Approximately 69 percent of the project area is classified into timber litter fuel models TL3, TL4, TL8 and TU5 (See Table 7.2.2). The remaining 31 percent of the project area is currently in a grass or grass/shrub fuel model (GR1, GR2, or GS2).

Most of the fuel models found in the project area exhibit predominantly surface fire behavior under wildfire conditions, with limited opportunity for fire to get up into the crowns. Fuel model TU5, however, has a high surface fuel loading, in addition to a ladder fuel component that allows fire to move up into and become established in the crowns. Grass-shrub fuel model GS2 would also exhibit high flame lengths due to the shrub (or seedling/sapling) component. Currently, 21 percent of the project area is subject to wildfire flame lengths of greater than 11 feet (under typical wildfire conditions) where firefighting efforts would be greatly hindered.

The remaining fuel models would exhibit flame lengths below 8 feet in a typical wildfire scenario. Forty-four percent of the project area would exhibit flame lengths below 2 foot, while 35 percent of the area would exhibit 6-7 foot flame lengths (See table 7.2.2).

Table 7.3.2. Fuel model distribution in the project area with predicted flame length and fire-caused mortality in ponderosa pine overstory under a typical wildfire scenario.

Fuel Model	Fuel Type	Percent of Area	Flame length (ft)*	Percent Mortality**
GR1	Grass	10	1.5	0
GR2	Grass	13	6.2	0
GS2	Grass/shrub	8	11.1	21
TL3	Timber	13	1.4	0
TL4	Timber	21	2.0	0
TL8	Timber	22	7.1	0
TU5	Timber	13	14.9	80

*fuel moistures: 6% 1-hr, 7%10-hr, 8% 100-hr, 75% live; wind speed 15 mph; 65% slope
**80 ft canopy height, 0.5 crown ratio, 85 degrees

Fire Severity – tree mortality

Tree mortality is used as a measure of fire severity, or stand resiliency, as it represents the ability of a stand to withstand, or succumb to a wildfire. Fire-caused mortality is based on the expected fire behavior, as well as tree species and size class. Direct fire

damage including percent crown volume scorched (Stephens and Finney 2002) and bark char have been shown to be key factors in predicting post fire tree mortality (van Mantgem and Schwartz 2003).

Open stands of Ponderosa pine are typically resistant to the detrimental effects of fire. These open stand conditions were historically maintained by low to mixed severity fire, which reduced the surface fuel accumulations, reduced ladder fuels, and prevented the encroachment of less fire resistant species. Species characteristics, such as bark thickness, root depth, and canopy base height make species such as ponderosa pine and Douglas-fir trees fire resistant. Douglas-fir is less fire-resistant that ponderosa pine due to its lower branching habit and shade tolerance, which allows this species to grow in denser stand conditions.

Under typical wildfire conditions (See Table 7.2.2), 13% of the project area is currently at risk of over 80% mortality in the ponderosa pine. An additional 8 percent would be subject to over 20% mortality, while the remaining 66 percent of the area is still expected to see little mortality as a direct result of wildfire. This does not account for post fire stress and secondary mortality from insects and pathogens, which can be expected to increase post fire mortality.

7.3.2 Environmental Effects from Alternative A (Proposed Action):

This project would reduce surface fuel loading and ladder fuels in the WUI through the use of prescribed fire. This project would promote stands of fire-resistant ponderosa pine and healthy Douglas-fir in the Hazard Creek drainage. Returning fire as a disturbance agent to the landscape would maintain these open conditions and return the project area to a historic fire regime dominated by frequent low-severity fire.

Stephens and Moghaddas (2005) found that prescribed fire only and mechanical followed by prescribed fire treatments resulted in the lowest average fireline intensities, rate of spread, and predicted mortality. Prescribed fire is a useful tool that can effectively alter potential fire behavior by reducing surface and ladder fuels. Prescribed burning often directly consumes some of the lowest ladder fuels (shrubs, dead trees, needle drape, small trees) and scorches the lower branches of the overstory trees, effectively raising the live crown above the ground surface (Graham and Jain 2005). Staged treatments of prescribed fire can effectively reduce fire hazard, particularly in open stands where canopy fuels are already low enough to inhibit crown fire spread (Agee and Skinner 2005).

<u>Fire behavior Fuel Models</u>

The mechanical treatment would significantly reduce surface and ladder fuel concentrations on 60 acres. The fuel conditions would be altered from fuel model TU5 to TL3 or TL4, leaving only 2 percent of the project area remaining in TU5 conditions.

Prescribed burning would reduce surface and ladder fuels across the project area as well as remove the encroachment of Douglas-fir and grand fir seedlings in the understory. The areas classified as grass-shrub GS2 would be altered by the reduction in the shrub (or seedling/sapling) component. Fuel characteristics would result in a TL4, based on the habitat types and existing structure of these stands.

Treatment of the existing fuels would result in lower fuel loadings, primarily in the fine fuels (pine litter and dead grasses) as well as reduced ladder fuels. The low fuel loadings in timber litter fuel models TL3 and TL4 would be maintained. Fuel loadings in the timber litter fuel model TL8 would be reduced by prescribed burning, although short term increase in fine fuels may result as scorched needles fall from lower limbs, maintaining the TL8 conditions. Grass fuel models would likely remain in the same fuel models, although the dead fuel component would be reduced. Periodic applications of low severity prescribed fire would help to maintain lower surface fuel loadings.

Fire Severity – tree mortality

Approximately 15% of the project area would be altered enough to change fuel models and reducing the potential for wildfire-caused mortality. Because 60 acres of timber fuel model TU5 would be changed to a lighter fuel model prior to burning, prescribed fire mortality would be minimal. Periodic applications of low severity prescribed fire would prevent the buildup of ladder fuels as new seedlings are eliminated while they are small and do not yet contribute to torching or crown fire behavior.

Proposed burning would be conducted under prescribed weather and fuel conditions in order to limit flame lengths, thus limiting crown scorch and torching. Wind speed, air temperature, and fuel moisture are all factors that affect flame length, rate of spread, crown scorch, and mortality. Ignition techniques would be used to further control fire behavior and effects.

7.3.3 Environmental Effects from Alternative B (No Action):

Under this alternative, both surface fuel accumulations and ladder fuels can be expected to continue to build. As overstory tree species continue to convert from the fire resistant ponderosa pine toward less fire resistant fir species, increased crown closure and ladder fuels would increase the likelihood of crown fire initiation. Studies have shown that the no treatment option is ineffective in reducing fire severity (Stephens and Moghaddas 2005).

Grass and brush litter would continue to build up in the non-timbered areas. Timbered stands would move from TL3, TL4 and TL8 toward a TU5 fuel model. Resulting fire behavior would increase as would opportunities for fire to move upward into the crowns. Wildfires would have greater opportunities to escape control efforts and burn larger areas, extending into the wildland-urban interface along the highway 95 corridor.

Areas characterized by low-severity fire regimes would gradually convert to stand-replacement fire regimes. Higher mortality would result from more severe wildfires, and surviving trees would be predisposed to insects and disease mortality (Barrett 1994). As overstory tree species continue to convert from the fire resistant ponderosa pine toward less fire resistant fir and spruce species, mortality would increase as these thin-barked, dense crowned, shallow rooted species are less able to withstand even low severity fires.

Wildfire activity in the project area would be difficult to suppress, thus posing a great risk to private property and the highway 95 corridor. Fire activity and smoke would impact traffic safety on the highway and may require short– or long–term closures of the only

road connecting north Idaho and South Idaho. Power and phone lines that feed the Salmon River corridor from above Riggins to below White Bird may also be disrupted for long periods of time.

7.3.4 Cumulative Effects:

There are currently no ongoing or planned projects on the Payette National Forest or state lands adjacent to or in proximity to the project area. The BLM is currently implementing the Bally Mountain Vegetation Management project, including two timber sales followed by landscape burning, immediately south of Hazard Creek. The BLM also conducted small scale salvage removal of trees north of Hazard Creek and is in the preliminary stages of planning vegetation and fuels management activities across the Little Salmon River drainage. Additionally, some local landowners continue to alter the fuels on their property and surrounding their private structures.

All of these fuel reduction treatments can reduce the intensity and severity of a wildfire burning through those areas. These treatments tie in with other projects on adjacent lands and the proposed action, and may enhance fire suppression efforts and decrease the overall wildfire severity. Any future development within the project area would benefit from reduced fire risk under the action alternatives because of the added fire protection these alternatives offer. This project, in conjunction with other fuels reduction treatments in the Little Salmon River corridor, would contribute to the improvement of Fire Regime Condition Class (FRCC) across the landscape.

The no action alternative would have no immediate effect on fuel conditions in the project area. However, fuel loadings would accumulate, increased stand density and ladder fuels would continue to increase, and less fire resistant species would eventually dominate most stands. The result is that more of the landscape could sustain fires with greater crown fire potential, and increased tree mortality. Over time fire suppression options would become even more limited, increasing the risk of property and resource damage, and firefighter and public injury.

7.4 Air Quality

The project area is located in Idaho Airshed No. 15. The analysis of air quality includes identifying the adjacent and downwind airsheds of concern (Class I and non-attainment areas) and comparing the amounts of smoke and particulate matter to be produced as a result of the fuels treatment activities associated with each alternative. The analysis includes discussion of the consequences of wildfire in regards to air quality.

7.4.1 Affected Environment:

The Bureau of Land Management is a party to the South Idaho Smoke Management Unit, which joined the joint Montana/Idaho Airshed Group in 1999. The Operating Guide for the Montana/Idaho Smoke Management Group is based upon the Environmental Protection Agency Interim Air Quality Policy on Wildland and Prescribed

Fires. The Smoke Monitoring Unit, based in Missoula, Montana, coordinates prescribe burn activities through meteorological scheduling in order to ensure that cumulative air quality impacts are minimized.

Air quality impacts due to prescribed fire smoke result from a combination of emission production and atmospheric dispersion (Sandberg et. al 2002). Dispersion is dependent on meteorological conditions including seasonality, large-scale prevailing wind patterns, atmospheric stability, and local terrain-influenced weather patterns. The Smoke Monitoring Unit utilizes dispersion forecasts as a tool for making daily burn recommendations to members of the MT/ID Smoke Management Group.

Air quality associated with the Hazard Creek Project analysis area is generally considered good to excellent most of the year. Local adverse effects result from dust from native-surfaced roads and smoke from prescribed burning, agricultural burning, and wildfires.

The Hazard Creek Project analysis area is unclassified, but is considered to be in compliance with the NAAQS. The closest non-attainment areas include McCall, located 20 miles to the southeast. The average large-scale airflow is generally from a westerly direction throughout the year.

The Hells Canyon National Recreation Area, 11 miles to the west, is the closest Class I areas to the Hazard Creek Project analysis area. Other Class 1 areas (the Frank Church – River of No Return and the Gospel Hump Wilderness Areas) are both 24 air miles to the northeast. Class I areas receive the highest levels of protection under the Prevention of Significant Deterioration (PSD) program. All other areas, including the Hazard Creek Project analysis area, are designated Class II areas.

7.4.2 Environmental Effects from Alternative A (Proposed Action):

The proposed action would require a combination of hand pile burning (60 acres) and underburning (551 acres) to reduce fuel loadings to an acceptable level. Hand pile burning may be completed in a 1-3 day window during a single season, while underburning would be accomplished over the course of 5 years, averaging approximately 100 acres per year. The resulting smoke from these acres would affect local air quality, predominantly in the Hazard Creek and Little Salmon River drainages for a short period of 1-3 days.

Indirect effects would be a long-term decrease in fuel loading following implementation of prescribed burning. Therefore, there is likely to be a decrease in particulate matter emissions and the impairment of visibility from wildfires when they occur.

7.4.3 Environmental Effects from Alternative B (No Action):

There would be no direct effects on the existing condition of air quality from this alternative because no prescribed burning would occur. No particulate matter would be produced and visibility would not be impaired due to prescribed burning.

Indirect effects would be that fuel loadings continue to increase and wildfires would continue to occur. Wildfires tend to burn much larger acreages than controlled prescribed fire does. Wildfire occurrence without previous fuel reduction is likely to produce two to four times greater particulate matter emissions than would be generated by prescribed fire (Quigley and Arbelbide 1997).

7.4.4 Cumulative Effects:

The cumulative effects area for air quality is Airshed 15. Consideration of cumulative effects for air quality takes a different approach than for other resources. Past activities in the analysis area don't necessarily require consideration, except in the sense that use of existing roads and facilities may contribute to fugitive dust levels as described above. Present use of and activities in the analysis area are continuing with a current assessment of good to excellent air quality.

Locally adverse and cumulative impacts to air quality could be expected if prescribed burning occurred in conjunction with on-going wildfires or other prescribed burning activities in and adjacent to the airshed. Other potential prescribed burning projects that could have an impact are listed in the beginning of this chapter (description of the past, present and foreseeable future actions). However, design measures and procedures outlined in the Montana/Idaho Smoke Management Operations Guide are intended to increase the efficiency and effectiveness of communications about, and coordination of, prescribed burning to avoid adverse cumulative effects.

Under the No Action Alternative, there would be increased potential for wildfire in the project area. Wildfires are not planned around other wildfire events or meteorological conditions that would allow for dispersion and transport of smoke and particulate away from impact zones. Smoke and particulate matter associated with a wildfire in the project area would most likely combine with that from other wildfires, making conditions worse within the airshed.

7.5 Soils and Water Resources

7.5.1 Affected Environment:

Soils

The analysis project area is located in the lower portion of the Hazard Creek watershed. Within the project area a large range of slopes occur, which generally range from 10 to 70 percent.

The soils within the project area are primarily colluvium derived from granite or loess or alluvium derived from basalt. Table 7.5 below summarizes the soil map unit characteristics found within the project area. It should be noted that the erosion hazards described below refer to off-road and off-trail areas after soil disturbance activities expose the soil surface. Soil loss and erosion hazards are caused by sheet or rill erosion by land disturbances that expose 50-75 percent of the surface.

Table 7.5. Hazard Creek Fuels Project Area Soils Summary

Soil Map Unit Name and Number	Percent of Project Area	Average Slopes Ranges	Parent Material	Erosion Hazard	Proposed Vegetation Treatment
Klickson-Rock outcop complex 66	42.6% 235.0 acres	40 to 90%	Loess and/or alluvium and/or colluvium derived from basalt	Very High and Severe	Thinning 32.07 acres Low severity prescribed burning 235.0 acres
Spokel very stony loam, 40 to 90 percent slopes 103	45.0 % 247.8 acres	40 to 90%	Colluvium derived from granite	Very High and Severe	Thinning 27.9 acres Low severity prescribed burning 247.8 acres
Suloaf cobbly silt loam, 7 to 40 percent slopes 110	5.8% 32.1 acres	7 to 40%	Volcanic ash over residuum weathered from granite and/or quartz-monzonite and/or gneiss and/or mica schist	Moderate	Low severity prescribed burning 32.1 acres
Juhandle-Suttler association 59	5.9% 32.4 acres	40 to 90%	Volcanic ash over residuum weathered from granite and/or quartz-monzonite and/or gneiss and/or mica schist	Very High and Severe	Low severity prescribed burning 32.4 acres
Klickson-Wapshilla association 69	0.4% 2.0 acres	40 to 90%	Loess and/or colluvium derived from igneous rock	Very High and Severe	Low severity prescribed burning 2.0 acres
Spokel-Suttler association 106	0.3% 1.6 acres	40 to 90%	Colluvium derived from granite.	Very High and Severe	Low severity prescribed burning 1.6 acres

[1]Soil mapping units summarized soil information from the United States Department of Agriculture website (http://websoilsurvey.nrcs.usda.gov/app/).

Soils Potential for Damage by Fire: Ratings indicate the potential for damage to nutrient, physical and biotic soil characteristics by fire. Potential for damage by fire, as defined in the soil survey, "involve an evaluation of the impact of prescribed fires or wildfires that are intense enough to remove the duff layer and consume organic matter in the surface layer. The ratings are based on texture of the surface layer, content of rock fragments and organic matter in the surface layer, thickness of the surface layer, and slope."

Within the project area, all of the soil types have a “low” rating for potential damage by fire, with the exception of unit 106 (1.6 acres in project area - 0.29 percent of project area), which rates as “moderate”. “Low” indicates that fire damage is unlikely. Good performance can be expected, and little or no maintenance is needed. “Moderate” indicates that fire damage can occur because one or more soil properties are less than desirable. Fair performance can be expected, and some maintenance is needed.

Mass Wasting – Landslides: Mass wasting (e.g., a landslide), a category of natural landscape processes, occurs when large masses of soil are rapidly displaced downslope. Naturally occurring landslides function to deliver important aquatic habitat components to streams, such as spawning gravel and large woody debris. Landslides are episodic events and may be associated with rain-on-snow events, such as the January 1997 storm that caused many landslides in the Hazard Creek watershed and the Little Salmon River subbasin. Small tributaries experienced debris torrents which washed out roads and contributed large amounts of sediment to Hazard Creek.

Mass wasting in the general project area includes slumps, creep, debris avalanches or flows and debris torrents. Landslides can also result in on-site loss of soil productivity, as surface soils are translocated down slope.

Land disturbances that change the hydrologic regime (e.g., reduced transpiration following timber harvest or fire) may increase the occurrence of mass wasting and harm aquatic habitats. In addition to the land clearing and soil compaction associated with roads, construction of improper road alignments may undercut the base of unstable slopes. Where roads intercept and concentrate surface runoff and subsurface flow, water may be diverted to hillsides causing soil saturation and slope failures. Finally, if culvert or other drainage structures become plugged with sediment and debris, road fill can be washed out and cause mass wasting.

Natural soil-mass-movements on forested slope in the Western United States can be divided into two major groups of closely related landslides (Megahan and King 2004). The landslides of most importance include (1) debris slides, debris avalanches, debris flows, and debris torrents; and followed by (2) creep, slumps, and earth flows. Each type requires the presence of steep slopes, frequently in excess of the angle of soil stability (Megahan and King 2004). All characteristically occur under high soil moisture conditions and usually develop or are accelerated during periods of abnormally high rainfall. Further, all are encouraged or accelerated by destruction of the natural mechanical support on the slopes.

Timber harvest, fuel treatments and roads occurring on steeper slopes, may contribute at varying levels to initiation and acceleration of soil mass movements. Vegetation treatments contribute to mass wasting occurrences through: (1) destruction of roots, the natural mechanical support of slope soils, (2) disruption of surface vegetation cover which alters soil water distribution, and (3) road building or existing roads causing slope failures resulting largely from slope loading (from road fill and sidecasting), oversteepended bank cuts, and inadequate provision for road drainage (Chatwin et al. 1994).

Landslide hazard is variable within the project area, and instances of mass erosion have occurred within the project area. With the exception of the January, 1997, storm event

(discussed above), field reconnaissance indicates past mass wasting has been generally restricted to small scale-events with modest impacts. A plot of known landslides, together with output from the slope stability model (SINMAP) was acquired from the Payette National Forest. These were used as an initial screen to rate landslide prone hazard areas as low, moderate, or high; based on geologic materials, slope gradient and shape, topography, thickness of soil mantel, and other factors. SINMAP is a good initial screen and is used in conjunction with site-specific field inspections which would be also dependent on proposed land disturbing actions and ability to affect slope stability. Within the project area the slope stability model indicates that less than 5 percent of the project area is rated at high risk for landslides.

Mass erosion is the movement of large bodies of soil under the effect of gravity. Movement may be accelerated by high moisture levels, undercutting of toe slopes, or loss of tree rooting strength, among other factors (Chatwin et al. 1994). Landslides here include slumps, creep, debris avalanches or flows and debris torrents. Landslides can result in on-site loss of soil productivity, as surface soils are translocated down slope. Sediment delivered to streams may comprise fine sediments, which could have negative impacts, or larger rock and large organic debris, which could enhance stream habitat complexity.

Within the project area the primary man caused impacts to soils have occurred from road construction and use and unauthorized “pioneered” ATV trails and is followed by timber harvest, livestock grazing, and recreation.

Water Resources

The project area and the Hazard Creek watershed is the primary effects analysis area. The Hazard Creek watershed totals 51,920 acres and flows into the Little Salmon River at river mile 19.5. Elevations within the watershed range from 3,160 feet at the mouth to 8,767 feet. Hard Creek flows into Hazard Creek at stream mile 0 .9. The Hazard Creek Fuels Project area totals 551 acres and borders the north side of Hazard Creek in the lower portion of the watershed. Three small perennial and intermittent streams occur within the project area and flow into Hazard Creek.

Removal of the forest canopy can result in increased water yield and hydrograph modification (e.g., increased peak flows, particularly in areas subject to rain-on-snow events). An indicator of the overall relative risk of impact to the hydrologic functions of a forested watershed may be calculated as the equivalent clearcut area (ECA). Values generated by this method are combined with other information, such as stream condition and channel type, to interpret the potential effects of proposed land management activities. The Forest Service has conducted ECA analysis for several sub-watersheds, which occur within the analysis area and identified an ECA of 21.4 percent for Hazard Creek (USDA Forest Service 2003). It should be noted that some sub-watershed may have high ECAs while other sub-watersheds within the same watershed have low ECAs. For example, the Upper Hazard Creek and Upper Hard Creek sub-watersheds have very high ECAs, well over 30 percent, which are primarily attributed to past wildfires (USDA Forest Service 2003). Therefore, risks of impacts to hydrologic functions in these upper sub-watersheds are much greater than in the lower sub-watersheds of Hazard and Hard Creeks (USDA Forest Service 2003).

The majority of the Hazard Creek watershed is unroaded and overall road density is 0.71 miles per square mile (USDA Forest Service 2003). Higher road densities occur in the lower portion of the drainage (BLM lands) and upper portion of the drainage on Forest Service lands.

The Hazard Creek watershed is not included on the Clean Water Act Section 303(d) list as an impaired water body. However, Hazard Creek does flow into an impaired segment of the Little Salmon River. The Little Salmon River segment occurring from Round Valley Creek to Salmon River (24.89 miles) is on the Section 303 (d) list and the impaired water quality constituents include temperature and sediment (IDEQ, 2002/2003 Integrated 303(d)/305(b) Report). Overall, water quality is rated good for the Hazard Creek watershed, however, the Hazard Creek watershed has approximately 36 percent of the watershed rated as moderately to highly erosion-sensitive (USDA Forest Service 2003).

Hazard Creek is an important tributary to the Little Salmon River with regard to water quality. It contributes cold water to temperature-limited salmonids in the Little Salmon River during the summer (Apperson 1998). The Hazard-Hard Creek complex provides a sustained contribution of cold water that supports downstream salmonid habitat (IWRB 2001).

7.5.2 Environmental Effects from Alternative A (Proposed Action):

Mechanical thinning and pruning of 60 acres with hand tools would have no adverse effects to soil physical structure or cause adverse erosion or sediment. Within the mechanical treatment areas slash would be piled and burned and would not occur within 50 feet of one small intermittent stream (west unit). The east mechanical treatment unit occurs over 300 feet from a small stream. Slash pile burning often experience surface conditions associated with a high-severity burn that may result in hydrophobic or water repellent conditions. However, the small localized areas and stream buffers associated with the pile burning are expected to result in discountable potential for erosion and sediment reaching the stream.

The amount of prescribed fire that would actually occur in any given year depends on many factors which allow a burn “window” for implementation. It is proposed to conduct prescribed burning over a 3 to 5 year period, consequently it is expected that no more than 200 acres per year may actually be treated with prescribed fire annually. Overall, the low severity burn is expected to result in negligible erosion and sediment.

Firelines will be water-barred and rehabilitated after burning activities are completed. The handline construction and control line preparation would be expected to result in negligible erosion and sediment in the short term.

The disturbed WEPP soil model (Elliot et al., 2000) is a tool to allow users to describe numerous forest and rangeland erosion conditions. Disturbed WEPP allows summary outputs, and presents the probability of a given level of erosion occurring the year following a given disturbance. Disturbed WEPP is designed to predict runoff and sediment yield from:

- Young and old disturbed forests
- Skid trails and harvested forests
- Prescribed and wildfires

Values for disturbed WEPP modeling of the proposed projects, such as slope, and percent cover for different activities, were collected in the field during 2014, or are estimates based on knowledge of the area. The accuracy of WEPP-predicted runoff or erosion rate may be plus or minus 50 percent. The primary purpose of using the WEPP model was to provide an estimate of increased sediment yield from project implementation and provide additional analysis information for the evaluation of the effectiveness of project design measures in reducing sediment delivery to stream channels.

Using a minimum 25 to 100 foot buffer, WEPP modeling predicts no probability of sediment delivery to a channel based on a 1.5-year climatic period and is discountable for a 3.0-year climatic period for a low severity prescribed burning project (551 acres).

WEPP modeling was done for the actions occurring within the project area, however, when compared to a watershed level (i.e., 6th code HUC and 5th code HUC), increases in sediment would be expected to be less than 0.5 to 1 percent over baseline for the Hazard Creek watershed(s) (5th code HUC or 6th code HUC). WEPP modeling based on 30-years of climate estimated probability of 37 percent for sediment delivery and 1.8 tons for year one (average using 30-years of climatic data). Overall, based on a 30-year average the sediment yield would be discountable at a watershed level.

Mechanical cutting of small diameter trees (60 acres) would not adversely impact slope stability within the project area. Potential for mortality to mature/overstory trees would be expected to be less than 2-5 percent from prescribed burning (551acres). Project implementation would not change overall stand structure in the short term and no increase in water yield would occur. Low severity prescribed burn occurring in areas that have a high hazard rating (less than 5 percent) would not increase risk for slope instability or landslides. Adequate slope stability would be provided by live trees (root strength) that would be retained on site. No adverse impacts to slope stability or adverse run-off or erosion would be expected to occur from implementation of the proposed project.

No adverse effects are expected to occur to designated beneficial uses for Hazard Creek from implementation of the proposed actions or the 303 (d) impaired segments of the Little Salmon River. No adverse effects to water temperature or increased water yield would occur from implementation of the proposed action.

Improving road drainage would reduce potential for adverse erosion and sediment occurring from existing roads within the project area. Reducing fuel load build up (551 acres) and understory thinning of 60 acres would reduce risk from effects of potential high severity wildfires within the project area (see Section 7.2 Fuels).

7.5.3 Environmental Effects from Alternative B (No Action):

No direct or indirect short term adverse effects to soils or water resources would be expected to occur in the short term. Existing conditions and trends for soils and water resources would be expected to continue within the project and analysis area. A continuing build up fuels in these areas would lead to an increased risk of uncharacteristic stand replacement wildfire in the long term. Dependent on size and overall burn severity from a wildfire; such an event could result in adverse effects to soils and water resources within the Hazard Creek watershed. Potential adverse effects would include: increased erosion and sediment delivery to streams; changes to hydrologic regimes (e.g., higher peak flows) and potential for channel scouring; and impacts to slope stability. Stand replacing fires occurring on areas rated high risk landslides would have reduced slope stability and increased potential for landslides and debris torrents.

7.5.4 Cumulative Effects:

The cumulative effects analysis area is the Hazard Creek watershed and Little Salmon River. Past and present actions have impacted soils and water resources to varying levels. Land uses within the Hazard Creek watershed would have indirect impacts to water quality in the Little Salmon River. The primary effects to soils and water resources has occurred from timber harvest, road and trail construction and use, unauthorized "pioneered" ATV trail use", livestock grazing, recreation use, wildfires, extreme weather conditions (e.g., rain on snow events, precipitation), and rural development activities. Soil disturbing actions have resulted in erosion and sediment delivery to stream channels. Stand replacing wildfires have had adverse effects on hydrologic regimes in watersheds and have resulted in increased peak flows and stream channels may have experienced scouring flows. Roads and trails in localized areas have resulted in chronic sediment sources, particularly roads and trails located in RCAs and riparian habitats.

Overall, the majority of the Hazard Creek watershed is roadless and water quality is good. The proposed action alternative, in combination with past, present, and reasonably foreseeable future actions potentially would have minor or negligible effects to soils and water resources within the cumulative effects analysis area; which includes the Hazard Creek watershed and Little Salmon River. Implementation of the proposed action would not adversely impact the 303 (d) listed segments of the Little Salmon River (impaired water quality constituents include temperature and sediment).

7.6 Fisheries, Aquatic Habitats, and Special Status Fish Species

7.6.1 Affected Environment

The Hazard Creek watershed includes a total of 51,920 acres, and included in this total is 27,867 acres for the Hazard Creek sub-watershed and 24,053 acres for the Hard Creek sub-watershed. Hazard Creek flows into the Little Salmon River at river mile 19.5. Hard Creek flows into Hazard Creek at stream mile 0 .9. The Hazard Creek Fuels Project area totals 551 acres and borders the north side of Hazard Creek in the lower portion of the watershed. Elevations within the watershed range from 3,160 feet

at the mouth to 8,767 feet. Within the Hazard Creek watershed much of the area is forested with mixed conifers at the middle and lower elevations and subalpine fir, lodgepole pine and Englemann spruce are more common at the higher elevations, or along riparian areas.

A large amount of the drainage is roadless and undeveloped; however, sediment production within the watershed has been accelerated in some areas through human-related activities such as roads, timber harvest, and recreation (lower watershed). During 1994, the Corral Fire burned a large amount of the upper portions of the Hazard and Hard Creek watersheds. The ECA is above 30% in the upper Hazard and Hard Creek watersheds as a result of this fire. During early January, 1997, a rain on snow event resulted in the occurrence of several debris torrents in the lower elevation first order tributaries. This particular event contributed large amounts of sediment to lower Hazard and Hard Creeks and the Little Salmon River.

The drainage provides designated critical habitat for Endangered Species Act (ESA)-listed spring/summer Chinook salmon, steelhead trout, and bull trout (see Section 11.0, Attachment 3). The southern and southeast boundary of project area borders 1.45 miles of designated critical habitat for spring/summer, steelhead trout, and bull trout. The drainage provides spawning and rearing habitat for spring/summer Chinook salmon and steelhead trout. Bull trout use the stream for subadult/adult rearing. A full passage barrier (falls) is located at stream mile 3.7 which restricts listed species habitat to the lower reaches of the stream. Other fish found in the drainage include rainbow/redband trout, cutthroat trout, brook trout, and whitefish. The primary limiting factors for fish production in Hazard Creek include: deposited sediment, elevated summer water temperatures, and limited amounts of good quality spawning gravels. Natural barriers restrict ESA-listed species use to a small percentage of the lower main Hazard Creek and Hard Creek.

The dominant geologic type is border/transition. This geologic type occurs on the borders of the Idaho batholith with scattered outcrops throughout the region, and consists of granitic rocks, granitic gneisses, schist, quartzites, and other metamorphic rocks. This geologic type does not weather as quickly as central core rocks. Soil textures are medium to coarse and are generally highly erodible.

The Cottonwood Field Office Resource Management Plan (RMP) identified programmatic aquatic management direction for specific conservation and restoration watersheds (includes subwatersheds within the planning area (BLM 2009, Appendix B). Identifying conservation and restoration watersheds demonstrates the BLM's priority of programmatic management direction and strategies for watershed, riparian, and aquatic resources; which is the basis for developing goals, objectives, standards, and monitoring strategy. Hazard Creek and Hard Creek have been identified as Conservation watersheds. Conservation watersheds have aquatic/watershed processes and functions that occur in a relatively undisturbed and natural landscape setting. Management strategies emphasize allowing natural disturbances, but active management is sometime required to conserve these physical and biological processes and patterns.

Refer to the Soils and Water Resources sections of this chapter (Section 7.5) for additional information pertinent to the analysis for aquatic species and habitats. The *Little Salmon River Subbasin Biological Assessment of Ongoing and Proposed Activities on Special Status Fish* (BLM 2000) also provides additional watershed information for the Hazard Creek watershed and the Little Salmon River subbasin.

Fisheries

The Hazard Creek drainage provides spawning and rearing habitat for ESA-listed spring/summer Chinook salmon and steelhead trout. Bull trout use the stream for subadult/adult rearing. Other fish found in the drainage include brook trout, cutthroat trout, and whitefish. Redband trout and westslope cutthroat trout are designated BLM sensitive fish species. The drainage also provides potential habitat that may be used by Pacific lamprey, which is a BLM sensitive fish species.

In the Little Salmon River subbasin, a mainstem passage barrier falls on the Little Salmon River presently blocks fish passage above river mile 24, and Hazard Creek flows into the Little Salmon River at river mile 19.5. Currently, no known anadromous fish use or bull trout use occurs above the Little Salmon River barrier falls. However, a few anecdotal reports do exist for anadromous fish use above the Little Salmon River barrier falls. A full passage barrier (falls) for spring/summer Chinook salmon, steelhead trout, and bull trout occurs at stream mile 3.7 on Hazard Creek. A partial/full barrier restricts spring/summer Chinook salmon and bull trout fish passage at stream mile 0.6 on Hard Creek. A full passage barrier for steelhead trout occurs at stream mile 4.7 on Hard Creek.

Fish Habitat

Hazard Creek is a fifth order stream comprised of A and B channel types. A-type channels have gradients greater than 4% and have confined alluvial channels. B-type channels have gradients from 1.5 to 4.0% and have moderately confined channels. Table X below summarizes Hazard Creek fish habitat parameters in the lower reaches below the barrier falls.

Table 7.6. Habitat Analysis for Hazard Creek (Reaches 1-3, Stream Miles 0.0 - 2.4)[1]

Habitat Pot.	Cobble Embed.	Spawning Gravels %<6.3	Pool Rif. Ratio	Summer Temp. C°	Active Debris & Pot. Debris 100m.	Pool Qual.	Instream Cover	Bank Cov.	Bank Stab.
Natural	<22%	<19%	1:4	<=16	25+/60+	5.0	11%+	5%+	95%+
Exist.	28-34%	27-34%	1:10	17C	1/10-15	4.6	14%	5%	100%
%Nat.	60%	60%	70%	80%	60%/60 %	80%	100%	100 %	100%

[1]Stream survey conducted is a modified Hankins and Reeves survey protocol (1988) (Johnson 1994, USDI-BLM 1993, field verified and updated during 2014).

The Hazard Creek mainstem length is 10.5 miles and total stream miles for the drainage is approximately 52.1 miles. The dominant channel types are A and B.

The Little Salmon River drainage and lower portion of the Hazard Creek watershed experienced an early January, 1997, rain on snow event. The debris torrents started at about the 5,000 feet elevation level and scoured the small 1st to 3rd order tributary streams delivering sediment, large woody debris (LWD), and various sized substrate, rocks, and woody debris, down to Little Salmon River, Hard Creek, and Hazard Creek. The same early January 1997 event also resulted in landslides that also impacted streams. The watersheds and stream channels affected by the 1997 event have experienced recovery and flushing of deposited sediment and improved channel conditions has occurred, however, some localized legacy effects still exist (particularly to small tributary streams) such as unstable banks and flood/debris torrent scouring effects to channels.

Endangered Species Act (ESA)-Listed and BLM Sensitive Fish Species

Within the project and analysis area, the Little Salmon River, Hazard Creek, and Hard Creek provide habitat for ESA-listed Snake River spring/summer Chinook salmon (*Oncorhynchus tshawytscha*), steelhead trout (*Oncorhynchus mykiss*), and bull trout (*Salvelinus confluentus*) (see Section 11.0, Attachment 3). The proposed project occurs in the Hazard Creek 6th code (HUC #170602100302). For additional specific Hazard Creek watershed and Little Salmon River subbasin information refer to the Little Salmon River subbasin Biological Assessment (BA) (BLM 2000). In accordance with Section 7 of the Endangered Species Act (ESA) the BLM coordinated with the National Marine Fisheries Service (NMFS) and U.S. Fisheries and Wildlife Service (USFWS) biologists in preparing a biological assessment (BA) specific to the Proposed Action (BLM 2015).

There are two species under the jurisdiction of National Oceanic Atmospheric Administration (NOAA), NMFS, which are listed under the ESA which occur in the project/analysis area. These ESA-listed species include the spring/summer Chinook salmon and steelhead trout. The Snake River spring/summer Chinook salmon was listed as threatened on May 22, 1992 (Federal Register, Vol. 57, 14653). Steelhead trout in the Snake River basin have been listed as threatened under the ESA with an effective listing date of October 17, 1997 (Federal Register, August 18, 1997, Vol. 62, 43937). The Little Salmon River, Hazard Creek, and Hard Creek were designated critical habitat for Snake River spring/summer Chinook salmon on December 28, 1993 (Federal Register, Vol. 58, 68543), effective on January 27, 1994. Critical habitat for Snake River Basin steelhead trout was designated on September 2, 2005 (70 FR 52630) and within the project/analysis area which includes the Little Salmon River, Hazard Creek, and Hard Creek as specified in the Federal Register. The project area borders 1.45 miles of designated critical habitat for spring/summer Chinook salmon and steelhead trout.

The bull trout is under the jurisdiction of USFWS and is listed under the ESA. On July 10, 1998, the USFWS listed the Klamath and the Columbia River population segment of the bull trout as threatened (Federal Register, June 10, 1998, Vol. 63, 31647). On October 18, 2010, the USFWS designated critical habitat for bull trout throughout their U.S. range. The final rule for the revised designation of critical habitat became effective

on November 17, 2010 (Federal Register, October 18, 2010, Vol. 75, No. 200, 63898). The Little Salmon River, Hazard Creek, and Hard Creek are designated critical habitat for bull trout. The project area borders 1.45 miles of designated critical habitat for bull trout.

The listing of the above species requires the BLM to ensure that all actions authorized or funded by the agency are not likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of designated or proposed critical habitat of listed species [ESA Section 7 (a)(2) and (4)].

Pursuant to section 305(b)(2) of the Magnuson-Stevens Act, Federal agencies must consult with NOAA Fisheries (NMFS) regarding any of their actions authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken that may adversely affect Essential Fish Habitat (EFH). The Magnuson-Stevens Act, section 3, defines EFH as "those waters and substrate necessary for fish for spawning, breeding, feeding, or growth to maturity." Federal agencies may incorporate an EFH Assessment into ESA BA (BLM 2015). The referenced BA prepared for this project includes an EFH assessment for Chinook salmon for the Hazard Creek watershed. The project area borders 1.45 miles of spawning and rearing habitat for Chinook salmon.

The Hazard Creek watershed also provides habitat for the following BLM sensitive species which are identified as follows:

- Westslope cutthroat trout (*Oncorhynchus clarkii lewisi*)
- Pacific lamprey (*Lampetra tridentata*)
- Redband trout (*Oncorhynchus mykiss gairdneri*)

The following is specific to sockeye salmon and fall Chinook salmon and the Lower Salmon River. The Little Salmon River flows into the Salmon River at river mile 86.7. The Salmon River is used by ESA-listed sockeye salmon and fall Chinook salmon and is designated critical habitat for these two fish species. The sockeye salmon utilizes the mainstem Salmon River as an upstream and downstream passage corridor. No sockeye salmon spawning or early rearing occurs in the Lower Salmon River subbasin. Fall Chinook salmon use the Salmon River for upstream and downstream passage, spawning and early rearing. The Snake River sockeye salmon was listed as endangered on November 20, 1991 (Federal Register, Vol. 56, 58619). The Snake River fall Chinook salmon was listed as threatened on May 22, 1992 (Federal Register, Vol. 57, 14653). The Lower Salmon was designated critical habitat for Snake River sockeye salmon and Snake River fall Chinook salmon on December 28, 1993 (Federal Register, Vol. 58, 68543), effective on January 27, 1994. Within the Salmon River, no adverse effects to fish passage or water quality for migrating fish would occur from the proposed project. Implementation of the proposed project would result in no adverse effects to sockeye salmon, fall Chinook salmon, or designated Salmon River critical habitat and a determination of *"no effect*" was made for the species and no further discussion about these species would occur in this document.

7.7.2 Environmental Effects from Alternative A (Proposed Action):

For additional information regarding effects to water quality and aquatic habitats refer to the previous Section 7.5, Soils and Water Resources. The riparian and aquatic functions and processes that may potentially be affected by the proposed action (given the existing conditions and associated issues) include the following:

- Sediment/Stream Substrate Condition
- Water Quality/Temperature
- Large Woody Debris
- Water Yield
- Stream Channel Function and Streambank Stability

Sediment/Stream Substrate Condition

Short term "pulse disturbance" increases in turbidity and sediment potentially could result from project implementation actions such as prescribed burning, however, actions such as improved road drainage to reduce road related erosion and sediment would focus on long term reductions in chronic or "press disturbance" sediment. "Pulse disturbance" like most fires, floods, and some droughts are within the range of natural disturbances to which an ecosystem is adapted, are temporary in time and often patchy in space, and natural recovery is usually possible without assistance. "Press disturbance" alters the long term resilience of an ecosystem, like sediment from permanent roads or channel alteration from mining or grazing. The "press disturbance" described in this assessment are generally chronic, often widespread (e.g., roads), and may exceed the capacity for recovery without assistance. Surface erosion and sediment delivery to streams would be expected to be near pre-project conditions within one to two years after project implementation, with gradual improving reductions occurring in the long term.

Salmonids are typically negatively affected by increasing amounts of sediment (Bjornn and Reiser 1991). A review of studies related to the effects of fine sediment on salmonids by Chapman and McLeod (1987) concluded that survival to emergence decreases as fine sediment increases in the spawning gravels, the loss of pool volume due to sediment deposition reduces the suitability of a stream for adults, macroinvertebrates decrease in biomass and diversity, and winter carrying capacity decreases. Sedimentation of deep pools and coarse substrate limits the physical space available to juvenile fish for rearing and overwintering. The summer or winter carrying capacity of a stream for fish declines when sediment fills the interstitial spaces of the substrate (Bjornn and Reiser 1991).

Fine sediment (less than 6.33 mm) deposited in spawning areas can trap or smother eggs and embryos, reducing reproductive success of spawning adults. In spawning areas, egg deposition, development, and survival become limited when sediment fills the spaces between gravel, preventing the flow of oxygen and the flushing of metabolic wastes.

Project Related Effects to Erosion/Sediment: The mechanical thinning of 60 acres with hand tools and chainsaws would result in negligible disturbance to ground cover and no piling and burning of slash would occur within 50 feet of one small intermittent

stream. Slash pile burning often experience surface conditions associated with a high-severity burn that may result in hydrophobic or water repellent conditions. However, the small localized areas and stream buffers associated with the pile burning are expected to result in negligible potential for erosion and sediment reaching the stream.

The primary issue with prescribed fire is the increased potential for surface erosion due to duff reduction and subsequent mineral soil exposure. There is a curvilinear relationship between duff reduction and mineral soil exposure, with mineral soil exposure increasing with increasing duff consumption (Sandberg 1980). The proposed prescribed burn treatment objective is to leave sites with the surface condition of a low-severity burn. With increasing duff and litter moisture content, soil temperatures are reduced, preventing soil hydrophobicity and reduction surface erosion (Robichaud and Waldrop 1994). Burn plan prescriptions would include objectives to limit duff consumption and mineral soil exposure. The amount of prescribed fire that would actually occur in any given year depends on many factors which allow a burn “window” for implementation. It is proposed to conduct prescribed burning over a 3 to 5 year period, consequently it is expected that no more than 200 acres per year may actually be treated with prescribed fire annually. It is also expected that tree mortality to mature overstory trees would be less than 5 percent with the proposed prescribed fire treatment.

WEPP modeling predicts no probability of sediment delivery to a channel based on a 1.5-year climatic period and is discountable for a 3.0-year climatic period for a low severity prescribed burning project (551 acres). WEPP modeling based on 30-years of climate estimated probability of 37 percent for sediment delivery and 1.8 tons for year one (average using 30-years of climatic data). Overall, based on a 30-year average the sediment yield would be discountable at a watershed level. Using state-of-the-art deposited sediment monitoring techniques it is expected that deposited sediment impacts to cobble embeddedness, surface fines, and fines by depth (spawning gravels) would be undetectable.

Prescribed fire is expected to result in negligible erosion and sediment and no measurable increase in deposited sediment is expected to occur in Hazard Creek. Improving road drainage would reduce potential for adverse erosion and sediment occurring from existing roads within the project area.

Prescribed Fire in Riparian Conservation Areas (RCAs): Prescribed fire treatments would occur in RCAs to support achievement of making the upland vegetation located within RCAs more defensible in the event of a wildfire. Prescribed fire would be allowed to back down into RCAs. Less fireline (ground disturbance and loss of ground cover) would occur with the flexibility of allowing fire to back into RCAs. Fire in RCAs would be managed to limit fire effects to low severity. Prescribed fire would have the potential to result in sediment delivery, however, the project design feature to retain ground cover and limit the burn to low severity would minimize this risk. Burning is not expected to have adverse erosion and sediment effects that would result in any measurable deposited sediment impacts to aquatic habitats. The proposed treatments within RCAs have design features to minimize potential for adverse erosion and sediment are and vegetation and soil disturbance from low severity burning is not expected to retard attainment of desired conditions for soil, water, riparian, and aquatic resources; which

are identified in the Record of Decision and Approved Cottonwood Resource Management Plan (BLM 2009).

Slope Stability: No removal of trees above 8 inch dbh is proposed to occur in the 60 acre mechanical treatment area and low severity prescribed burning that would occur within the project area (551 acres). Cutting of small diameter trees would not adversely impact slope stability within the project area. Potential for mature/overstory trees would be expected to be less than 5 percent mortality from prescribed burning. Project implementation would not change overall stand structure in the short term and no increase in water yield would occur. Low severity prescribed burn occurring in areas that have a rating as a high hazard would not increase risk for slope instability or landslides. Adequate slope stability would be provided by live trees (root strength) that would be retained on site. No adverse impacts to slope stability are expected to occur from implementation of the proposed project.

Water Quality/Temperature

Toxics

A spill hazard exists wherever roads are near streams or road drainage enters streams (Furniss et al. 1991). Fuel spills may negatively affect a fish-bearing stream biologically through direct poisoning of fish and invertebrates, a food source. Fuels and fuel oils are moderately to highly toxic to salmonids, depending on the concentration and exposure time (Gutsell 1921). Free oil and emulsions may adhere to gills and interfere with respiration and heavy concentration of oil can suffocate fish. The fate of oil in water includes spreading, movement, evaporation, solution, emulsification, photo-chemical oxidation, microbial degradation, sedimentation, and hydrocarbons deposited in sediments which may persist for long periods (Saha and Konar 1986).

Water quality analysis includes potential risks for introduction of toxic materials. This assessment does not include predictions of the amount of toxic materials entering streams. The project proposal identifies measures that minimize potential risks of toxic materials entering streams.

Water Temperature

Stream temperatures are the net result of a variety of transfer processes, including radiation inputs, evaporation, convection, conduction, and advection (Brown 1983). Removal of vegetation along streams may result in instream temperature increased during summer months, and in the loss of insulating vegetation that can contribute to colder winter stream temperatures. Water temperature influences the metabolism, behavior, and mortality of fish and other organisms in their environment (Mihurksy and Kennedy 1967).

Unsuitable temperatures can lead to disease outbreaks in migrating and spawning fish, altered timing of migration, and accelerated or retarded maturation. Unsuitable temperatures can also force adult and rearing juvenile fish to find thermal refuge in tributaries where there may be increased risk of predation and/or competition for food, potentially affecting a fish's fitness, thus its survival going into winter. Fish can often

survive short durations of temperatures above or below their preferred range, growth is reduced at low temperatures because all metabolic processes are slowed, and at high temperatures, because most or all food must be used for maintenance (Bjornn and Reiser 1991).

Measured buffer strip shading shows that a buffer strip 85 feet wide shades a stream as well as an average undisturbed canopy in late successional old growth forests in the Western Cascades (Steinblums 1977). In a study of small streams, Brazier and Brown (1973) found the maximum shading ability of the average buffer strip was reached with a width of 80 feet.

Colder water temperatures due to loss of insulating vegetation can lead to the formation of frazil or anchor ice on stream bottoms. Incubating embryos can be killed when frazil or anchor ice forms in streams and reduces water interchange between stream and redd (Bjornn and Reiser 1991).

Generally spawning temperature is not as high of a concern for steelhead and redband/rainbow trout, which spawn in the spring, or bull trout, which spawn in the in the fall when stream temperature are typically cooler. High summer temperatures can affect summer rearing habitat for all federally listed or BLM sensitive fish species, and the spawning success for in spring/summer Chinook salmon that spawn in August to mid-September.

Potential increases in stream temperature are addressed by assessing the degree of activities in riparian areas that may result in increased or decreased solar radiation to streams. No timber harvest is proposed in RCAs, however, prescribed fire would be allowed to back down into RCAs.

Project Related Effects to Water Quality/Temperature: No storage of hazardous materials (e.g., fuels) would be allowed on site during project implementation. Project implementation would have very low risk for any toxic materials or fuels reaching live waters. Low severity fire would be allowed to back down into RCAs. Low severity fire in the RCAs would be expected to result in negligible effects to overstory trees providing stream shading and no effects to aquatic habitats or water quality (i.e., temperature) is expected to occur from implementation of the proposed action. It is also expected that tree mortality to mature overstory trees would be less than 5 percent with the proposed prescribed fire treatment. It is also expected that overstory tree morality occurring from low severity fire backing into RCAs would be even less than would occur in the upland areas. No measurable increase to water temperatures would occur from implementation of the proposed action.

Large Woody Debris

Large woody debris (LWD) is one of the most important sources of habitat and cover for fish populations in streams (MacDonald et al. 1991 p. 129). LWD increases fish habitat complexity, which helps ensure that cover and suitable habitat can be found over a wide range of flow and climatic conditions (MacDonald et al. 1991 p. 128). Large wood has a major impact on channel forming in smaller streams (Sullivan et al. 1987). The location and orientation of LWD can influence channel meandering and bank stability (Swanson

and Lienkaemper 1978; Cherry and Beschta 1989). LWD is often the most important structural agent forming pools in small streams (MacDonald et al. 1991). Bilby (1984), and Rainville et al. (1985) found that 80 percent of pools in small streams in Washington and the Idaho Panhandle respectively, were wood associated. LWD also influences sediment transport in streams by forming depositional sites (MacDonald et al. 1991). Wood was responsible for storing half the sediment in several small streams in Idaho (Megahan and Nowlin 1976). LWD can also provide storage sites for leaves, twigs, and other organic material (MacDonald et al., 1991). In small streams in forested areas, this fine organic material can provide the bulk of the energy and materials entering into aquatic food web (MacDonald et al. 1991).

LWD is a component of habitat quality and complexity and is also an important contributor to stream productivity, cover, and food production for fish and other aquatic organisms. Large wood in the streams also contributes to channel stability in small, low order streams, and is thus an important element even in streams where fish are not present. Under natural conditions, large wood is contributed to streams from the surrounding riparian areas as trees fall over and may be recruited slowly over time or in large numbers over a short period of time. The latter often occurs in response to a significant disturbance event, such as wildfire or an extreme weather event where floods or debris torrents wash large amounts of material into the stream. Stream restoration for LWD deficient streams often includes felling trees into streams, hauling LWD to the stream, and selective placement in the stream.

The amount of LWD in a stream is usually measured in the field during stream surveys by counting the number of large woody pieces present in the stream. Future woody debris recruitment is estimated by counting the number of trees in the riparian area that could fall into the stream.

Increases in water yield and high flood flows have the potential to scour stream channels and streambanks. These increased stream flows also may potentially move and flush embedded or anchored LWD from a stream reach. LWD may be moved downstream to a larger stream or river reaches where LWD may not have the same important function for instream cover.

Most woody debris recruitment in this landscape comes from the streamside zone. Within the Hazard Creek Fuels Project area and analysis area; past flood events, landslides and debris torrents have impacted the Little Salmon River, Hazard Creek, Hard Creek.

Robison and Beschta (1990) found that when the distance from a tree to a stream was more than one effective tree height, the probability of the tree contributing LWD approached zero. The effectiveness of riparian forests along stream channels to deliver LWD is low at distances greater than one tree height away from the channel (McDade et al. 1990).

Project Related Effects to Large Woody Debris: Low severity fire would be allowed to back down into RCAs. Low severity fire in the RCAs would be expected to result in negligible effects to existing LWD levels and potential LWD recruitment. It is expected that overstory tree morality occurring from low severity fire backing into RCAs would be even less than would occur in the upland areas (less than 2 – 5 percent). Live trees

that may be killed would potentially provide for LWD, dependent on distance from the stream and the lean of the tree. Potential does exist for streamside snags burning up, which may provide potential for LWD recruitments and potential for loss of LWD is considered negligible. Overall, no adverse effects to large woody debris recruitment would occur from project implementation.

Water Yield

Increased water yield is one indicator used to assess potential effects of implementation of the proposed action, and it is a rough predictor of potential changes in channel condition and instream habitat. Increases in water yield may indirectly affect fish habitat through increased bank erosion, channel down cutting, increased accumulation of larger streambed materials, reduction in number of pools, overall reduction of habitat complexity, and changes in number, size, or frequency of LWD.

ECA is a term used to describe the total area within a watershed that does or would exist in a clearcut condition. The results of the water yield analysis (ECA) is used for analysis of potential impacts to fish habitat.

The National Marine Fisheries Service (NOAA Fisheries (NMFS) 1995) suggests that an ECA of 15 percent is cause for concern in priority watersheds. The Matrix of Pathways and Indicators of Watershed Condition (NOAA Fisheries et al., 1998) identifies less than 15 percent ECA as a high quality habitat condition; 15–20 percent ECA as moderate quality habitat condition; and greater than 20 percent as low quality habitat condition. These thresholds were identified to provide a conservative approach to water yield that would avoid the following undesirable effects on stream habitat condition: accumulation of streambed materials (aggradation), channel braiding, channel down cutting, and increased bank erosion. The above may collectively or singularly contribute to increased width/depth ratio, decreased number of pools, decreased pool quality, and overall simplification of instream habitat (Chamberlin et al, 1991).

Increases in water yield are highly variable in time and space because they are dependent on climate, topography, soils, vegetation, and other environmental factors. This high degree of variability makes it difficult to quantifiably determine an outcome as a result of timber harvest activities. Stream channel types and stability rating were used in conjunction with percent increases in ECA to assess the risk that project associated water yield increases may cause channel changes.

Stream channel stability is determined through an inventory procedure developed by Pfankuch (1978, p. 1). He developed a procedure to assess entire channel systems within a watershed, and to use the results in conjunction with other hydrologic analyses. Stream channels are rated based on their ability to withstand increase in stream discharge associated with decreases in the density and areal extent of vegetation. A stream with a “poor” rating has a higher risk of sustaining damage from increased peak discharge than a stream rated “good” or “excellent”. Scores are the sum total of stability indicator classes for streambanks and stream bottoms (Pfankuch 1978, pp. 5 – 6). Stability ratings are the result of a scoring system where:

- Excellent: less than 38.

- Good: 39 – 76.
- Fair: 77 – 114
- Poor: greater than or equal to 115

The fish bearing streams and small tributary streams within the project area had channel stability evaluations (Pfankuch 1978) completed during 2014. Overall, stream reach inventory and channel stability evaluations had a good rating (one reach rated fair). Several small tributary stream channels had severe channel and streambank scouring that occurred during a January, 1997, rain on snow event; and have recovered since that event. The potential impact from water yield changes to stream channel conditions and LWD are discussed under those indicators.

Project Related Effects to Water Yield: A total of 551 acres is identified for prescribed fire treatments, however, total areas that are "blackened" from burning would be less than 80 percent of the project area because of the mosaic burn pattern that would result from various topography and fuels occurring within the project area. It is also expected that tree mortality to mature overstory trees would be less than 2 to 5 percent with the proposed prescribed fire treatment. No new roads or any temporary roads would be constructed for implementation of the proposed project.

The Hazard Creek watershed is a large 5th order HUC and the project area occurs in the lower portion of the watershed. Overall, with the exception of a reduction of understory fuels; no change to stand structure or ECA is expected to occur within the watershed with the implementation of the proposed project. No changes to water yield is expected to occur from implementation of the proposed project in the short term.

Implementation of the proposed project would reduce the continuing build up fuels in these areas that would lead to an increased risk of uncharacteristic stand replacement wildfire that would potentially result from No Action, in the long term. Dependent on size and overall burn severity from a wildfire; such an event could potentially result in adverse effects from stand replacement fires (increase of ECA) which would alter the hydrologic regimes for the watershed. Corresponding impacts to water yield (dependent of severity and size of wildfire) could potentially result in increased risks from flooding and channel scouring and increase the risk for potential debris torrents.

Stream Channel Function and Stability

The most common biological features establishing or affecting the relationships of channel and valley slope have been native pioneer species of riparian vegetation (Smith and Prichard 1992). High energy runoff and its associated transported sediment have been moderated by dissipation, through spreading across floodplains, vegetative entrapment, development of sinuous meander patterns, and seasonal recharge of ground-water aquifers and riparian bank storage. Healthy riparian areas are noted for having adequate vegetation, landform, or large woody debris to dissipated energy during high-flow events, limit erosion, and improve water quality. Healthy riparian and wetland areas also filter sediment and capture bedload, which aids floodplain development and enhances flood-water retention and ground-water recharge. In

addition, healthy riparian–wetland areas also produce diverse ponding and channel characteritstics that provide habitat necessary for fish production, waterbird breeding, wildlife habitat, and other uses (Prichard et al. 1996).

Erman et al. (1977) reported that the composition of benthic invertebrate communities in streams with buffers greater than 100 feet were indistinguishable from those in streams flowing through unlogged watersheds.

Road construction have been the most significant land use influences on riparian habitats and stream channels within the analysis area, and is followed by livestock grazing within some subwatersheds. Roads have encroached on riparian areas and stream channels. Road fords, bridges, and culverts exist at stream crossings, and these stream crossings alter stream channels and may be a chronic erosion and sediment source. Highway 95 has encroached on the Little Salmon River stream channel and riparian habitat adjacent to the project area.

Project Related Effects to Stream Channel Functions and Streambank Stability: While there are no plans to ignite prescribed fire burns within the RCAs, there would be some effect from fire backing down into these areas; consequently, some riparian habitats would be impacted and potential effects to riparian areas would occur. A low severity fire backing down into RCAs and riparian habitats is expected to have discountable to negligible effects to stream channel function and streambank stability in the short term. No adverse effects to stream channel functions or streambank stability is expected to occur in the long term.

Implementation of the proposed project would reduce the continuing build up fuels in these areas that, under No Action would lead to an increased risk of uncharacteristic stand replacement wildfire in the long term. Dependent on size and overall burn severity from a wildfire; such an event could potentially result in adverse effects from stand replacement fires (increase of ECA) which would alter the hydrologic regimes for the watershed and corresponding impacts to water yield and potentially for high flow impacts. A high severity fire would also have the potential to impact riparian vegetation which provides for streambank stability.

Endangered Species Act (ESA)-Listed and BLM Sensitive Fish Species

Refer to the following Table 7.7, for a summary of determinations for ESA-listed and BLM Sensitive species, and critical habitats. A BA has been prepared in cooperation with the U.S. Fish and Wildlife Service and National Marine Fisheries Service (NMFS) for the proposed project (BLM 2015).

Table 7.7. ESA-Listed Species, Critical Habitat, and BLM Sensitive Fish Determination

Species Status	Proposed Action (Alt. 1)	No Action (Alt. 2)
Sockeye Salmon *Endangered*	NE (Species) NE (CH)	NE (Species) NE (CH)

Species Status	Proposed Action (Alt. 1)	No Action (Alt. 2)
Fall Chinook Salmon *Threatened*	NE (Species) NE (CH)	NE (Species) NE (CH)
Spring/Summer Chinook Salmon *Threatened*	MA-NLAA (Species) MA-NLAA (CH)	NE (Species) NE (CH)
Steelhead Trout *Threatened*	MA-NLAA (Species) MA-NLAA (CH)	NE (Species) NE (CH)
Bull Trout *Threatened*	MA-NLAA (Species) MA-NLAA (CH)	NE (Species) NE (CH)
Westslope Cutthroat Trout	MII	NI
Redband Trout	MII	NI
Pacific Lamprey	MII	NI

ESA-Listed: NE=No Effect; MA-NLAA="*May Affect, Not Likely to Adversely Affect*"; MA-LAA="*May Affect, Likely to Adversely Affect*"

Critical Habitat: CH

Idaho BLM Sensitive: NI=No Impact; MII="*May impact individuals or habitat, but will not likely lead to a trend toward federal listing or cause a loss of viability of the population or species*".

A "*not likely to adversely affect"* determination was made for Essential Fish Habitat (EFH) (see analysis rationale for listed fish). Pursuant to section 305(b)(2) of the Magnuson-Stevens Act, Federal agencies must consult with NOAA Fisheries regarding any of their actions authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken that may adversely affect EFH. The Magnuson-Stevens Act, section 3, defines EFH as "those waters and substrate necessary for fish for spawning, breeding, feeding, or growth to maturity". The referenced BA (BLM 2015) incorporated an EFH Assessment into the analysis.

Rationale for Special Status Species Determinations: Project implementation is expected to result in negligible or discountable erosion or sediment and no measurable increase in deposited sediment would occur in Hazard Creek. No adverse effects to water yield or peak flows, water quality (e.g., temperature), channel condition, streambank stability, or large woody debris recruitment would occur from project implementation. Conducting low severity prescribed burning would not adversely affect slope stability. Improving road drainage would reduce potential for adverse erosion and sediment occurring from existing roads within the project area. For additional supporting rationale for special status species, refer to above analysis conducted for the above indicators (numbers 1 -5).

7.7.3 Environmental Effects from Alternative B (No Action):

No direct or indirect short term adverse effects to riparian and aquatic habitats and special status fish species would be expected to occur in the short term. Existing conditions and trends for riparian and aquatic habitats and special status fish species would be expected to continue within the project and analysis area. A continuing build up fuels in these areas would lead to an increased risk of uncharacteristic stand replacement wildfire in the long term.

Dependent on size and overall burn severity from a wildfire; such an event could result in adverse effects to aquatic habitats and special status fish species within the Hazard Creek watershed. An uncharacteristic stand replacing fire has the potential to result in significant sediment delivery to Hazard Creek and the Little Salmon River, which would have adverse impacts on cobble emeddedness, surface fines, and spawning gravels; which would have adverse impacts to spawning, rearing, and foraging habitats for special status fish species. A stand replacing wildfire has the potential to adversely impact riparian habitats and impact ECA with fire caused tree mortality. Consequently, the stream channels would be more prone to high flow scouring and impacts to aquatic habitats and streambank stability. A stand replacing wildfire has the potential to have adverse impacts to slope stability, particularly in areas rated as high risk for landslides. A wildfire that has a high or moderate burn severity occurring within riparian habitats would result in increased levels of large woody debris recruitment to stream channels, however, aquatic habitats would be impacted from potential channel scouring events and mortality to streamside trees and shrubs.

7.7.4 Cumulative Effects:

The cumulative effects analysis area is the Hazard Creek watershed and the Little Salmon River. Past and present actions have impacted upland, riparian, and aquatic habitats to varying levels. The primary effects to riparian and aquatic habitats has occurred from timber harvest, road and trail construction and use, unauthorized "pioneered" ATV trail use", livestock grazing, recreation use, wildfires, extreme weather conditions (e.g., rain on snow events, precipitation), and rural development activities.

The proposed action alternative, in combination with past, present, and reasonably foreseeable future actions would impact riparian and aquatic habitats within small localized areas and overall would be minor within the cumulative effects analysis area. Effects of the proposed action would result in overall negligible effects to riparian and aquatic habitats and special status fish within the project area and cumulative effects analysis area. Instream negligible impacts would occur and it is expected that water quality and aquatic habitat impacts attributed to implementation of the proposed action would be very low and undetectable with state-of-the-art monitoring protocols. Overall, very minor and insignificant water quality or aquatic impacts would occur to the primary indicators evaluated, which include: sediment/stream substrate condition, water quality/temperature, large woody debris, water yield, and stream channel function and streambank stability (see above effects analysis for these indicators).

7.8 Special Status Plants

77.2.1 Affected Environment:

The most common stand structures found within the project area is comprised of small tree and medium sized tree stands; a lesser amount of large tree-stands), riparian habitats, and small areas with low canopy cover (less than 10 percent) also occur in the project area. The project area contains a mixture of even-aged and multi-aged stands. The common overstory trees include ponderosa pine, Douglas-fir, and grand fir. Refer to Section 7.2, Vegetation for additional vegetation information and effects analysis. The

project area occurs within the lower portion of the Hazard Creek watershed and elevations range from 3,200 feet to 4,500 feet.

Preferred habitats for the ESA-listed plant species, MacFarlane's four-o'clock (*Mirabilis macfarlanei*) and Spalding's catchfly (*Silene spaldingii,* include Palouse prairie grasslands and canyon grasslands. A small percentage of the project area includes open grassland area with scattered trees or timbered areas with a very low canopy cover (less than 10 percent). Past plant surveys of the area have not documented these ESA-listed plants as occurring within the project area. Whitebark pine (*Pinus albicaulis*) is a federally designated candidate species and preferred habitat for this species includes higher elevation alpine areas. Past plant surveys of the area have not documented any occurrence of whitebark pine and the project area does not provide preferred habitats.

BLM Manual 6840, *Special Status Species Management*, requires that sensitive plant species be managed with the same level of protection as candidate species, to avoid being listed as threatened or endangered in the future. The project area provides suitable habitats for several BLM designated sensitive species that are listed in the Table 7.8. Broad-fruit mariposa lily and Palouse thistle have been found in relatively close proximity to the project area in the Little Salmon River drainage.

Table 7.8. BLM Sensitive Plants Which May Potentially Occur Within the Project Area.

Scientific Name (Common Name)	Habitat
Calochortus macrocarpus var. *maculosus* (green-band mariposa lily)	Endemic to the canyons of the Lower Salmon, Lower Clearwater, and Lower Snake Rivers. Most commonly associated with bluebunch wheatgrass communities and to a lesser extent, Idaho fescue communities. It occurs primarily on dry, warm, south-facing slopes.
Calochortus nitidus (broad-fruit mariposa lily)	Endemic to the Palouse Prairie and canyon grasslands and associated with canyon rims, ridges and upper slopes. It also occurs within natural forest openings and open ponderosa pine and/or Douglas-fir communities in forested uplands. The plant is shade-intolerant and occurs on flat to gentle or occasionally steep slopes on all aspects.
Cirsium brevifolium (Palouse thistle)	Endemic to the Palouse Prairie and canyon grasslands. Also occurs in forest openings in ponderosa pine and Douglas-fir communities in forested uplands. May also occur along prairie and grassland road rights-of-way.
Symphyotrichum jessicae Synonym *Aster jessicae* (Jessica's aster)	Palouse Prairie and canyon grasslands, often near small drainages, but on dry ground. Generally found within ponderosa pine/snowberry, Idaho fescue/snowberry, and Douglas-fir/ninebark habitat types. Other associated species include bluebunch wheatgrass and arrowleaf balsamroot.

One BLM Watch List species, puzzling halimolobos (*Halimolobos perplexa* var. *perplexa*), was found in the project area. This biennial herb only occurs in the main Salmon River and Little Salmon River drainages and their tributaries. This species can colonize road cuts and other areas with disturbed soils but also grows in natural forest openings.

7.8.2 Environmental Effects from Alternative A (Proposed Action):

There would be no effect on any federally-listed threatened, endangered, or candidate plant species with the implementation of the proposed action. Plant surveys of the areas have not documented occurrences of ESA listed species and the project area does not provide optimum habitats for the species. A "*no effect*" determination is concluded for ESA-listed MacFarlane's four-o'clock and Spaldings catchfly. A "*no impact*" determination is concluded for whitebark pine, a federally designated candidate species, because past plant surveys have not documented any occurrences and the project area does not provide suitable habitat for the species.

The BLM sensitive plant species identified in Table 7.8 above have evolved with natural late summer wildfires when plants were dormant, and it is expected that low and moderately severe wildfires would result in minor or discountable effects to the species and provide long term maintenance of suitable habitat conditions. However, spring burning could affect the plants annual cycle of growth and reproduction if it occurs during emergence, flowering, or fruit development stages. No adverse impacts to BLM sensitive plant species is expected to occur from mechanical treatments because these areas do not provide preferred suitable habitat for the species and no occurrences are known to occur in these areas. Low severity prescribed burning may result in some risks from the resulting spread of invasive species, however, such impacts are expected to be negligible or low adverse.

Puzzling halimolobos plants grow in localized areas where prescribed burning is proposed to occur. This species would likely expand into areas that are disturbed or at least its habitat would be maintained by disturbance. Although individual plants might be impacted by burning, the overall population would likely survive due its adaptation to early successional conditions and presence of a soil seed bank.

Short term minor effects from prescribed burning (primarily spring burning) is expected to occur from implementation of the proposed action and a "*may impact individuals or habitat but not likely to cause trend toward federal listing or reduce viability for the population or species*" for BLM sensitive species listed in Table 7.8 above and puzzling halimolobos (BLM Watch List species). Long term benefits from maintenance of suitable habitats for the species would be expected to occur from project implementation.

7.8.3 Environmental Effects from Alternative B (No Action):

Under this alternative, there would be no impacts to any federally-listed threatened or endangered species, candidate species, BLM sensitive or watch list species, or preferred habitats in the short term. Existing conditions and trends for BLM sensitive species which may potentially occur in the project area and preferred habitats would be expected to continue within the analysis area. A continuing build up fuels in these areas would lead to an increased risk of uncharacteristic stand replacement wildfire in the long term. Species that prefer more open habitats or disturbance (e.g., early seral, grasslands, low canopy cover forested areas, etc.) may benefit from wildfires.

7.8.4 Cumulative Effects:

The analysis area for cumulative impacts will be the same area included in the project area. There would be no cumulative effects to ESA-listed or candidate plant species because area does not provide optimum habitats and plant surveys have not documented any occurrences of these species. Past and present actions have impacted suitable habitats for BLM sensitive plant and Watch List species to varying levels. The primary potential effects to special status plant species and habitats has occurred from timber harvest, road and trail construction and use, unauthorized "pioneered" ATV trail use", livestock grazing, recreation use, wildfires, and rural development activities.

Cumulative effects for BLM sensitive and watch list species occurring or potentially occurring within the analysis area are addressed through consideration of past, present, and reasonably foreseeable actions. It is not possible to directly quantify effects of specific past activities that are several years or decades old on species of concern today, because the status and occurrence of Sensitive plants was not known for much of the management history of the analysis area.

Historically the changes in condition and abundance of specific habitats important to these species in the analysis area are also unknown. Therefore, the effects of past projects can only be qualified through general analysis. However, the results of past projects contribute to the current existing condition, which can be used to discuss and quantify effects of proposed activities on this group of plant species.

In general, the following cumulative effects have or could be expected to occur in the analysis area:

- Encroachment of shrubs and trees into the more open canopy habitats occupied by BLM sensitive species (see Table 7.8 above) due to wildfire suppression and ecological succession.
- Creation/maintenance of early seral habitat for puzzling halimolobos due to road and trail building and use; timber harvest; land-clearing in the vicinity of homesites; wildfire occurrence and suppression techniques (such as dozer lines). Puzzling halimolobos does occur along previously constructed roads and trails along Hard and Hazard Creeks outside and within the project area.
- Introduction of competitive weedy species into disturbed areas from airborne seeds and seeds brought in from future vehicle use of roads in the analysis area.
- Impacts to puzzling halimolobos may occur from future herbicide spraying of noxious and other weeds, especially along road corridors.

7.9 Wildlife, Habitat, Migratory Bird Species, and Special Status Species

7.9.1 Affected Environment:

Wildlife and Habitat

The project area primarily consists of a small tree and medium sized tree stands; with a lesser amount of large tree stands, riparian habitats, and small areas with low canopy cover (less than 10 percent cover). The project area contains a mixture of even-aged and multi-aged stands, and common overstory trees include ponderosa pine, Douglas-fir, and grand fir. Refer to Section 7.2, Vegetation, for additional vegetation information. The project area is dominated by a variety of grand fir and Douglas fir habitat types. The project area (approximately 551 acres) occurs in the Hazard Creek watershed, which flows into the Little Salmon River at river mile 19.5. Elevations range from 3,200 feet near the mouth of Hazard Creek to 4,500 feet and topography is moderate to steeper sloped areas. The area provides habitat for a variety of game and nongame species. Big game species utilizing the area include elk, white-tailed deer, mule deer, black bear, mountain lion, and gray wolf; and to a lesser extent bighorn sheep may use the area.

Wildlife species were evaluated in relation to available habitat quality and quantity occurring within the project area. For specific species, the amount (acres) of potentially suitable habitat that would be modified will be the primary indicator for analysis and will be addressed for each alternative. Direct, indirect and cumulative effects will be addressed predominantly within the project area, and where applicable extend beyond the project area to the sub-watershed or watershed level.

The most common wildlife habitats within the project area are mid-aged to mature mixed conifer stands. Common overstory trees within the project area include ponderosa pine, Douglas-fir, and grand fir.

Riparian habitats associated with the project area occur adacent to 3 small intermittent and perennial streams and Hazard Creek. Common riparian species include grand fir, Douglas-fir, Engelmann spruce, red-osier dogwood, alder, willow, *Rosa* sp., syringa, *Ribes* sp., Rocky Mountain maple, oceanspray, ninebark, water birch, snowberry, thimbleberry, *Carex* sp., mountain brome, sweet-scented bedstraw, miners lettuce, meadowrue, beadlily, starry solomon-plume, and twisted stalk.

Past and current land uses which have impacted wildlife species and habitats within the analysis area include timber harvest, roads, and recreation. Several unauthorized “pioneered” all terrain vehicle trails also occur within the project area.

Migratory Bird Species

The most common stand structure found in the project area is small tree and medium sized tree stands; with a lesser amount of large tree stands, riparian habitats, and small areas with low canopy cover (less than 10 percent cover). Refer to previous section (Wildlife and Habitat) and Section 7.2, Vegetation, for additional habitat and effects analysis information.

All migratory birds are protected under the 1918 Migratory Bird Treaty Act (16 USC 703), as well as the Neotropical Migratory Bird Conservation Act (16 USC Chapter 80). Executive Order 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds* requires the BLM and other federal agencies to work with the U.S. Fish and Wildlife Service (USFWS) to improve protection for migratory birds. Migratory birds occur within the project area and analysis area. Idaho Partners in Flight (IPIF) has identified 243

species of birds that breed in the State of Idaho. Of these species, 119 are considered Neotropical migrants.

Neotropical migrant birds utilize coniferous forest habitats of the U.S. during the spring and summer breeding seasons, but migrate to southern latitudes to spend winters as far south as Mexico and South America.

Idaho Partners in Flight (2000) identified four high-priority habitats in Idaho that are also important habitats for migratory birds and include riparian, low-elevation mixed conifer, grasslands, and ponderosa pine. Three of these habitats occur in the project area, which includes riparian. Several of the high priority birds species chosen for this analysis are also discussed as BLM sensitive species.

For the riparian habitats; 2 of the 13 priority species that may occur include the dusky and willow flycatchers. The willow flycatcher will serve to represent the riparian habitat, and this species is a BLM Idaho sensitive species. For additional information and analysis regarding the willow flycatcher refer to BLM Sensitive Species section which follows.

For the low-elevation mixed conifer habitats; 4 of the 9 priority species that may occur include the northern goshawk, Williamson's sapsucker, sharp-shinned hawk, and brown creeper. The northern goshawk will serve to represent the mixed conifer habitat, and this is a BLM sensitive species. For additional information and analysis regarding the northern goshawk refer to BLM Sensitive Species section which follows.

Special Status Species

The most common stand structure found in the project area is small tree and medium sized tree stands; with a lesser amount of large tree stands, riparian habitats, and small areas with low canopy cover (less than 10 percent cover). Refer to previous section (Wildlife and Habitat) and Section 7.2, Vegetation, for additional habitat and effects analysis information.

Endangered Species Act (ESA) – Listed Species and Proposed Species

Three threatened (ESA-listed) occur or may potentially occur on lands managed by the Cottonwood Field Office. Table 7.9.3 below summarizes if species or preferred habitats are present within the project and analysis area and the potential for various alternative affects to the species or habitats, and species determinations.

Table 7.9.3. Federally-Listed and Proposed Species Summary and Determination

Species	POTENTIAL OCCURRENCE IN PROJECT AREA				
	Potentially Present?		Potentially Affected?		Determination[1]
	Species	Habitat	Species	Habitat	
ESA-Listed Threatened					
Canada Lynx *Lynx canadensis*	Not likely to occur	No	No	No	NE
Northern Idaho Ground Squirrel	No	No	No	No	NE

Species	POTENTIAL OCCURRENCE IN PROJECT AREA				
	Potentially Present?		Potentially Affected?		Determination[1]
	Species	Habitat	Species	Habitat	
Spermophilus brunneus brunneus					
Yellow Billed Cuckoo *Coccyzus americanus*	No	No	No	No	NE

[1]NLAA="May Affect – Not Likely to Adversely Affect"; NE=No Effect; NI=No Impact

The project area does not provide suitable habitat (e.g., Engelmann spruce/subalpine forests above 4,000 feet) for Canada lynx (ESA-listed threatened), suitable habitat (e.g., dry meadows surrounded by ponderosa pine or Douglas fir) for Northern Idaho ground squirrel (ESA-listed threatened), or suitable habitat (e.g., larger stands of cottonwood trees) for yellow-billed cuckoo (ESA-listed threatened). No recent sightings have been documented within the analysis area for Canada lynx, Northern Idaho ground squirrel, or yellow-billed cuckoo. A "*no effect*" determination has been concluded and no further discussion concerning these species will occur in this document.

BLM Sensitive Species

Because the project and analysis area includes a variety of habitats a variety of BLM designated sensitive species occur or potentially may occur in the analysis area (see Tables 7.9.4 and 7.9.5 below). No BLM designated sensitive invertebrates are expected to occur in the project area.

Table 7.9.4. BLM Sensitive Species (Wildlife) Summary and Determinations

Species	POTENTIAL OCCURRENCE IN PROJECT AREA				
	Potentially Present?		Potentially Affected?		Determination[1]
	Species	Habitat	Species	Habitat	
Wildlife - Mammals					
Bighorn Sheep *Ovis canadensis spp.*	Yes	Yes (limited)	No	Yes	MI
Coast Mole *Scapanus orarius schefferi*	No	No	No	No	NI
Fisher *Martes pennant*	Yes	Yes	No	Yes	MI
Gray Wolf *Canis lupus*	Yes	Yes	Yes	Yes	MI
Wolverine *Gulo gulo luscus*	No	No	No	No	NI
Big Brown Bat *Eptesicus fuscus*	Yes	Yes	Yes	Yes	MI
California Myotis *Myotis californicas*	No	No	No	No	NI
Canyon Bat	No	No	No	No	NI

Species	POTENTIAL OCCURRENCE IN PROJECT AREA				
	Potentially Present?		Potentially Affected?		Determination[1]
	Species	Habitat	Species	Habitat	
Parastrellus hesperus					
Fringed Myotis *Myotis thysanoides*	Yes	Yes	Yes	Yes	MI
Hoary Bat *Lasiurus cinereus*	Yes	Yes	Yes	Yes	MI
Little Brown Bat *Myotis lucifugus*	Yes	Yes	Yes	Yes	MI
Long-eared Myotis *Myotis evotis*	Yes	Yes	Yes	Yes	MI
Long-legged Bat *Myotis volans*	Yes	Yes	Yes	Yes	MI
Pallid Bat *Antrozous pallidus*	Yes	Yes (limited)	No	No	NI
Silver-haired Bat *Lasioncycteris noctivagans*	Yes	Yes	Yes	Yes	MI
Townsend's Big-eared Bat *Corynorhinus townsendii*	Yes	No	No	No	NI
Western Small-footed Myotis *Myotis cillolabrum*	No	No	No	No	NI
Yuma Myotis *Myotis yumanensis*	Yes	Yes (limited)	No	No	NI

[1]BLM Sensitive Species Determination: NI="*No Impact*"; MI="*May impact individuals or habitat but not likely to cause trend toward federal listing or reduce viability for the population or species*".

Table 7.9.5. BLM Sensitive Species (Birds and Amphibians) Summary and Determinations

Species	POTENTIAL OCCURRENCE IN PROJECT AREA				
	Potentially Present?		Potentially Affected?		Determination[1]
	Species	Habitat	Species	Habitat	
Birds					
Bald Eagle *Haliaeetus leucocephalus*	Yes	Yes	No	No	NI
Golden Eagle *Aquila chrysaetos*	Yes	Yes	No	No	NI
Northern Goshawk *Accipiter gentilis*	Yes	Yes	Yes	Yes	MI
Flammulated Owl *Otus flammeolus*	Yes	Yes	Yes	Yes	MI
Short-eared Owl *Asio flammeus*	No	No	No	No	NI
Black Swift *Cypseloides niger*	No	No	No	No	NI
Black Tern *Chilodonias niger*	No	No	No	No	NI
Brewer's Sparrow *Spizella breweri*	No	No	No	No	NI
Cassin's Finch	Yes	Yes	Yes	Yes	MI

Species	POTENTIAL OCCURRENCE IN PROJECT AREA				
	Potentially Present?		Potentially Affected?		Determination[1]
	Species	Habitat	Species	Habitat	
Carpodacus cassinii					
Grasshopper Sparrow *Ammodramus savannarum*	No	No	No	No	NI
Green-tailed Towhee *Pipilo chlorurus*	No	No	No	No	NI
Harlequin Duck *Histrionicus histrionicus*	No	No	No	No	NI
Lewis' Woodpecker *Melanerpes lewis*	Yes	Yes	Yes	Yes	MI
White-headed Woodpecker *Picoides albolarvatus*	Yes	Yes	Yes	Yes	MI
Long-billed Curlew *Numenius americanus*	No	No	No	No	NI
Mountain Quail *Oreortyx pictus*	Yes	Yes	Yes	Yes	MI
Olive-sided Flycatcher *Contopus cooperi*	Yes	Yes	Yes	Yes	MI
Willow Flycatcher *Empidonax trailii*	Yes	Yes	Yes	Yes	MI
Vaux's Swift *Chaetura vauxi*	Yes	Yes	Yes	Yes	MI
Amphibians					
Coeur d'Alene Salamander *Plethodon idahoensis*	No	No	No	No	NI
Idaho Giant Salamander *Dicamptodon aterrimus*	Yes	Yes	Yes	Yes	MI
Northern Leopard Frog *Rana pipiens*	No	No	No	No	NI
Western/Boreal Toad *Anaxyrus boreas*	Yes	Yes	Yes	Yes	MI
Woodhouse's Toad *Bufo woodhousii*	No	No	No	No	NI

[1]BLM Sensitive Species Determination: NI="*No Impact*"; MI="*May impact individuals or habitat but not likely to cause trend toward federal listing or reduce viability for the population or species*".

Refer to Tables 7.9.6, 7.9.7, and 7.9.8 below for a summary of preferred habitats for BLM sensitive species that occur or potentially occur within the project and analysis area and may be impacted by the various alternatives.

Table 7.9.6: BLM Sensitive Mammal Species

Species Name	Habitat

Species Name	Habitat
Bighorn Sheep *Ovis canadensis spp.*	Populations occupy rugged canyons, foothills, and mountainous terrain at elevations ranging from 300-3300 m. (980-10,500 ft.). Key habitat features include steep, rugged “escape” terrain, grasses and forbs for forage, and a limited amount of tall vegetation. Populations in dry areas require perennial water sources, such as streams and springs, during the summer.
Fisher *Martes pennanti*	Dense canopied, late seral timber types at higher elevations. Dead and down timber in grand fir, Douglas fir, or other conifer types are most preferred.
Gray Wolf *Canis lupus*	Key components of wolf habitats are sufficient year-round prey base of ungulates and alternative prey, suitable and semi-secluded denning and rendezvous sites, and sufficient seasonal habitats with minimal exposure to humans. The gray wolf was delisted as an ESA-listed species in 2011.
Big Brown Bat *Eptesicus fuscus*	Resident. Found in virtually every American habitat ranging from timberline meadows to lowland deserts, though it is most abundant in deciduous forest areas. Summer roosts generally are in buildings; also hollow trees, rock crevices, tunnels, and cliff swallow nests; prefers sites that do not get hot. Hibernates in the winter.
Fringed Myotis *Myotis thysanodes*	Resident to short-distance migrant. Primarily at middle elevations of 1,200-2,150 m (3,900-7,000 ft.) in desert, grassland, and woodland habitats. Roosts in caves, mines, rock crevices, buildings, and other protected sites. Nursery colonies occur in caves, mines, and sometimes buildings. Hibernates in the winter but is known to be active at times.
Hoary Bat *Lasiurus cinereus*	Migratory. A solitary bat. Habitat includes deciduous and coniferous forests and woodlands, including areas altered by humans. Roost sites are usually in tree foliage 3-5 m (1-16 ft.) above ground, with dense foliage above and open flying room below, often at the edge of a clearing and commonly in hedgerow trees. Sometimes these bats roost in rock crevices but rarely in caves. Hibernating individuals have been found on tree trunks, tree cavities, and in squirrel's nests.
Little Brown Bat *Myotis volans*	Found mainly in mountainous and riparian areas in a wide variety of forest habitats; from tree-lined xeric-scrub to aspen meadows and Pacific Northwest coniferous rain forests. Roosts in tree cavities and crevices.
Long-eared Myotis *Myotis evotis*	Probably migratory. Forested areas, especially those with broken rock outcrops; also shrubland, over meadows near tall timber, along wooded streams, over reservoirs. Often roosts in buildings, also in hollow trees, mines, caves, fissures, etc. Hibernates in the winter. Individuals will wake and move around within the hibernaculum.
Long-legged Bat *Myotis volans*	Resident. Dependent on wooded habitats from pinion- juniper to coniferous forests, usually at elevations of 4,000 to 9,000 ft. (1,200-2,700 m). Maternity colonies are most often formed in tree cavities or under loose bark, they also are found in rock crevices, cliffs, and buildings.
Silver-haired Bat *Lasioncycteris noctivagans*	Resident. Habitat is primarily coniferous forested areas adjacent to lakes, ponds, or streams, including areas that have been altered by humans. Summer roosts and nursery sites are in tree foliage, cavities, or under loose bark, sometimes in buildings.

Table 7.9.7: BLM Sensitive Bird Species

Species Name	Habitat
Northern Goshawk *Accipiter gentilis*	Forests, forest edge, open woodlands. Most common in ponderosa pine, lodgepole pine and Douglas fir forests. Riparian habitats in winter. Nests are masses of twigs in tall conifers. Foods are tree squirrels, jackrabbits, ground squirrels, small birds, and occasionally grouse.
Flammulated Owl *Otus flammeolus*	Montane forests, open stands of fire-climax ponderosa pine or Douglas-fir forests. Nests in abandoned woodpecker holes. Primarily insectivorous.
Cassin's Finch *Carpodacus cassinii*	Migratory. Occupies a variety of coniferous forest types over a broad elevation ranges. Often found in mature forests of lodgepole pine and ponderosa pine. Occasionally breeds in open sagebrush shrubsteppe with scattered western junipers.
Lewis Woodpecker *Melanerpes lewis*	Open or logged forests, river groves in mountains. Nest is a hole in tree. Foods are insects, berries, and fruits.
White-headed Woodpecker *Picoides albolarvatus*	Montane coniferous forests, primarily dry open forests with ponderosa pine and Douglas fir. Nest is a hole in tree or stump, often close to ground. Food is primarily insects.
Mountain Quail *Oreotys pictus*	Riparian areas, shrub mountainsides, coniferous forests, and forest edge. Nests on ground. Foods are buds, seeds, grain, and insects.
Olive-sided Flycatcher *Contopus borealis*	Migratory. Open timber at meadow margins in sparse timber, burns, partially logged areas. Nest is woven twigs near end of a horizontal limb of a conifer. Food includes insects caught while flying.
Willow Flycatcher *Empidonax traillii*	Migratory. Riparian areas, swamps, willow thickets, open woodlands. Builds cup shape nest in shrub or deciduous tree. Insectivorous.
Vaux's Swift *Chaetura vauxi*	Migratory. Prefers late seral stages of coniferous and mixed deciduous/coniferous forests; more abundant in old-growth forests than in younger stands.

Table 7.9.8: BLM Sensitive Amphibian Species

Common Name	Habitat
Idaho Giant Salamander *Dicamptodon aterrimus*	Larvae usually inhabit clear, cold streams, but are also found in mountain lakes and ponds. Adults are found under rocks and logs in humid forests, near mountain streams, or on rocky shores of mountain lakes. Larvae feed on wide variety of aquatic invertebrates as well as some small vertebrates (e.g., fishes, tadpoles, or other larval salamanders). Adults eat terrestrial invertebrates, small snakes, shrews, and salamanders.
Western/Boreal Toad *Anaxyrus boreas* and Eastern/Boreal Toad *Anayrkus boreas boreas*	Streams, springs, grasslands, woodlands, mountain meadows. Usually in and/or near ponds, lakes, reservoirs, rivers, streams. Insectivorous.

7.9.2 Environmental Effects from Alternative A (Proposed Action):

Wildlife and Habitat

The mechanical treatment of 60 acres would "open" up the understory of mid-aged stands but would not change the overall stand structure. Reducing understory ladder

fuels would reduce potential for wildfire stand replacement occurrences in the long term which would be beneficial to wildlife species that prefer medium sized to large tree stands. Restricting mechanical treatment activities within these stands from April 1 through July 15th would minimize potential for mortality or disturbance and displacement of nesting birds.

The low severity underburn of 551 acres is expected to result in minimal mortality to overstory trees (e.g., <2 - 5%) and would not change the overall stand structure within the project area. However, such burning would be beneficial to maintaining or support achievement of large tree and old growth characteristic stands, and reduce potential for wildfires resulting in stand replacement impacts. Prescribed burning may disturb or displace wildlife species utilizing the area. Less mobile species, such as amphibians and reptiles would also be more prone to injury or mortality from burning activities. Prescribed burning during April 1 – July 15 has the potential to cause mortality or disturb and displace nesting birds. Ground nesting birds would be particularly vulnerable to mortality or disturbance from prescribed burning during this period.

Thinning of small diameter trees and brush along roads used as fuel breaks (50 – 100 feet) for prescribed burning would reduce security along roads and prescribed burning would result in more open stands within the project area which reduce security for elk and deer. Overall, the reduction of security habitat within the project area from implementation of the proposed action would be very low. When fuel break preparation occurs between April 1 – July 15 potential occurs for disturbance, displacement, and mortality to nesting birds. It is expected that no more than 200 acres per year would have prescribed burning conducted over the duration of the project (3 – 5 years).

Migratory Bird Species

Refer to above Wildlife and Habitat section above for overall environmental effects to habitats that would occur from vegetation treatments proposed in small tree, medium sized tree, and large tree stands; and riparian habitats and small localized timbered areas with low canopy cover (less than 10 percent). Overall, in the short term no change to stand structure or vegetation type is expected to occur, stands would be more open in the understory with less fuels and fewer seedlings and small diameter trees (e.g., saplings). Low severity prescribed burning on would be expected to result in less than 5 percent mortality to overstory trees.

Mechanical treatments (60 acres), fuel break preparation (50-100 feet from handlines and roads used for fire control, and prescribed burning) has the potential to disturb, displace, or cause mortality to nesting birds. Low severity prescribed fire would be allowed to back into RCAs and potentially impact riparian habitats, which provide suitable habitats for willow flycatcher (BLM sensitive species). Within the analysis area occur a large amount of suitable forested and riparian habitat that would be not disturbed from various land treatments that would occur in the project area which may impact migratory birds in the short term. Overall, long term benefits to migratory bird habitats would occur from actions that support achievement of desired habitat conditions and reduce potential for severe wildfires and stand replacing fires.

Short term impacts to migratory birds would occur from vegetation treatments, however, long term benefits to species that prefer medium and large tree stands from reduction of

fuels and maintenance of stands. A reduction of fuels would reduce potential for stand replacing fires and would be beneficial to migratory bird species that prefer mature and large trees stands. Overall, long term benefits to migratory bird habitats would occur from actions that support achievement of desired habitat conditions and reduce potential for severe wildfires and stand replacing fires.

Proposed thinning of small diameter trees (60 acres) and prescribed burning (551 acres) which occurs between April 1 – July 15 has the potential to disturb, displace, or cause mortality to nesting migratory birds. It is expected that no more than 200 acres per year would have prescribed burning conducted over the duration of the project (3 – 5 years).

Special Status Species

A "*no effect*" determination is concluded for all ESA-listed, see previous discussion above. The mechanical treatment would "open" up the understory of medium sized tree stands but would not change the overall stand structure. Mechanical treatments would result in disturbance and displacement of wildlife species that prefer medium to mature conifer stands. Spring or fall prescribed burning would have short term impacts from disturbance to displacement of BLM sensitive species that utilize riparian and forested stands (see Tables 7.9.6, 7.9.7, and 7.9.8 above).

Less mobile BLM sensitive species such as the western toad and Idaho giant salamander would be more prone to injury or mortality from vegetation treatments (e.g., prescribed burning) that occur in riparian areas or RCAs. Ground nesting birds such as the mountain quail (BLM sensitive species) are particularly vulnerable to prescribed burning which occurs during the spring.

Because of potential for disturbance or displacement of BLM sensitive species utilizing habitats within the project area while conducting mechanical treatments (small diameter tree thinning) or during prescribed burning periods a "*May impact individuals or habitat but not likely to cause trend toward federal listing or reduce viability for the population or species*" (see Tables 7.9.6, 7.9.7, and 7.9.8 above). Long term benefits would occur to BLM sensitive species that prefer medium sized and large tree; and support future achievement old-growth characteristic timbered stands because of the reduced potential for uncharacteristic stand replacement fires.

7.9.3 Environmental Effects from Alternative B (No Action):

Wildlife and Habitat

No direct or indirect short term effects to habitats or wildlife species would occur in the short term. A continuing build up fuels in these areas would lead to an increased risk of uncharacteristic stand replacement wildfire in the long term. Security would be reduced for biggame ungulate species (i.e., elk and deer) in the event that a stand replacing wildfire occurred, however, forage production would increase with the conversion of forest habitats to early seral habitats. In the event that moderate or high severity fire occurs and results in stand replacement, such habitats would be converted to early

seral conditions which would result in displacement of wildlife species that favor mid-aged to large tree stand habitats. In the absence of wildfires, existing conditions and trends for the project area for wildlife species and habitats would be expected to continue.

Migratory Bird Species

No direct or indirect short term adverse effects to migratory birds or preferred habitats in the short term. A continuing build up fuels in these areas would lead to an increased risk of uncharacteristic stand replacement wildfire in the long term. In the event that moderate or high severity wildfires occurs and results in stand replacement; such habitats would be converted to early seral conditions which would result in displacement of species that favor mid-aged to large tree stand habitats. In the absence of a wildfire, existing conditions and trends for project area and migratory birds and habitats would be expected to continue within the analysis area.

Special Status Species

No direct or indirect short term adverse effects to BLM sensitive species or preferred habitats would be expected to occur in the short term. A continuing build up fuels in these areas would lead to an increased risk of uncharacteristic stand replacement wildfire in the long term. In the event that moderate or high severity fire occurs and results in stand replacement, such habitats would be converted to early seral conditions which would result in displacement of wildlife species that favor mid-aged to large tree stand habitats (see Tables 7.9.6, 7.9.7, and 7.9.8 above. In the absence of a wildfire, existing conditions and trends for project area and BLM sensitive species and preferred habitats would be expected to continue within the analysis area.

7.9.4 Cumulative Effects:

The cumulative effects analysis area is the Hazard Creek watershed. Past and present actions have impacted upland and riparian wildlife habitats to varying levels. The primary effects to wildlife habitats has occurred from timber harvest, road and trail construction and use, unauthorized “pioneered” ATV trail use”, livestock grazing, recreation use, wildfires, and rural development activities.

The action alternatives, in combination with past, present, and reasonably foreseeable future actions would impact riparian and upland wildlife habitats within small localized areas and overall would be minor within the cumulative effects analysis area. Effects of the proposed action would result in localized effects within the project area, however, such would result in overall minimal to low direct and indirect cumulative effects on wildlife habitats and species within the analysis area (e.g., project area and Hazard Creek watershed).

7.10 Invasive Species

The project area occurs within the Salmon River Weed Management area and invasive plants of concern known to occur in or near the project include yellow toadflax, spotted

knapweed, rush skeletonweed and meadow knapweed. Various annual bromes may also be found within the grassland plant communities. Control actions for invasive plants of concern are being implemented by the BLM, Idaho County and the Forest Service. Spotted knapweed is the most wildly distributed of these weed species and occurs mainly on travel corridors. Herbicide treatments are undertaken on these corridors to prevent the spread of this weed into new areas. The other species are not common and are generally treated with an eradication objective.

7.10.2 Environmental Effects from Alternative A (Proposed Action):

Implementation of mechanical thinning is not expected to result in a level of disturbance that would provide an opportunity for an increase in weed populations in the project area. Use of chainsaws and hand piling of slash may result in localized minor disturbance of existing vegetative cover but is not expected to reduce the existing vegetative footprint.

Burning may slightly increase the short-term opportunity for expansion of existing invasive species in the project area due to disturbance factors. There is limited opportunity for the introduction of new invasive species to the area as burning operations would be accomplished with local resources and introduction of new invasive species is unlikely. Fire intensities would be expected to be fairly low as burning prescriptions would be consistent with removing understory fuels while still protecting overstory conifer species. The native understory grasslands in the project area are adapted to occasional fire and should be able to withstand low intensity prescribed burning without long-term impacts to plant health. In the short term, burning would reduce the litter cover on the soil surface and increase the amount of bare ground. The bare soils would provide an open site for establishment of new plants including both native species and potentially non-native should there be a seed source in the area. The project area is predominately native vegetative cover with limited populations of invasive plant species. Invasive plants are mainly located along travel corridors which are currently being inventoried and treated by BLM and other cooperators.

The proposed action includes post project vegetation monitoring which would include survey for invasive plants in the project area to detect changes in the existing populations. Treatment would continue along travel corridors and inventory would allow treatment of any new invasive plant sites found. With existing protocols for invasive plant treatment already occurring in the area and post treatment survey for new sites of invasive species that would be included in treatment activities, it is unlikely that increase in existing invasive species would occur or new species would become established in the area as a result of this alternative.

7.10.*3 Environmental Effects from Alternative B (No Action):*

Under this alternative there would be no change in the existing conditions. This alternative does increase the potential for more acres of spotted knapweed and cheatgrass that would result from high intensity fire and resultant loss of overstory cover. High intensity fire conditions, like those which would occur with current fuel

loading in the project area, have a higher potential for long-term vegetation change toward weedy species. It is likely that in the case of wildfire, much of the conifer overstory would be removed, therefore providing better conditions for establishment and persistence of spotted knapweed in currently forested areas. Dryer areas which currently have a sparse overstory of conifers and native bunchgrass would be more likely to see an increase in the density and persistence of exotic annual bromes under the no action alternative. High intensity fire conditions would have a higher potential to kill individual native bunchgrass plants than the lower intensity conditions of the proposed action. Removal of individual bunchgrass plants reduces the level of perennial grass competition with annual bromes and would likely result in an increase in the density of annual bromes in the plant community.

7.10.*4 Cumulative Effects:*

Foreseeable actions which may occur in the general project area include the BLMs Boulder project and potentially some small forest product sales proposed on BLM which would likely include weed prevention measures. It is unknown what management actions would occur on private lands in the area but some forest management and grazing would be expected to occur.

With project design features that avoid weed introduction such as the use of local resources and post project vegetation monitoring that would trigger a treatment response, any action alternative would not be expected to contribute to negative cumulative impacts for weeds. Implementation of the action alternatives that reduce fuel loading may actually decrease the potential for negative cumulative effects resulting from currently existing fuel loads as described in the effects analysis. General weed inventories in the project area have been conducted that facilitate effective management of the current weed situation and allow measures to be implemented to avoid a change in weed populations.

7.11 Recreation:

7.11.*1 Affected Environment:*

Recreation within the project area provides roaded natural and rural recreation with no developed recreation facilities other than a primitive trailhead that consists of a small parking area and a gate that leads to the USFS Hazard Creek trail (FS 317) network. The first mile of the ATV trail is located within the project area. Primary use is exploring local canyons, primitive camping, hunting, fishing along Hazard Creek and vehicular exploration. Legal access to the project area is restricted to non-motorized activities excluding the use of FS 317 and FS 234, as there are locked gates at the private property boundaries on all road segments leading into the area off of FS 234. Recreational users have pioneered ATV trails along old skid trails and between existing roads.

7.11.2 Environmental Effects from Alternative A (Proposed Action):

Implementation of the proposed treatments is expected to cause minimal temporary displacement of recreational users within or adjacent to the project area due to smoke and other activities. The displacement would be limited to the active treatment period only and would therefore have limited direct or indirect effects on recreation.

7.12.*3 Environmental Effects from Alternative B (No Action):*

There would be no potential impacts to recreation under this alternative. If in the absence of fuels reduction, a wildland fire occurs within the project area, recreation use patterns on the landscape could be altered or displaced up to one year dependent on the severity of the fire and whether roads and trails a closed in the area to protect altered resources. Appropriate management responses would be taken for wildland fires. Successful suppression would reduce the size of the area affected; however, if the fire out-paces suppression efforts a large area could potentially be affected. Ground disturbing fire suppression activities would displacement of recreation users during the active fire suppression and may displace users for short or long-term periods depending on the severity of the fire.

7.12.*4 Cumulative Effects:*

The proposal is not expected to contribute to long-term cumulative effects in relation to recreation.

7.12 Travel Management:

7.12.*1 Affected Environment:*

There are several roads throughout the area to that have provided access for logging and other activities. The 234 road accessing the project area provides access to State of Idaho and Forest Service lands and is open to the public. The first mile of the Hazard Creek trail (FS 317) is located within the project area. Recreational users have pioneered ATV trails along old skid trails and between existing roads.

The project area occurs within the Limited OHV Use area where vehicular travel is restricted to designated routes. Recreational users have pioneered ATV trails along old skid trails and between existing roads. The first mile of FS 317 is restricted to vehicles 50 inches or less. FS 234 is designated as open as are the two main routes leading into the area. The routes that will be utilized by motorized vehicles in the project area are designated as open to administrative use.

7.12.2 Environmental Effects from Alternative A (Proposed Action):

Pioneered routes created within the project area will not be addressed as part of this project. Therefore, implementation of the proposed treatments is not expected to have impacts to travel management within or adjacent to the project area. The pioneered trails that crisscross the area will be used to construct hand lines and will be naturalized upon completion of the work.

7.12.*3 Environmental Effects from Alternative B (No Action):*

There would be no potential impacts to travel management under this alternative. If in the absence of fuels reduction, a wildland fire occurs within the project area, there is a potential for roads and trails to be closed in the area to protect altered resources for a period of time depending on the severity of the fire on the landscape. Appropriate management responses would be taken for wildland fires. Successful suppression would reduce the size of the area affected; however, if the fire out-paces suppression efforts a large area could potentially be affected. Ground disturbing fire suppression activities could displace users during the active fire suppression.

7.12.*4 Cumulative Effects:*

The proposal is not expected to contribute to cumulative effects in relation to travel management.

7.13 Visual Resource Management:

7.13.*1 Affected Environment:*

BLM is required to manage public lands to protect their scenic values. To consistently evaluate its lands within their regional context, BLM developed the Visual Resource Management (VRM) program (Handbook H-8410-1; BLM 1986). Visual values are identified through VRM inventory and are considered with other resource values in the Resource Management Planning process. Visual management objectives are established in conformance with the land use allocations. These area specific objectives provide the standards for planning, designing, and evaluating future management projects. BLM uses the VRM process to manage the scenic quality of the landscape and to reduce the impact of development on the scenery.

A Visual Resource Contrast Rating was conducted of the project area, along Highway 95, at the FS 317 trailhead and at the overlook on Hard Creek. The project area encompasses three Visual Resource Management (VRM) classes, Class II, Class III and Class IV. Class III encompasses the majority of the project area. Portions of the project area are visible in the background.

The class II objective is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

The class III objective is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.

The class IV objective is to provide for management activities that require major modifications of the existing character of the landscape. The level of change to the characteristic landscape can be high. Management activities may dominate the view and be the major focus of viewer attention. However, every attempt shall be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements.

7.13.2 *Environmental Effects from Alternative A (Proposed Action):*

The project area can be briefly viewed from U.S. Highway 95 along less than 1 mile that borders it, within the project area and along portions of Hard Creek road. However, most people using U.S. Highway 95 at 55 miles per hour would not notice a change in scenery from the proposed activities. The Little Salmon River dominates the observation of people driving through this area along the highway as the river is very scenic with waterfalls that can be viewed from the highway. The road is curvy following the Little Salmon River, which seems to be the main focus of people riding in the car at 55 miles per hour while driving through the project area. There are also a number of concrete barriers, telephone lines, and power poles along the highway also included was several private residences and buildings. There are few places to pull over on the highway along the project area. Travelers traveling along Hard Creek will be focused on road conditions to include the rough road, sharp corners and limited visibility. Consequently, the visual experience of the vast majority of travelers would not change during or after the project is implemented. Local residents may experience minor temporary visual changes; however, the end result would remain within the Class II to Class IV objectives.

The implementation of the proposed treatments would result in minimal line and texture contrasts with temporary moderate color contrasts to the scenery. In general, these contrasts would be of small scale associated with the landscape and regrowth of vegetation should blend back the impacts the following year. As regrowth of grasses and shrubs occurs, the mechanical treatments visual effects could change, adding greater visual diversity to the landscape. In the long-term, the action alternatives would improve scenic quality by increasing vegetative diversity and age class and allowing for natural ecological change.

7.13.3 *Environmental Effects from Alternative B (No Action):*

There would be no potential impacts to the VRMS under this alternative. In the long-term, the No Action alternative could decrease the variability in vegetative type and age class, decreasing scenic diversity. If in the absence of fuels reduction, a wildland fire occurs within the project area, the landscape character could be greatly altered with an extensive loss of existing vegetative cover. Appropriate management responses would be taken for wildland fires. Successful suppression would reduce the size of the area affected; however, if the fire out-paces suppression efforts a large area could potentially be affected. Ground disturbing fire suppression activities would result in line and color contrasts and changes in the character of the landscape.

7.13.4 *Cumulative Effects:*

The proposal is not expected to contribute to long-term cumulative effects in relation to the VRMs. Short-term cumulative effects would include smoke, which would last for a few days and burn scars which would not be evident within one growing season.

7.14 Wild and Scenic Rivers:

7.14.*1 Affected Environment:*

The project area occurs within the 1.55-mile segment of Hazard Creek and the 12.3-mile segment of Hard Creek have been determined as preliminarily suitable for congressional designation as Recreational River(s). Neither creek was recommended to Congress for inclusion in the National Wild & Scenic River System (WSR). BLM guidance requires that interim management be developed and followed to protect the free-flowing nature and the outstanding remarkable values (ORV's) identified as Scenic and Geologic/Hydrologic values for these river segments until congressional action regarding designation is acted upon. Development along Hazard Creek includes Forest Service Road 023 and private land holdings on the lower 0.50 of river adjacent to the suitable segment. Development along Hard Creek includes a small spur that leads to a popular camping spot at the confluence of Hazard Creek and Hard Creek and a Forest Service road that parallels the entire segment.

7.14.2 *Environmental Effects from Alternative A (Proposed Action):*

Implementation of mechanical treatment components would have no direct or indirect effects on the OVR's associated with the suitability of the Hazard and Hard Creek WSRs.

7.14.*3 Environmental Effects from Alternative B (No Action):*

There would be no potential impacts to the WSR ORVs under this alternative. In the long-term, the No Action alternative could decrease the variability in vegetative type and age class, decreasing scenic diversity. If in the absence of fuels reduction, a wildland fire occurs within the project area, the landscape character could be greatly altered with an extensive loss of existing vegetative cover. Appropriate management response would be taken for wildland fires. Successful suppression would reduce the size of the area affected; however, if the fire out-paces suppression efforts a large area could potentially be affected. Ground disturbing fire suppression activities would result in line and color contrasts and changes in the character of the landscape.

7.14.*4 Cumulative Effects:*

The proposed action includes two segments determined suitable WSR-Recreation. Due to the steep terrain along these two segments, less than 45 acres of the treatment area could be seen from these segments and only briefly if driving along the Forest Service

roads. The visual impact of the mechanical treatment would be temporary, one season or less and would not affect the fall colors or Geologic/Hydrologic ORVSs. Therefore no cumulative impacts are anticipated from any of the alternatives that would change the management or ORV's or future potential for inclusion into the WSR.

7.15 Livestock Grazing:

7.15.*1 Affected Environment:*

The project area is within the BLMs Hard Creek Allotment which is currently leased for domestic sheep grazing by Soulen Livestock Company. Since 2008, the lessee has applied for non-use of the allotment and BLM has approved the application pending a decision on the future of domestic sheep grazing in the area. The BLM is currently reviewing the potential impacts to bighorn sheep populations from allowing domestic sheep grazing on the allotment.

7.15.*2 Environmental Effects from Alternative A (Proposed Action):*

The mechanical treatment components of the proposal are not likely to impact livestock use of the allotment as it has occurred historically. There may be some potential for human activity and working equipment to displace or scatter animals as treatments are implemented if they happen to occur at the same time animals are in the area.

It is BLM policy to implement a period of rest from domestic livestock grazing for two growing seasons following wildfire or use of prescribed fire. This rest period allows the forage plants to recover vigor adequate to withstand the additional disturbance of defoliation from livestock grazing. If necessary to assure rest after fire use, the BLM would issue grazing closures on burned areas for two growing seasons. If domestic sheep grazing use was allowed on the allotment after the analysis this could impact the lessee. Unburned areas of the allotment would remain open for grazing and are likely to provide adequate forage as allowed on the existing lease.

7.15.*3 Environmental Effects from Alternative B (No Action):*

There would be no direct impacts to the lessee under this alternative as no mechanical treatment or prescribed burning would occur. Therefore, there would be no potential disturbance to grazing animals from thinning activity and no need to close portions of the allotment after prescribed burning activities.

This alternative would result in a higher probability of indirect impacts as fuel loading would not be decreased. This high level of fuel loading would increase the probability of high intensity and larger scale wildfire. Larger scale wildfire could potentially result in the closure of the entire Hard Creek Allotment to grazing use in order to allow recovery of vegetative resources and reduce the opportunity for grazing use on the entire area instead of a portion of the allotment as would be the case in Alternative A. Impacts to vegetative resources from higher fire intensities may also require the closure of the

allotment for more than two growing seasons to allow for recovery of the vegetative resources.

7.15.4 *Cumulative Effects:*

The proposal is not expected to contribute to cumulative effects in relation to livestock grazing.

8.0 Tribes, Individuals, Organizations, or Agencies Consulted

The BLM sent a letter describing the proposal to the Nez Perce Tribe on June 24, 2014. Coordination with the Tribe did not identify any concerns for traditional cultural properties or their ability to exercise treaty rights.

Consultation under section 7 of the Endangered Species Act is ongoing for ESA-listed wildlife and fish. BLM coordinated with NOAA Fisheries and USFWS biologists in preparing a biological assessment specific to the Proposed Action (BLM 2015).

Consultation under section 106 of the National Historic Preservation Act with the Idaho State Historic Preservation Office was completed in December 2014.

9.0 List of Preparers

Jared Hammett: Vegetation
Kristen Sanders: Fire/fuels, Air Quality
Craig Johnson: Soils/Water, Aquatic Resources, Fisheries, Wildlife, Plants
David Sisson: Cultural Resources
Judy Culver: Recreation, Travel Management, Visual Resources, Wild and Scenic Rivers,
Lynn Danly: Weeds, Grazing
Scott Pavey: Planning and Environmental Coordinator

10.0 References Cited

Agee, J.K., Skinner, C.N., 2005. Basic principles of forest fuel reduction treatments. Forest Ecology and Management 211, 83–96.

Apperson, K. 1998. Fisheries Biologist, McCall Regional Office, Idaho Dept. of Fish and Game, McCall, ID, In: Idaho Water Resource Board, 2001, Comprehensive State Water Plan: Little Salmon River, Second Draft, Boise, ID.

Barrett, Stephen W. 1994. Fire Regimes on the Payette National Forest, Bear analysis Area. 18pp.

Bilby, R.E. 1984. Removal of woody debris may affect stream channel stability. Journal of Forestry 82:609-613. p.611

Bjornn, T.C., and D.W. Reiser. 1991. Habitat requirements of salmonids in streams. In: Influences of forest and rangeland management of salmonid fishes and their habitats. Meehan, editor. American Fisheries Society Special Publication 19, Bethesda, MD.

Brazier, J.R. and G.W. Brown. 1973. Buffer strips for stream temperature control. Research Paper 15. Forest Research Laboratory, School of Forestry, Oregon State University, Corvallis, Oregon, p. 1.

Brown, G.W. 1983. Forestry and water quality. P. 74. In: MacDonald, L.H., A.W. Smart, and R.C. Wissmar. 1991. Monitoring guidelines to evaluate effects of forestry activities on streams in the Pacific Northwest and Alaska. United States Environmental Protection Agency. EPA/910/9-91-001.

Bureau of Land Management (BLM). 2000. Little Salmon River subbasin biological assessment of ongoing and proposed Bureau of Land Management activities on sockeye salmon, fall Chinook salmon, spring/summer Chinook salmon, steelhead trout, bull trout, and westslope cutthroat trout. U.S. Dept. of Interior, Bureau of Land Management, Upper Columbia-Salmon Clearwater District, Cottonwood Field Office, Cottonwood, Idaho.

Bureau of Land Management (BLM). 2009. Cottonwood Approved Resource Management Plan and Record of Decision. U.S. Department of Interior, Bureau of Land Management, Coeur d'Alene District, Cottonwood Field Office, Cottonwood, Idaho.

Bureau of Land Management (BLM). 2015. Biological Assessment of the Hazard Creek Fuels Project. U.S. Department of Interior, Bureau of Land Management, Coeur d'Alene District, Cottonwood Field Office, Cottonwood, Idaho.

Chamberlin, R.D. Harr, and F.H. Everest. 1991. Timber harvesting, silviculture, and watershed processes. American Fisheries Society Special Publication 19: 181-205.

Chapman, D.W., and K.P. McLeod. 1987. Develop of criteria for fine sediment in the Northern Rockies Ecoregion. U.S. Environmental Protection Agency, EPA Report 910/9-87-162, Washington, D.C.

Chatwin, S.C., D.E. Howes, J.W. Schwab, and D.N. Swantson. 1994. *A guide for management of landslide- prone terrain in the Pacific Northwest*, 2nd ed. Victoria, BC: research Program, Ministry of Forests.

Cherry, J., and R.L. Beschta. 1989. Coarse woody debris and channel geomorphology: a flume study. P. 127. In: MacDonald, L.H., A.W. Smart, and R.C. Wissmar (1991), Monitoring guidelines to evaluate effects of forestry activities on streams in the Pacific Northwest and Alaska. United States Environmental Protection Agency. EPA/910/9-91-001.

Dixon, G.E. 2011. Essential FVS: A user's guide to the Forest Service vegetation simulator. Forest Management Service Center, Fort Collins, CO.

Elliot, W.J., D.E. Hall, and D.L. Scheele. 2000. Disturbed WEPP (Draft 02/2000). WEPP Interface for Disturbed Forest and Range Runoff, Erosion and Sediment Delivery.

Technical Documentation. USDA Forest Service. Rocky Mountain Research Station and San Dimas Technology and Development Center.

Erman, D.C., J.D. Newbold, and K.B. Roby. 1977. Evaluation of streamside buffer strips for protecting aquatic organisms. California Water Resources Center Technical Completion Report. Number 165. p. 36.

Furniss, M.J., T.D. Roelofs, and C.S. Yee. 1991. Road construction and maintenance. Pages 297-324 in W. R. Meehan, editor. Influences of forest and rangeland management on salmonid fishes and their habitats. Amer. Fish. Soc. , Spec, Pub. 19, Bethesda, Maryland.

Gutsell, J.S. 1921. Danger to fisheries from oil and tar pollution of water. Bureau of Fisheries. Document 910. Appendix to Report of U.S. Commission of Fisheries.

Hamilton, R. C. 1993. Characteristics of old-growth forests in the Intermountain Region. USDA, Forest Service, Intermountain Region, Ogden, UT. 86 pp.

Idaho County. 2009. Idaho County Revised Wildland-Urban Interface Wildfire Mitigation Plan- Volume I. October 6, 2009. Idaho County, Idaho. pp. 266.

Idaho Water Resources Board (IWRB). 2001. Comprehensive State Water Plan: Little Salmon River Basin. Second draft. Boise, ID. 123 p.

Idaho Department of Environmental Quality (IDEQ). 2008. Little Salmon River Subbasin Implementation Plan Draft 6/16/2008. Boise ID: Boise Regional Office, Idaho Department of Environmental Quality. 36 pp.

Idaho Department of Environmental Quality (IDEQ). 2006. Little Salmon River TMDL. State of Idaho, Boise Regional Office, Department of Environmental Quality, Boise, ID.

Idaho Partners in Flight. 2000. Idaho bird conservation plan, version 1.0. Idaho Partners in Flight, compiled by S. Ritter, Hamilton, MT. 166 pp.

LANDFIRE: LANDFIRE 1.1.0 LANDFIRE.US_130FBFM40. U.S. Department of the Interior, Geological Survey. [Online]. Available: http://landfire.cr.usgs.gov/viewer/ [2008].

MacDonald, L.H., A.W. Smart, and R.C. Wissmar. 1991. Monitoring guidelines to evaluate effects of forestry activities on streams in the Pacific Northwest and Alaska. United States Environmental Protection Agency. EPA/910/9-91-001.

McDade, M.H., F.J. Swanson, W.A. McKee (and others). 1990. Source distances for coarse woody debris entering small streams in western Oregon and Washington. Canadian Journal of Forest Research. 20: 326-330.

Megahan, W.F., and R.A. Nowlin. 1976. Sediment storage in channels draining small forested watershed. P. 128. In: MacDonald, L.H., A.W. Smart, and R.C. Wissmar (1991) Monitoring guidelines to evaluate effects of forestry activities on streams in the Pacific Northwest and Alaska. United States Environmental Protection Agency. EPA/910/9-91-001.

Megahan, W.F. and J.G. King. 2004. Erosion, Sedimentation, and Cumulative Effects in the Northern Rocky Mountains. Pages 201-222 in George G. Ice and John D. Stednick editors. A Century of Forest and Wildland Watershed Lessons. Society of American Foresters, Bethesda, Maryland.

Mihursky, J.A., and V.S. Kennedy. 1967. Water temperature criteria to protect aquatic life. P. 43. In: Overton, K.C., J.D. McIntyre, R. Armstrong, S.L. Whitewell, and K.A. Duncan. 1995. User's guide to fish habitat: Descriptions that represent natural conditions in Salmon River Basin, Idaho. USDA Forest Service General Technical Report INT-GTR-322. Intermountain Research Station.

Naficy, Cameron; Sala, Anna; Keeling, Eric G.; Graham, Jon; DeLuca, Thomas H. 2010. Interactive effects of historical logging and fire exclusion on ponderosa pine forest structure in the northern Rockies. Ecological Applications. 20(7): 1851-1864.

NOAA-Fisheries (NMFS). 1995. Biological Opinion on the Land Resource Management Plans for the Boise, Challis, Nez Perce, Payette, Salmon, Sawtooth, Umatilla, and Wallowa-Whitman National Forests.

NOAA Fisheries (NMFS), USFWS, USDA-FS, and USDI-BLM. 1998. Matrix of pathways and indicators of watershed conditions for Chinook salmon, steelhead trout, and bull trout. National Oceanic and Atmospheric Administration – National Marine Fisheries Service; U.S. Dept. of Interior, U.S. Fish and Wildlife Service; U.S. Dept. of Agriculture, Forest Service; and U.S. Dept. of Interior, Bureau of Land Management. Local adaptation for the Northern Central Idaho Level 1 Team.

Pfankuch, D.J. 1978. Stream reach inventory and channel stability evaluation. R1-75-002, USDA Forest Service, Northern Region

Prichard, D., P. Clemmer, M. Gorges, G. Meyer, and K. Shumac. 1996. Riparian Area Management. Technical Reference 1737-12, USDI Bureau of Land Management, National Applied Resource Sciences Center, Denver, CO.

Quigley, T. M., and S. J. Arbelbide, technical editors. 1997. An assessment of ecosystem components in the interior Columbia Basin. USDA Forest Service. Volumes I-V. Pacific Northwest Research Station. General Technical Report PNW-GTR-382. 303pp.

Rainville, R.P., S.C. Rainville, and E.L. Lider. 1985. Riparian silvicultural strategies for fish habitat emphasis. P. 127. In: McDonald, L.H., A.W. Smart, and R.C. Wissmar. Monitoring fuidelines to evaluate effects of forestry activities on streams in the Pacific Northwest and Alaska. Unites States Environmental Protection Agency. EPA/910;9-91-001.

Robichaud, P.R. and T.A. Waldrop. 1994. Runoff and sediment production after a low- and high-severity site preparation burn. Water Resources Bulletin 30(1):27-34.

Robison, G.W. and R.L. Beschta. 1990. Identifying trees in riparian areas that can provide coarse woody debris to streams. Paper #2450. Oregon State University. Corvallis, OR.

Saha, M.K., and S.K. Konar. 1986. Chronic effects of crude petroleum on aquatic systems. Environmental Ecology 4:506-510.

Sandberg, D.V. 1980. Duff reduction by prescribed burning in Douglas-fir. Res. Pap. PNW-272, U.S. Dept. of Agriculture, Forest Service Pacific Northwest Forest and Range Experiment Station, Portland, OR. 18 p.

Sandberg, D.V., R.D. Ottmar, J.L. Peterson, and J. Core. 2002. Wildland Fire in Ecosystems: Effects of Fire on Air. Gen. Tech. Rep. RMRS-GTR-42 vol. 5. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountaina Research Station. 79p.

Scott, Joe H.; Burgan, Robert E. 2005. Standard fire behavior fuel models: a comprehensive set for use with Rothermel's surface fire spread model. Gen. Tech. Rep. RMRS-GTR-153. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 72 p.

Smith, B. and D. Prichard. 1992. Riparian Area Management–Management Techniques in Riparian Areas. Technical Reference 1737-6, USDI Bureau of Land Management, Service Center, Denver, CO.

Steele, Robert; Pfister, Robert D.; Ryker, Russell A.; Kittams, Jay A. 1981. Forest habitat types of central Idaho. Gen. Tech. Rep. INT-GTR-114. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station. 138 p.

Steinblums. I. 1977. Streamside buffer strips: survival, effectiveness, and design. Master's Thesis, Corvallis, OR: Oregon State University. 181p.

Stephens, S.L. and M.A. Finney. 2002. Prescribed fire mortality of Sierra Nevada mixed conifer tree species: effects of crown damage and forest floor combustion. Forest Ecology and Management 162 (2002) 261–271.

Stephens, Scott L. and Jason J. Moghaddas. 2005. Experimental fuel treatment impacts on forest structure, potential fire behavior, and predicted tree mortality in a California mixed conifer forest. Forest Ecology and Management 215 (2005) 21–36.

Sullivan, K., T.E. Lisle, C.A. Dolloff, G.E. Grant, and L.M. Reid, 1987. Stream channels: the link between forests and fishes. Pp. 39-97. In: Streamside management: forestry and fishery interactions. E.O. Salo and T.W. Cundy (eds.) University of Washington Institute of Forest Resources. Contribution No. 57.

Swanson, F.J., and G.W. Lienkaemper. 1978. Physical consequences of large organic debris in Pacific Northwest streams. P. 127. In: MacDonald, L.H., A.W. Smart, and R.C. Wissmar (1991), Monitoring guidelines to evaluate effects of forestry activities on streams in the Pacific Northwest and Alaska. United States Environmental Protection Agency. EPA/910/9-91-001.

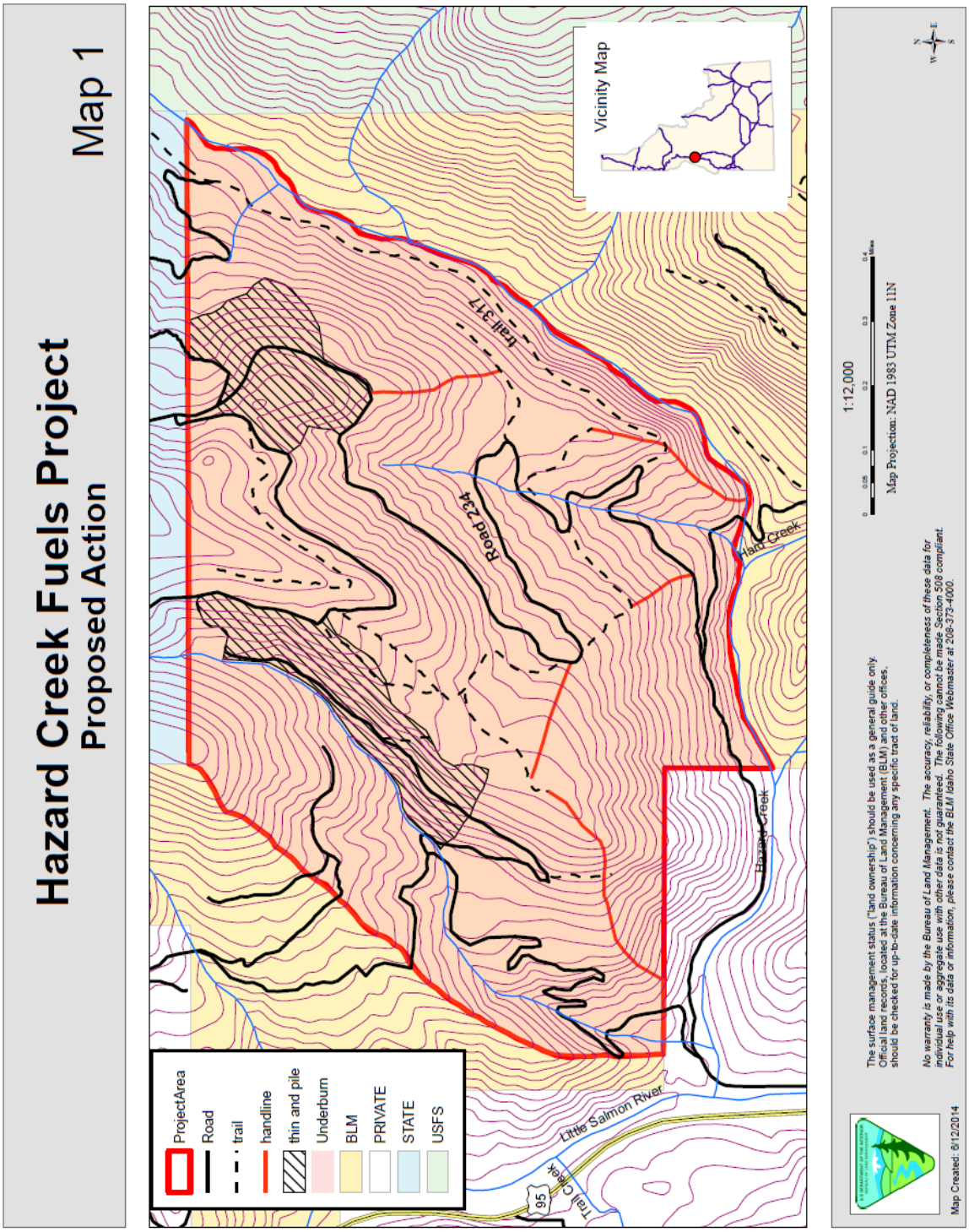
USDA Forest Service. 2003. Little Salmon River subbasin review. U.S. Dept. of Agriculture, Forest Service, Payette National Forest, New Meadows Ranger District, New Meadows, ID.

Van Mantgem, Phillip and Mark Schwartz. 2003. An experimental demonstration of stem damage as a predictor of fire-caused mortality for ponderosa pine. Canadian Journal of Forest Restoration 34: 1343–1347.

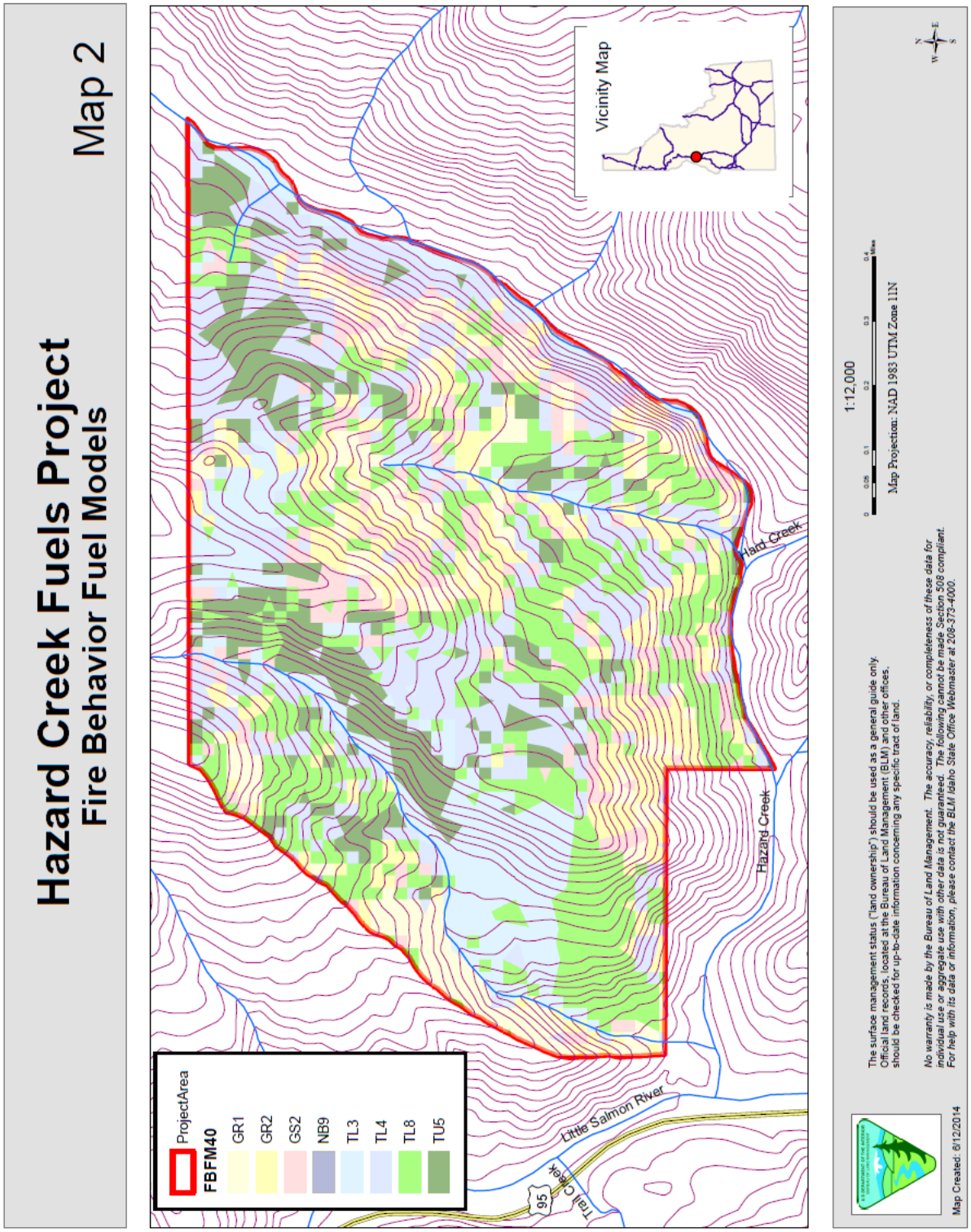
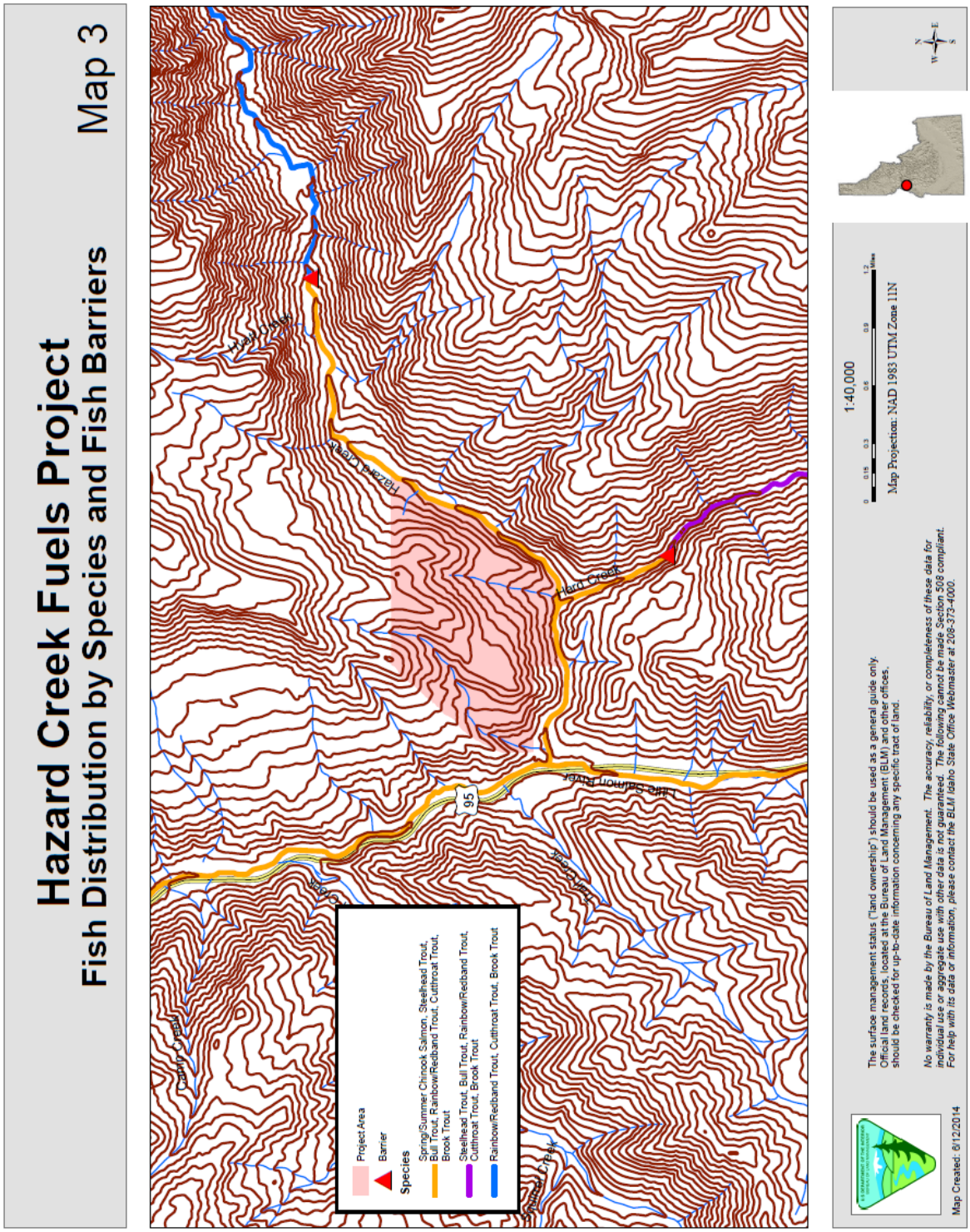
11.0 Attachments

1. *Proposed Action Map*
2. *Fire Behavior Fuel Model Map*
3. *Fish Distribution by Species and Fish Barriers Map*

Proposed Action Map



Fire Behavior Fuel Model Map



Fish Distribution by Species and Fish Barriers Map