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Environmental Assessment

MIDDLE BUGS PROJECT

North Fork Ranger District, Clearwater National Forest

Idaho and Clearwater Counties, Idaho

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Table of Contents

Chapter I. Purpose and Need for Action 3
Existing Conditions 3
Desired Conditions 3
Purpose and Need for Action 5
Proposed Action 5
Public Involvement 6
Environmental Issues 6
Regulatory Framework and Consistency 9
Chapter II. Alternatives, including the Proposed Action 16
Alternatives Considered in Detail 16
Alternatives Analyzed but Not Considered in Detail 24
Comparison of Alternatives 26
Chapter III. Affected Environment and Environmental Consequences 29
Vegetation 29
Rare Plants 34
Wildlife 38
Water Quality 68
Fisheries 78
Fuels 84
Soils 87
Recreation 93
Scenic Resources 97
Roadless 101
Economics 105
Tribal Treaty Rights 109
Chapter IV. Other Required Analysis 111
Effects of Alternatives on Prime Farm land, Rangeland, and Forest land 111
Energy Requirements of Alternatives 111
Effects of Alternatives on Minorities and Women 111
Environmental Justice 111
Invasive Species (E.O. 13112) 111
List of Preparers 112
Appendices 113

Appendix A – Maps and Treatment Descriptions 113
Appendix B - Federal Consistency Checklist 128
Appendix C – BMPS 130
Appendix D – Cumulative Impacts 147
Appendix E – References and Literature Cited 152

Chapter I. Purpose and Need for Action

The Forest Service has prepared this environmental assessment in compliance with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws and regulations. This environmental assessment discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed action and alternatives. Additional documentation, including detailed analyses of project-area resources, may be found in the project planning record located at the North Fork Ranger Station Office in Orofino, Idaho.

Existing Conditions

The North Fork Ranger District of the Clearwater National Forest proposes forest management and watershed improvement activities on 705 acres in the Middle Bugs Project area located about 11 air miles east of Pierce, Idaho in Township 36N, Range 7E, Sections 2, 11-15, 17, 20-23, 26-28 and 34; Township 36N, Range 8E, Section 4-9, Boise Meridian, Idaho and Clearwater Counties, Idaho. The project area encompasses approximately 5,540 acres in the Middle Creek drainage between Lean-to Ridge and Beaver Dam Creek. The area is accessed by Forest Roads 100, 103, 104, 500 and 555. The project area is bounded on three sides by the Bighorn Weitas Roadless Area. It is bounded to the southwest by the NeeMeePoo Trail which is part of the historic Lolo Trail system. (See map.)

Much of the project area is comprised of mature, 80 to 90 year old lodgepole pine stands initiated by large wildfires in 1919. Over the last five years, mountain pine beetle infestations in these aging lodgepole pine stands have increased, with several patches of beetle caused mortality present. Overstocked mixed conifer stands are declining in health and vigor and becoming increasingly susceptible to insect and disease infestations. Mountain pine beetle outbreaks can be prevented by creating a mosaic of age and size classes, which reduces the acreage susceptible to mountain pine beetles at one time (Amman and Safranyik 1984).

There are 37 miles of road in the Middle Creek drainage. Approximately 16 miles are currently open to motorized traffic with the remaining 21 miles closed to motorized use. Many of the closed roads are overgrown with vegetation and several roads have unstable segments and deteriorating or nonfunctional culverts and drainage ditches. Many roads are no longer needed to conduct management activities and many are, or have the potential to, add sediment to streams through road surface erosion or stream crossing failures.

The Clearwater National Forest (CNF) Plan identifies the majority of this area as Management Area (MA) C8S Big Game Summer Range. The primary goals for this MA are to manage to maintain high quality wildlife and fishery objectives while producing timber from the productive Forest land. Wildlife objectives are primarily oriented at elk habitat management. The Big Game Habitat Restoration on a Watershed Scale Assessment (BHROWS 1999) recommendations for this area includes reductions in road densities and vegetation manipulations that would restore or expand forage areas for big game. Recommendations from the BHROWS Assessment are based on and supported by the Forest Plan.

Desired Conditions

The desired conditions for this landscape are based on Forest Plan direction and incorporated data from Ecological Units of the Northern Region Subsections, Land Type Associations, and the BHROWS Assessment. Desired species composition and successional stage distributions are detailed in the tables below.

Table 1-1. Forest Cover Types

Species Composition	Current Condition (%)	Desired Condition (%)
Lodgepole Pine	30	15-35
Grand fir	24	0-5
Douglas-fir	23	0-5
Western Redcedar	6	5-15
Engalmann spruce	2	0-5
Subalpine fir	1	0-5
Western larch	1	10-20
Western White pine	<1	45-55
Ponderosa pine	<1	0-5
Other	12	10-15

Table 1-2. Successional Stages by LTA Group

LTA Group	Successional Stage	Current Distribution (%)	Desired Distribution (%)
Moist Frost Churned Ridges	Early (0-40 years)	4	20-50
	Mid (41-100 years)	59	15-35
	Late (Over 100 years)	37	30-60
Umbric Low Relief Rolling Hills	Early (0-40 years)	19	30-50
	Mid (41-100 years)	44	15-50
	Late (Over 100 years)	36	30-50
Colluvial Midslopes	Early (0-40 years)	30	30-55
	Mid (41-100 years)	29	20-40
	Late (Over 100 years)	41	25-55

Under the desired condition, silvicultural systems for timber harvest reflect the natural disturbance regimes for the site and maintain forest resiliency. Vegetation conditions consistent with historic composition, structure, and fire regimes are restored and maintained. The sustainable flow of commodities from Clearwater National Forest lands is a result of treatments used to move the current vegetation pattern to a desired vegetation pattern. Healthy forests with ecological resistance and resilience would facilitate sustainable management and provide a broad range of ecosystem services including wildlife, recreation, aquatics and commodity production.

In the desired condition, all forest successional stages are represented and approach the scale created by natural disturbance regimes and are of a size and pattern to sustain wildlife habitat needs. There are large areas of secure, suitable habitats for elk. Wildlife objectives consisting of a minimum of 75% elk habitat potential and other resource requirements for the area would be met, as stated in the Forest Plan (II-26). The area continues to provide habitat for snag-dependent indicator species and retain standing live/dead trees and large, down wood for structural diversity and soil productivity.

In the desired condition, the permanent road system is the minimum necessary to achieve the management objectives. Unnecessary roads, skid trails and log landings are restored to hydrologically stable conditions and re-vegetated or reforested. Motorized access (both road and trail) considerations reduce erosion and provide for wildlife reproduction and seclusion. Roads are adequately drained and do not contribute measurable sediment to project area streams. Culverts associated with those roads are passable to all aquatic organisms and are designed, at a minimum, to handle 100-year flow events. Soil productivity is maintained and erosion

minimized. Detrimental soil conditions are minimized and organic material is retained to maintain soil biological and physical properties.

Cultural sites are identified, evaluated and protected. Important sites to the local area or of National interest are interpreted for public appreciation and education.

Purpose and Need for Action

The following resource management opportunities were identified for the project area based on the existing condition of the area, applicable Forest Plan management direction (II-2, 25, 26) and opportunities identified in the North Fork Big Game Habitat Restoration on a Watershed Scale (BHROWS, p. 123) Assessment (1999).

Goods and Services

Purpose: To provide goods and services important to society and recover the economic value of dead and dying trees.

Need: Lodgepole pine stands dominate the treatment areas. Mountain pine beetle infestations are contributing to increased mortality in the area. There is a need to capture the commercial value of the timber in infested stands before it is lost due to mortality and decay. Harvest of the timber would provide materials to local industries consistent with forest plan direction.

Vegetation Improvement

Purpose: Improve species diversity in the project area to create conditions that are resilient and allow for rapid recovery after disturbances.

Need: Proposed treatment areas are dominated by homogenous stands of lodgepole pine of similar age. Homogenous stands are less resilient to disturbances such as insects, disease and fire. There is a need to reduce the lodge pole pine component while increasing white pine and larch which would increase biodiversity and tolerance to disturbance within individual stands as well as the project area.

Purpose: Reduce stand densities in overstocked stands to promote tree growth and vigor.

Need: Competition from excessive vegetation in mixed Douglas fir and western larch stands has reduced stand vigor and increased susceptibility to mortality from insects and disease. These overstocked areas are slowly declining in health and vigor. Reducing stand density by thinning would improve the resiliency of older mixed conifer timber stands to withstand the effects of fire and potential insects and disease outbreaks.

Watershed Improvement

Purpose: Reduce potential sediment inputs into the aquatic ecosystem and improve passage for aquatic species.

Need: Sediment input from gravel and native surface roads can flow into streams, negatively affecting fish habitat and water quality. Improvement of watershed function and stream conditions can be accomplished by reducing road densities and repairing existing roads and culverts to reduce sediment, improve drainage and aquatic organism passage.

Proposed Action

The actions proposed by the Forest Service to meet the purpose and need are briefly described below.

Improve forest health and provide goods and services

- Harvest timber on 705 acres
  - Regeneration harvest 642 acres
  - Commercial thin 63 acres
- Conduct post-harvest burning and or slashing on 650 acres to reduce fuel hazards and prepare harvested sites for planting.
- Precommercially thin 114 acres of trees less than 20 years old to improve growth
- Construct approximately 4 miles of temporary roads to facilitate harvest and decommission them after use.
- Construct approximately 2 miles of permanent road to access proposed harvest areas. Roads would be closed to motorized access after use.

Reduce sediment production

- Recondition approximately 26 miles of Roads 100, 103 and 556.
- Decommission approximately 3.5 miles of Roads 103J, 103K, 336, 558, 1610, 3101A, 5159, 5159A and their spurs that are not needed for management.
- Put 11.3 miles of Roads 103, 336, 553, 553A, 3100, 3101, 5153, 5153A and 5159 and their spurs into long term storage.
- Replace approximately 42 undersized or damaged culverts on Roads 103 and 555.

Public Involvement

The proposal was first listed on the Clearwater National Forest website (http://www.fs.fed.us/sopa/) in the Schedule of Proposed Actions on January 1, 2011.

On June 29, 2011, scoping letters describing the proposed action, location and purpose and need were sent to the Nez Perce Tribe and all interested individuals, businesses, organizations and agencies. A legal notice and request for public comment appeared in the Lewiston Tribune on July 1, 2011. On July 22, 2011, Forest Service specialists presented this project to tribal staff members for comment and discussion. On September 20, 2011, the project proposal was presented to the Clearwater Basin Collaborative. Comments received from two individuals, two organizations, two agencies and the Confederated Salish and Kootenai Tribes were considered in the analysis.

Environmental Issues

The proposed action was developed to meet the purpose and need for action and designed to minimize effects on resources. Analysis of public and internal comments for the project identified issues that were grouped into the categories described below.

Issues Used to Develop Alternatives to the Proposed Action

No Permanent Road Construction: One commenter was concerned that the miles of proposed temporary and permanent road building was excessive, given the amount of roads present in the area and Forest Plan C8S management area direction to maintain high quality wildlife and fishery objectives. (Specific C8S management area direction is detailed below.)

Alternatives C and E were developed to address this issue. No permanent road construction would occur in Alternative C. Only temporary roads would be built. No new permanent or temporary road construction would occur in Alternative E.

Address Visual Concerns with Leave Tree Protection Measures: There was concern that post-harvest activity fuel treatments could kill leave trees and impact views from the historical trail corridor. To address this concern, Alternative C would treat post-harvest fuel accumulations by mechanical means in areas harvested with ground based logging systems to protect leave trees and limit mortality. Mechanical fuel treatments would consist of excavator piling and burning, mulching, chipping, or mastication to reduce the surface fuels.

Economic Viability of Harvest Activities: Alternative D would only conduct watershed improvement activities in response to a commenter who wanted an alternative that would not harvest trees because the low value of the timber and long haul distances would make this project economically infeasible.

No New Road Construction: There was concern that proposed temporary and permanent road construction would impact soils and contribute to sediment production; therefore, project activities should be limited to existing roads. Alternative E was developed to address this concern; it would limit treatments to existing roads.

No Large Openings: Alternative F was developed to address the issue of harvesting openings larger than 40 acres because commentors were concerned that the size and scope of the large proposed harvest units violated NFMA direction.

Decommission More Roads: One commenter suggested the project decommission more roads to reduce road densities in the area. Another commentor suggested inclusion of additional road decommissioning to offset impacts to elk habitat; specifically decommission Roads 3100, 3101 and Roads 103J and 103K. Alternative H was developed to address this issue. A project area roads analysis and subsequent site specific road surveys identified all known road decommissioning and long term road storage and culvert replacement opportunities in the area.

Issues Used to Develop Design Criteria and/or Mitigation

Noxious weed treatments: A commentor was concerned that project activities would increase the spread of noxious weeds. This project would include project design measures and contract provisions to minimize the spread of noxious weeds.

Opening Size: Proposed regeneration treatments in mature lodgepole pine would create two openings encompassing 416 and 191 acres. The proposed 191 acre unit would be adjacent to an existing 26 acre opening; increasing this new opening to 217 acres. There were concerns about the effects of these large openings created by the proposed harvest. A commentor questioned if the created openings would exceed NFMA size restrictions. NFMA, section 6 (F)(iv) indicates that the Forest Service must establish size limits for regeneration harvest performed in one entry as well as provisions to exceed established limits and these limits and provisions are established in Forest Service Manual (FSM) 2471.1. Since regeneration treatments are proposed in lodgepole pine stands where mountain pine beetle mortality has occurred and an outbreak is imminent, the proposed units meet the criteria set forth in FSM 2471.1 (R1 Supplement) to be exempt from requiring Regional Forester approval to exceed 40 acres. Impacts of these larger openings are analyzed in Chapter 3 of this document. Project design features include leave tree retention and tree restocking requirements for these areas.

Recreation Impacts: There was a concern about potential conflicts on Roads 103 and 555 which are groomed snowmobile routes in the winter and provide recreation access in the summer. The commentor suggested that design features be incorporated into the project to reduce potential conflicts between logging trucks and recreational traffic. This project includes a design feature to restrict log haul on Road 555 in response to this concern.

Obliteration of skid trails, log landings and temporary roads: A commentor wanted to see all skid trails, log landings and temporary roads fully obliterated including recontouring and seeding with native vegetation to restore ecosystem function to its fullest potential and to prevent illegal use by off-road vehicles. This project includes design features to address these concerns.

Other Issues Carried Through the Analysis

Resource Concerns: People expressed concern that proposed activities should protect water quality, soils, fisheries, and wildlife habitats. They advised that Northern Region standards and guidelines for soils, snags and coarse woody debris should be followed. Project design features are included to assure that Forest Plan goals and standards for these resources would be met as well as other applicable laws and regulations. Potential impacts to these resources are analyzed in detail in Chapter 3 and summarized in Table 2-5.

Cultural Resource Concerns: People were concerned that proposed activities such as temporary road construction could impact important cultural properties. The historical trail corridor and national landmark lie within the south end of the project area. No activities are proposed within this corridor. In compliance with the National Historic Preservation Act, cultural resource surveys have been conducted in the proposed treatment areas and State Historic Preservation Office (SHPO) concurrence would be obtained before project implementation. This project complies with the National Historic Preservation Act of 1966, as amended.

Tribal Treaty Rights: The Nez Perce Tribe has specific treaty reserved rights that result in activities that take place on what is now federal land, including Clearwater National Forest. Article 3 of the 1855 Treaty with the Nez Perce Tribe states: "the exclusive right of taking fish in all the streams where running through or bordering said reservation is further secured to said Indians; as also the right of taking fish at all usual and accustomed places in common with citizens of the Territory; and of erecting temporary buildings for curing, together with the privilege of hunting, gathering roots and berries, and pasturing their horses and cattle upon open and unclaimed land."

Treaty rights of the Nez Perce Tribe are connected to the cultural, fish, and wildlife issues described in this section. Mitigation measures and project design features aimed at minimizing impacts to cultural sites, fish, wildlife, and plants should have the same impact on tribal treaty rights.

Impacts to elk habitat potential: There were concerns that proposed harvest would decrease elk habitat potential. Potential impacts to elk from proposed activities are analyzed in detail in Chapter 3. All action alternatives were designed to be consistent with Forest Plan direction for MA C8S.

Dispersed Campsite Access: A commentor was concerned that road decommissioning and storage on Road 103 (after the intersection of the Lean to Connection Road 556) could impact access to dispersed campsites. Potential impacts to motorized recreational access and dispersed camp sites are analyzed in detail in Chapter 3.

Issues Decided by Law or Policy, Not affected by the Proposal, or outside the Scope of the Project

Proposed harvest near roadless areas: There was concern that project activities could impact water resources, soils, wildlife habitat and recreation opportunities in the adjoining roadless area and that these impacts should be analyzed. Some commentors were concerned that proposed activities were inconsistent with the 2001 Roadless Rule and the 2008 Idaho Roadless Rule because some proposed treatment areas appeared to enter the roadless area, de factor or

inventoried. No timber harvest or road construction activities are proposed in any area recognized as roadless under the 2008 Idaho Roadless Rule. The 2008 Idaho Roadless Rule supersedes RARE I, RARE II and the 2001 Roadless Conservation Rule. Impacts to roadless area attributes from proposed activities are appropriately analyzed in this document.

Regulatory Framework and Consistency

The Middle Bugs Project analysis and documentation of effects is consistent with direction described below.

Forest Plan Direction

The Clearwater National Forest Plan (CFP), as amended, guides all natural resource management activities by providing a foundation and framework of standards and guidelines for National Forest System lands administered by the Clearwater National Forest. Forestwide management direction relevant to this project is found in the CFP on pages II-1 through II-40. Applicable goals and standards are summarized below.

- Maintain and, where appropriate, improve the winter and summer habitat over time to support increased populations of big-game wildlife species. (II-2)
- Provide a sustained yield of timber and other outputs at a level that is cost-efficient and that will help support the economic structure of local communities and will provide regional and national needs. (II-2)
- Select on the ground those silvicultural systems that will be the most beneficial to long-term timber production, but modified as necessary to meet other resource and management area direction. (II-2)
- Provide on-site review and evaluation of those lands identified as being unsuitable for timber per 36 CFR 219.14 to determine future use. (II-3)
- Insure that soil productivity is maintained and no irreversible damage occurs to soil and water resources from Forest management activities. (II-3)
- Locate, design and manage Forest roads to meet resource objectives and public concerns, and to provide optimal soil and watershed protection. (II-3)
- Manage National Forest resources to prevent or reduce serious long lasting hazards from pest organisms utilizing principles of integrated pest management. (II-4)
- Use silvicultural methods and schedule cultural practices which reduce the development and/or perpetuation of pest problems. (II-35)
- Provide the proper mix of hiding and thermal cover, forage, and protection from harassment during critical periods on big-game summer range (primarily elk), in accordance with criteria contained in the "Guidelines for Evaluating and managing Summer Elk habitat in northern Idaho." (II-23)
- In C8S, the prescription must meet wildlife objectives (minimum of 75 percent elk habitat potential) and other resource requirements for the area as stated in the Forest Plan and Regional Guide to be planned and implemented. (II-26)
- Manage water quality and stream conditions to assure that National Forest management activities do not cause permanent or long-term damage to existing or specified beneficial uses. (II-27)

Area specific standards and guidelines are found on pages III-1 through III-74 of the CFP. Management area direction, specific to the Middle Bugs Project area, is summarized below.

Management Area C8S – Big-Game Summer Range/Timber Management: There are 5,152 acres (93%) of MA C8S in the project area. All proposed treatments would occur in MA C8S.

- Manage areas seen from Management Areas A4, A5 and A6 to meet the adopted VQO's shown in Appendix G. (III-53)
- Manage big-game summer range for a minimum of 75 percent of elk habitat potential. (III-54)
- Design harvest activities within each elk analysis area that do not require re-entry within ten years. (III-54)
- Provide security habitat areas adjacent to harvest areas when planning timber sale activities. (III-54)
- Locate and design roads for timber harvest only, maintain adequate mitigation for soil and water quality objectives.
- Confine, contain or control wildfires. (III-56)

Management Area M2 – Riparian Habitat Conservation Areas: There are 1,482 acres (27%) of M2 in the project area. MA M2 is associated with other management areas.

- Manage under the principles of multiple use as areas of special consideration, distinctive values, and integrated with adjacent management areas to the extent that water and other riparian dependent resources are protected. (III-69)

Management Area US – Unsuitable Land: MA US occurs in conjunction with other management areas. There are 293 acres of US in the project area. Project resource specialists conducted an onsite review and evaluation, consistent with CFP direction (II-3, III-74) and 36 CFR 219.14. They determined that approximately 112 acres identified and mapped as US during Forest planning would be managed as C8S. These lands lie in Unit E.

- Manage to maintain and protect soil and watershed values and vegetative cover. Manage for resources other than timber such as dispersed recreation, and big game summer range as appropriate.
- As appropriate, the Forestwide management direction included in Chapter II and adjacent management area direction applies to these lands.

Management Area A6 – Historic/Visual Travel Corridor: MA A6 consists of a 6 mile long corridor approximately ½ mile in width (1/4 mile on either side) that encompasses the historic Lolo Trail system which consists of: the Lolo Trail, Nee-Me-Poo Trail, Lewis and Clark Trail, Bird-Truax Wagon Road, and Lolo Motorway. There are 365 acres of MA A6 in the project area. No proposed activities would occur in this MA. All action alternatives would manage seen area to meet or exceed VQO's as listed in Appendix G. (III-19)

Clearwater Forest Plan Lawsuit Settlement Agreement

On September 13, 1993, the Forest Service signed a settlement with all parties and agreed, in part, to proceed only with those timber sale and/or new road construction projects, which result in "no measurable increase" in sediment yield in drainages currently not meeting Forest Plan standards. Only those watersheds that do not meet sediment and/or cobble embeddedness, which is a measurement of sediment, would trigger this portion of the Stipulation Agreement. For the Middle Bugs project, all of the analysis area streams meet the desired cobble embeddedness levels based on data from 1997 and 2006. No known natural or management-induced impacts that would have measurably increased sediment concentrations have occurred in the project area watersheds since cobble embeddedness data was collected. Therefore, the Lawsuit Settlement Agreement does not apply to this project. For this project, the harvest and road construction activities are designed to meet the appropriate standards/criteria, without using road decommissioning, road storage or culvert replacement as mitigation.

Clearwater Forest Plan Water Quality Standards

Water quality standards in the CFP on pages II-27 through II-29 direct that soil and water resources be managed at levels designed to meet Forest management objectives for watersheds as well as meet Idaho State Water Quality Standards. The CFP was amended in 1995 by the Inland Native Fish Strategy (commonly called INFISH) by the U.S. Forest Service and Bureau of Land Management for managing watersheds on Federal lands that contain bull trout or their habitat. Interim direction provided by INFISH identifies and defines Riparian Habitat Conservation Areas (RHCAs), establishes Riparian Management Objectives (RMOs), and applies standards and guidelines to RHCA to meet the RMOs. INFISH default RHCAs include those areas within 300 feet of fish bearing streams, within 150 feet of non-fish bearing streams, and within 100 feet of intermittent streams and wetlands in watersheds. INFISH buffer widths exceed Best Management Practices (BMP) standards. Activities that do not meet the RMOs are not allowed within default RHCAs. Utilization of existing and temporary roads and regeneration harvest activities would not retard or prevent the attainment of the RMOs (pool frequency, water temperature, large woody debris, bank stability, and width to depth ratio). Applying default INFISH riparian habitat conservation areas means no harvest or prescribed burning ignition would occur within these areas.

Forest Plan Water Quality objective for Middle Creek and Rocky Ridge Creek is moderate fish with cutthroat as the indicator species. It is high fish for cutthroat for Beaver Dam and Felix Creeks.

Region 1 Soil Quality Standards

Regional soil quality standards (USDA 1999) specify that at least 85% of an activity area (which is defined as a land area affected by a management activity) must have soil that is in satisfactory condition. In other words, detrimental impacts (including past management impacts) shall be less than 15% of an activity area. In areas where less than 15% detrimental soil conditions exist from prior activities, the cumulative detrimental effect of the current activity following project implementation and restoration must not exceed 15%. Detrimental soil impacts from all proposed activities would be less than 15%; therefore, this project complies with Region 1 Soil Quality Standards.

Watershed and Fisheries Resources Regulatory Framework

All Federal and State laws and regulations applicable to water quality would be applied to the Middle Bugs project, including 36 CFR 219.20, the Clean Water Act, and Idaho State Water Quality Standards, Idaho Forest Practices Act, Idaho Stream Channel Protection Act, and BMPs. In addition, laws and regulations require the maintenance of viable populations of aquatic species including the National Forest Management Act (36 CFR 219.19), subsequent Forest Service direction (Fish and Wildlife Policy, 9500-4) and Forest Service Manual direction (FSM 2470, 2600).

Section 303(d) of the Clean Water Act stipulates that states must identify and prioritize water bodies that are water quality limited (i.e., water bodies that do not meet water quality standards). For waters identified on this list, states must develop a total maximum daily load (TMDL) for the pollutants, set at a level to achieve water quality standards. The Idaho Department of Environmental Quality 2010 Integrated Report indicates Middle Creek, Beaver Dam Creek and Rocky Ridge Creek are Water Quality Limited Streams (WQLS) for temperature. Beneficial uses for all three streams are secondary contact recreation, cold water aquatic life and salmonid spawning. A TMDL plan was written in 2003 but no implementation plan has been developed. The project has been designed to have no effect on stream temperature.

Section 404 of the Clean Water Act requires permits to dredge or fill within waters of the United States. The US Army Corps of Engineers administers these provisions. Culvert removal and replacement activities proposed under this project would require authorization under Section 404 before project implementation.

Authorization with the Idaho Department of Water Resources under the Stream Channel Protection Act would also be obtained before implementation of proposed culvert removal and replacement.

Under Section 402 of the Clean Water Act, should it be determined than a National Pollution Discharge Elimination System (NPDES) permit is required for this project to address storm water discharges from logging roads, the Forest Service would comply with any applicable NPDES permitting requirements.

Endangered Species Act

The most recent U.S. Fish and Wildlife Service threatened and endangered species list for the Clearwater National Forest, Idaho and Clearwater Counties, includes Canada lynx, steelhead trout, bull trout, Snake River fall Chinook Salmon and Spalding's catchfly and MacFarlane's four o'clock. There are no steelhead trout or fall Chinook salmon or designated critical habitat for these species within the project area. Because neither species exists in the North Fork Clearwater drainage, there would be "no effect" to either species. Bull trout have been found downstream of the project area in Weitas Creek. Weitas Creek has been designated as critical habitat for bull trout. Vegetation management activities would likely not affect bull trout or bull trout habitat, but watershed improvement would include instream excavation.

The Regional Forester approved an updated sensitive species list in February 2011. The sensitive aquatic species that occur in the project area are westslope cutthroat trout, redband trout and western pearlshell mussel.

A Biological Assessment has been completed for the Middle Bugs project that documents the project "may affect, not likely to adversely affect" Canada lynx. This determination is based on compliance with the standards and guides described in the Northern Rockies Lynx Management Direction Record of Decision (NRLMD ROD), March 2007.

Northern Rockies Lynx Management Direction

The contiguous United States distinct population segment of the Canada lynx is listed as threatened (USFWS 2000). Critical habitat has been proposed for the Canada lynx (USFWS 2008); however, none of the proposed critical habitat is on the Clearwater National Forest. Management of lynx in the Northern Rocky Mountains, including the Clearwater NF and North Fork Ranger District is governed by the Record of Decision for the Northern Rockies Lynx Management Direction (USFS 2007b), which contains a set of objectives, goals, standards and guidelines for managing lynx and their habitats in the Northern Rockies. This management direction applies only to mapped lynx habitats on National Forest lands that are presently occupied by Canada lynx. The Middle Bugs Project is consistent with applicable objectives and guidelines as described in the wildlife section of this document.

Travel Management Rule (November 9, 2005)

The Clearwater National Forest has completed a Forest-wide analysis to implement the 2005 Travel Management Rule on the Clearwater NF. The decision for the analysis was upheld in April 2012. The Middle Bugs Project is consistent with the 2005 Travel Management Rule and the 2012 Travel Management Plan.

Idaho Roadless Rule and Roadless Areas

The Middle Bugs project lies adjacent to the Bighorn Weitas Roadless Area (B-WRA) which is managed under the Backcountry Restoration theme as identified under the Idaho Roadless Rule (36 CFR 294 Subpart C). Roads have existed along the boundary since the 1987 Forest Plan went into effect. None of the project area lies within the roadless area. No treatments are proposed in roadless areas. Project activities would not change any roadless area boundary, location or size or shape. Roaded access to the roadless area already exists. The project area is currently roaded. Any existing wilderness attributes within the B-WRA would remain unchanged as a result of this project. The B-WRA would not be impacted by this project.

National Historic Preservation Act of 1966, as amended

A cultural resource inventory was conducted for the proposed project area. No properties eligible or potentially eligible for listing in the National Register of Historic Places were found. In accordance with the Act, the findings of the inventory were submitted to the Idaho State Historic Preservation Officer and the Nez Perce Tribal Historic Preservation Officer for review and comment. Both entities concurred with a finding of "no effect to historic properties".

Executive Order on Environmental Justice

Based on experience with similar projects on the North Fork Ranger District and Clearwater National Forest, none of the alternatives would affect minority groups, women, or civil rights. Timber harvesting and future timber yields contribute to the timber supply for the wood products industry and ultimately, consumers of wood products. This project is expected to provide job opportunities in local communities. Some of these communities include minority populations that may benefit from the economic effects. Small or minority owned businesses would have the opportunity to compete for the work.

National Forest Management Act (NFMA)

The National Forest Management Act (NFMA) requires that projects and activities be consistent with the governing Forest Plan (16 USC 1604(i)). Those findings include the following:

1. Suitability for Timber Production: No timber harvest, other than salvage sales or sales to protect other multiple-use values, shall occur on lands not suited for timber production (16 USC 1604(k)). Guidelines for determining suitability are found in the Forest Service Handbook 2409.13. Proposed harvest units are within the productive habitat types as described in Cooper et al. 1991. An analysis of suitability for resource management was completed for the resource area. Areas of unsuitability within treatment units would have design features that prevent harvesting and burning in them. This standard is met under all proposed actions.

2. Timber Harvest on National Forest Lands (16 USC 1604(g) (3) (E)): A Responsible Official may authorize site-specific projects and activities to harvest timber on National Forest System lands only where:

a. Soil, slope, or other watershed conditions will not be irreversibly damaged (16 USC 1604(g)(3)(E)(i)). All action alternatives would protect the organic matter, soil porosity, and topsoil through the use of BMP's and design features. Localized and limited losses would occur on landings, skid trails, temporary roads, or where the soil is sterilized with fire. However, over the majority of the unit and the landscape, the processes that contribute to productive soils would be preserved. BMP's and design features assure that no irreversible damage to the watershed or stream channel considerations would occur.

b. There is assurance that the lands can be adequately restocked within five years after final regeneration harvest (16 USC 1604(g)(3)(E)(ii)). This conclusion is based on experience and regeneration status reports where 98% of the acres treated since 1976 were satisfactorily stocked within five years of final harvest.

c. All alternatives provide protection for streams, stream banks, shorelines, lakes, wetlands, and other bodies of water from detrimental changes in water temperatures, blockages of water courses, and deposits of sediment, through implementation of the INFISH standards and guidelines, programmatic agreements made with the US Fish and Wildlife Service, BMP's and project design and mitigations (16 USC 1604(g)(3)(E)(iii)).

d. The harvesting system to be used is not selected primarily because it will give the greatest dollar return or the greatest unit output of timber (16 USC 1604(g)(3)(E)(iv)). For this project, harvesting systems were selected to appropriately balance treatment efficiency with minimizing resource impacts.

3. **Clearcutting and Even-aged Management (16 USC 1604(g)(3)(F)):** Insure that clearcutting, seed tree cutting, shelterwood cutting, and other cuts designed to regenerate an even aged stand of timber will be used as a cutting method on National Forest System lands only where:

a. For clearcutting, it is determined to be the optimum method, and for other such cuts it is determined to be appropriate, to meet the objectives and requirements of the relevant land management plan (16 USC 1604(g)(3)(F)(i)). The silviculturist has determined that the regeneration harvest proposed for this project is appropriate due to high mortality and low growth rates. These even aged harvest prescriptions would create structure and composition similar to natural successional processes for these habitat types. All proposed treatments meet objectives and requirements of the Forest Plan.

b. The interdisciplinary review as determined by the Secretary has been completed and the potential environmental, biological, esthetic, engineering, and economic impacts on each advertised sale area have been assessed, as well as the consistency of the sale with the multiple use of the general area (16 USC 1604(g)(3)(F)(ii)).

c. Cut blocks, patches, or strips are shaped and blended to the extent practicable with the natural terrain (16 USC 1604(g)(3)(F)(iii)).

d. Cuts are carried out according to the maximum size limit requirements for areas to be cut during one harvest operation, provided, that such limits shall not apply to the size of areas harvested as a result of natural catastrophic conditions such as fire, insect and disease attack, or windstorm (FSM R1 supplement 2400-2001-2 2471.1, 16 USC 1604(g)(3)(F)(iv)). Proposed alternatives would create two openings encompassing 416 and 191 acres. The 191 acre unit would be adjacent to an existing 26 acre opening; increasing this new opening to 217 acres. These larger (40+ acre) openings would move the area closer to historic landscape disturbance features and vegetative conditions. Planting of western white pine and western larch within these openings would help progress toward restoration of forest cover types of these species to their historic levels. This project is exempt from Regional Forester approval and a 60 day public review because it falls within the following exception. *Where catastrophic events such as fire, windstorms, or insect and disease attacks have occurred, 40 acres may be exceeded without 60 day public review and Regional Forester approval, provided the public is notified and the environmental analysis supports this*.

e. Such cuts are carried out in a manner consistent with the protection of soil, watershed, fish, wildlife, recreation, and esthetic resources, and the regeneration of the timber resource (16 USC 1604(g)(3)(F)(v)).

The National Forest Management Act provides that timber harvest and other silvicultural practices shall be used to prevent damaging population increases of forest pest organisms and treatments shall not make stands susceptible to pest caused damage levels inconsistent with management objectives. Harvest of trees provides social and economic benefits. It also reduces potential losses attributed to insects and disease, losses from inter-tree competition and manipulates forest vegetation to enhance wildlife habitat and increase vegetation resiliency. The potential short and long-term negative effects of proposed activities on adjacent trees were considered. Retention areas were designed to minimize mortality during site preparation activities. Regeneration treatment areas would be restocked within 5 years.

4. Stands of trees are harvested according to requirements for culmination of mean annual increment of growth (16 USC 1604(m)).

5. Construction of temporary roadways in connection with timber contracts, and other permits or leases: Unless the necessity for a permanent road is set forth in the forest development road system plan, any road constructed on land of the National Forest System in connection with a timber contract or other permit or lease shall be designed with the goal of reestablishing vegetative cover on the roadway and areas where the vegetative cover has been disturbed by the construction of the road, within ten years after the termination of the contract, permit, or lease either through artificial or natural means. Such action shall be taken unless it is later determined that the road is needed for use as a part of the National Forest Transportation System (16 USC 1608(b)).

6. Standards of roadway construction: Roads constructed on National Forest System lands shall be designed to standards appropriate for the intended uses, considering safety, cost of transportation, and impacts on land and resources (16 USC 1608(c)).

A transportation plan, including a Road Analysis, was completed for the Middle Bugs project area. It analyzed current and future transportation needs. The project proposes construction of approximately 2 miles of permanent road to provide needed long term access to manage lands in this area.

National Environmental Policy Act (NEPA)

National Environmental Policy Act (NEPA) provisions have been followed as required in 40 CFR 1500. The proposed actions comply with the intent and requirements of NEPA. The Environmental Assessment analyzes a reasonable range of alternatives, including a No Action Alternative. It also discloses the expected effects of each alternative and discusses the identified issues and concerns.

Chapter II. Alternatives, including the Proposed Action

This chapter describes and compares the alternatives considered during this analysis. Chapter 2 sharply defines the issues and provides a clear basis for choice among options by the decision maker and the public (40 CFR 1502.14). The important difference between alternatives is based upon the driving (or key) issue that is emphasized in each. Alternatives were developed based upon Forest Plan objectives, National and Regional direction and policy, existing conditions and environmental issues.

Alternatives Considered in Detail

The Forest Service developed seven alternatives, including the No Action and proposed Action Alternatives, in response to issues raised internally or by the public. This provided a range of reasonable alternatives as required in 40 CFR 1502.14(a).

Alternative Descriptions

Alternative A: No Action

This alternative provides a baseline for comparison of environmental consequences of the proposed action to the existing condition and is a management option that could be selected by the Responsible Official. The results of taking no action would be the current condition as it changes over time due to natural forces. Current management plans would continue to guide management of the project area. The following trends would likely continue:

- Lodgepole pine stands would remain homogeneous in age and species composition and would become increasingly susceptible to mountain pine beetle attack and subsequent stand replacing fire. Resilience of the landscape would continue to decline over time.
- Current tree densities in mixed conifer stands would remain high. Fuels would increase as trees self-thin and die. Tree vigor and growth would decline, increasing susceptibility to insect and disease agents.
- Road densities would remain unchanged. Current road maintenance activities would continue, but some surface drainage problems require more than normal maintenance and would continue to present an erosion and sedimentation risk on Roads 555 and 103.
- Unstable roads and undersized or poor condition culverts would continue to present risks to channel integrity, water quality and aquatic organisms.
- Current compaction and detrimental soil impacts would persist on old skid trails and landings with very slight natural recovery of surface layers of compacted soils.
- The visual condition of the landscape would not change. Over time, diseased trees would continue to deteriorate and die, creating openings. Existing openings would continue to regenerate and would become less visually obvious.

Alternative B: Proposed Action

Alternative B fully meets the purpose and need by implementing the following activities.

To improve forest health and provide goods and services:

- Harvest timber on 705 acres consisting of:
    - Regeneration harvest on 642 acres, and

  - Commercial thin on 63 acres.
- Precommercial thin up to 114 acres
- Conduct post-harvest burning and/or slashing on 642 acres to reduce fuel hazards and prepare harvested sites for planting.
- Construct approximately 4 miles of temporary roads to facilitate harvest and decommission them after use.
- Construct approximately 2 miles of permanent road to access proposed harvest areas. Roads would be closed to motorized access after use.

To reduce sediment production:

- Reconstruct approximately 1 mile of Road 555.
- Recondition approximately 23 miles of Roads 103, 555 and 556.
- Decommission approximately 3 miles of Roads 103J, 103K, 336, 558, 1610, 3101A, 5159, 5159A and their spurs that are not needed for management.
- Put approximately 11.3 miles of Roads 103, 3100, 3101, 336, 553, 553A, 5159, 5153 and 5153A and their spurs into long term storage.
- Replace approximately 42 undersized or damaged culverts on Roads 103 and 555.
- Decompact 31 acres of skid trails.

Alternative C: No Permanent Road Construction; Reduce Visual Impacts

This alternative responds to concerns about the miles of roads in the project area and visual impacts from leave tree mortality potentially caused by post-harvest fuel treatments. This alternative would not build any permanent road, only temporary roads which would be obliterated after use. On tractor ground, it would mechanically treat activity fuels to protect leave tree clumps.

To improve forest health and provide goods and services:

- Harvest timber on 705 acres consisting of:
  - Regeneration harvest on 642 acres, and
  - Commercial thin on 63 acres.
- Precommercial thin up to 114 acres
- Conduct post-harvest burning on 642 acres to reduce fuel hazards and prepare harvested sites for planting. Of those acres, employ excavator piling and burning on approximately 464 acres to better protect leave trees.
- Construct approximately 5.2 miles of temporary roads to facilitate harvest and decommission them after use.

To reduce sediment production:

- Reconstruct approximately 1 mile of Road 555.
- Recondition approximately 23 miles of Roads 103, 555 and 556.
- Decommission approximately 3 miles of Roads 103J, 103K, 336, 558, 1610, 3101A, 5159, 5159A and their spurs that are not needed for management.
- Put approximately 11.3 miles of Roads 103, 3100, 3101, 336, 553, 553A, 5159, 5153 and 5153A and their spurs into long term storage.
- Replace approximately 42 undersized or damaged culverts on Roads 103 and 555.
- Decompact 31 acres of skid trails.

Table 2-1. Summary of Proposed Activities by Alternative

Activity	Alternative A No Action	Alternative B Proposed Action	Alternative C Temporary Roads Only Visual Protections
Regeneration Harvest (acres)	0	642	642
Commercial Thin (acres)	0	63	63
Logging System	0	464 acres tractor 241 acres skyline ground	
Site Preparation	0	Prescribed burn	Prescribed burn on skyline ground and excavator site-prepare tractor ground
Road Construction (miles)	0	2.1	0
Road Reconstruction (miles)	0	1	1
Road Reconditioning (miles)	0	23	23
Temporary Road (miles)	0	3.9	5.2
Pre-commercial Thin (acres)	0	114	
Road Long-Term Storage (miles)	0	11.3	
Road Decommissioning (miles)	0	3.01	
Watershed Improvements	0	Culvert replacement on Road 555 and 103 42 culverts	

Treatment Methods Common to all Action Alternatives

To accomplish vegetative and watershed objectives and start the move from existing to desired conditions, some form of the following treatments would be implemented in all action alternatives. These treatments all contain design features described below.

Timber Harvest

Regeneration Harvest: Approximately 642 acres of mature lodgepole pine would be regeneration harvested. Approximately 5 to 26 trees (dependent upon tree size) per acre would be retained for structural diversity, as shelter on harsher sites or to serve as a seed source. In most cases, leave trees would average 14 to 26 trees per acre, due to the lack of large trees. The larger diameter (17 inch and above) "legacy" trees would be favored as leave trees, followed by the largest diameter most fire resistant trees available and all mountain hemlock trees. Where possible, large diameter cull or broken top trees would also be left.

After harvest the units would be treated with prescribed fire or piling and burning and then replanted with western larch and western white pine.

Proposed regeneration treatments would create two openings larger than 40 acres; encompassing 416 and 191 acres. The proposed 191 acre unit would be adjacent to an existing 26 acre opening; increasing this new opening to 217 acres. These larger (40+ acre) openings would move the area closer to desired conditions by increasing the diversity of successional stages of the lodgepole pine forest type and thereby increase resiliency. Planting these openings with early seral species would also increase long term resiliency.

Commercial Thin: This intermediate treatment would improve stand composition and quality by removing less desirable tree species and dying trees on approximately 65 acres. This treatment would reduce stand canopy cover by about 40 per cent while promoting more desirable tree species consisting of white pine, larch and ponderosa pine. This treatment would space the best

formed, dominant or co-dominant trees approximately 20 feet apart. Large diameter legacy trees would be retained to provide long term structural diversity.

Precommercial Thinning –Approximately 114 acres of trees less than 20 years old would be thinned to approximate 12 foot spacing to improve growth, reduce fuel levels and improve forest health. Trees would be hand felled and slash lopped and scattered within the units or along closed roads. No ground-based machinery would be used. All thinning activities would take place outside of stream buffers.

Post-Harvest Site Preparation

Site preparation objectives are to reduce vegetative competition for the newly planted trees from the bear grass and huckleberry, while retaining adequate down woody debris for nutrient cycling and structural diversity.

Prescribed Burning Site Preparation: Where prescribed fire is used for site preparation, fuel reduction measures (limb/top removal or slash reduction around legacy trees) could be taken where needed to insure survival of retained western larch, ponderosa pine, and Douglas-fir.

Mechanical Site Preparation: Alternative C would employ mechanical site preparation with a track mounted machine, such as an excavator, to pile slash and brush or to created plantable spots approximately 3 feet wide through use of a mulching head. Typically, the machine would be used on the tractorable ground that is less than 35% slope, but it may be used on up to 45% slopes as long as soil disturbance is minimal (machine shall travel up and down the slope without midslope turns). Detrimental soil impacts would be minimized by using skid trails as travel routes where possible.

Watershed Improvement

All action alternatives propose watershed improvement activities consisting of road decommissioning and intermittent stored service, culvert removal and replacement and soil decompaction on landings and skid trails. Activities also include road maintenance and reconditioning activities such as road blading, brush cutting, culvert and ditch cleaning; and reconstruction activities including culvert replacement, gravel application and guardrail or gate placement. Appropriate BMPs and project design measures would be used to minimize sediment input into streams from roadwork activities. For a complete listing of roads, road miles, current conditions and proposed activities, please see Appendix A of this document.

Road Decommissioning: Roads no longer needed for management would be decommissioned through obliteration or abandonment to (1) decrease soil erosion and instream sediment deposition; (2) help improve channel structure and function; and (3) improve hillslope hydrologic processes to a more natural condition; and (4) restore soil productivity.

Road decommissioning activities may include surface decompaction; recontouring to natural hillslopes; removal of all culverts and reconstruction of natural slope channels and swales; full recontouring or earth barrier construction at road origin (sufficient to prevent motorized access); revegetation of disturbed soils with local native transplants and seed; and application of mulch from native on-site material or weed-free straw. Decommissioning would directly improve soil conditions by decompacting soils and adding wood and other organic matter to the existing road surface. This would also improve slope stability, hydrologic function and reduce the potential risk of mass erosion from culvert failure and fill failure.

Roads proposed for abandonment are often ridgetop roads on gentle slopes with few, if any, culverts and where road surveys show minimal risk of soil erosion or mass failure. These roads generally have a narrow disturbed width, have adequate plant and organic cover, and have cut and

fill slopes of no more than two feet height. Abandonment would leave the road in place but inaccessible to any vehicle use.

Intermittent Stored Service (Long-term Storage): Existing roads not needed for at least twenty years would be placed into Intermittent Stored Service. Practices used are intended to assure that the road is placed into a maintenance free condition that reduces that risk of surface erosion and sedimentation from mass failure. All culverts would be removed and channels and swales would be reconstructed to natural grade to provide a stable, maintenance free condition. Additional practices may include decompaction and outsloping or the road surface or full recontour in unstable areas to assure long-term stability. Roads in long-term storage remain on the Forest transportation system; however, they would be closed to all motorized, wheeled vehicles including motorcycles and ATVs. **NOTE:** Road decommissioning and intermittent service activities are proposed to correct existing resource problems and not to mitigate for other elements of this project.

Road reconstruction, reconditioning and maintenance activities are associated with timber harvest. Some decommissioned roads would be removed with the timber sale; others would be eliminated as appropriated funds become available. All proposed treatments are consistent with Clearwater National Forest direction (*Clearwater National Forest Intermittent Term and Stored Service Life policy, letter dated February 5, 2007*).

Road Maintenance: All roads used for harvest activities and log haul would be maintained to minimize erosion and provide proper drainage through surface blading, installation of drainage dips, and ditch and culvert maintenance.

Road Reconditioning: Road reconditioning would be completed on Roads 555, 556 and 103 used for log haul. Activities would entail cleaning ditches and culverts, blading the road surface to reestablish drainage and some spot surfacing to replace lost gravel on Road 103. Some undersized culverts would be replaced.

Road Reconstruction: Aggregate material would be placed on Road 555 to make it suitable for log hauling. Some undersized culverts would be replaced.

Permanent Road Construction: About 2 miles of permanent road would be constructed in Alternative B. After use, this road would be placed into intermittent stored service as described above. The road would be constructed, used and stored within a three year period. It would not cross streams, wetlands, areas with wet or poorly-drained soils, or areas with thin rocky soils to prevent adverse impacts to these sensitive areas.

Temporary Road Construction: Approximately 3.9 to 5.2 miles of temporary roads would be constructed, dependent upon the alternative. Temporary roads would be fully decommissioned after use. This would consist of recontouring and revegetating the road prism. Slash, stumps or other woody debris would be placed and scattered uniformly on the top of the recontoured corridor.

Soil Restoration

Improvement of soil productivity would occur in regeneration units on areas affected by management activities. Reducing compaction and rutting on skid trails and landings, increasing infiltration, and adding woody debris or organic matter would be the primary technique to improve soil quality. Equipment (ripper, forest cultivator, subsoiler, grapple rake, or similar equipment) would be used to loosen soils, recontour skid trails and landings with cutslopes, and add woody material as cover for stabilization. These soil improvement activities would only moderately offset soil compaction and displacement, but would improve infiltration and decrease soil recovery time.

Design Measures and Mitigation Features

The following design measures were developed to eliminate or reduce to acceptable levels the effects of the proposed activities. A majority of these are derived from site specific best management practices (BMP) from the Idaho Forest Practices Act and Stream Channel Alteration Handbook, with comparable practices from the FS R1/R4 Soil and Water Conservation Practices Handbook (FSH 2509.22). The effectiveness of each measure is also included, where applicable.

It should be noted that the watershed rehabilitation projects consisting of road decommissioning and culvert removals or replacement proposed under the action alternative are NOT required mitigation work needed to offset harvest activities. This means these projects may be implemented before, during or after harvest activities are completed.

1. Appropriate no-activity buffers would be delineated around wet areas, stream channels or unstable soils during project layout or implementation. INFISH default buffers would be used to define timber sale unit boundaries. No timber harvest would occur within 300 feet of fish-bearing streams, 150 feet of perennial non-fish bearing water, 50 feet of intermittent streams and 150 feet of wetlands larger than one acre.

   Clearwater National Forest BMP audits show these measures to be 99% effective in minimizing sediment introduction to streams.

2. No ignition of prescribed fire would take place within riparian areas, but fire may be allowed to back into these areas with low intensities.

3. Best Management Practices (BMPs) found in Rules Pertaining to the Idaho Forest Practices Act Title 38, Chapter 13, Idaho Code, and Soil and Water Conservation Practices Handbook, FSH 2509.22 would be applied to prevent non-channelized sediment delivery from harvest units and roads to streams in the project area.

   BMP implementation and effectiveness rates on similar landforms have been found adequate to prevent sediment delivery to streams as noted in the BMP audits conducted on the Forest from 1990 to 2009 (Jones 1999, 2002, 2004, 2005, 2007, 2008, 2009; Idaho Dept. of Environmental Quality, 2005). Vegetated buffer strips located between ground-disturbing activities and streams have been shown to be highly effective at preventing sediment delivery to streams in numerous different locations and conditions (Belt et al. 1992, Megahan and King 2005).

4. Nonmerchantable snags which are not a hazard during the felling or skidding operation would be left for wildlife and long-term site productivity.

5. Approximately 5 to 26 trees per acre would be retained as leave trees, dependent upon the size of trees in the unit. Due to the low number of large trees within the harvest units, the leave trees would mostly be in the 10 to12 inch diameter class, which would equate to 14 to 26 trees per acre.

6. Regeneration harvest units would retain 7 to 13 tons per acre of coarse woody material (CWM) greater than three inches in diameter to maintain soil productivity. (Graham et al. 1994). Where existing CWM does not currently meet this, additional standing trees will be retained for recruitment. Also leave tree retention requirements would address future recruitment.

7. Machine trails for timber harvest and fuel treatments would be designed to keep the extent of detrimental soil effects below 15%, using existing skid trails and landings where other resources are not compromised. Skid trails and landings utilized in all harvest units would be decompacted to improve soil productivity and meet soil quality standards.

Actions would include decompaction and placement of slash, and may include recontouring and placing wood and duff layers over exposed soil.

Machine trails can accomplish harvest and site preparation and remain within the 15% standard, but if uncontrolled, can lead to extensive trails. Sale administration and equipment operator skills are necessary for success. Re-use of trails and subsequent decompaction minimizes impacts. Decompaction has been shown to decrease bulk density by 30-60% in comparison to compacted areas (Rone 2011, CNF 2005). Vegetative cover increases from 20% in the initial year of decommissioning to 40% in year 5 (CNF 2005.)

8. Units C, D and E would have 100% canopy retention in the 5 small areas totaling 2 acres where sensitive soil characteristics have been identified (see map, appendix A).

   Retention of root strength is important for reduction of landslide hazard (McClelland et al, 1997) Keeping trees on the landscape will retain the root strength in these steep areas.

9. Activity would be designed to stay below 15% areal disturbance of the treatment area. Existing skid trails and landings would be utilized where other resources are not compromised. Methods include designation of skid trails, reuse of skid trails by machines used for piling and placement of slash on existing skid trails where possible to overlap detrimental effects rather than extending the footprint. Skid trails and landings in all units would be decompacted following use for timber harvest in order to improve soil productivity. Actions would include decompaction and placement of slash, woody material and/or duff over exposed soil.

   Effectiveness of design features are moderate to high based on past monitoring and research (Froehlich and McNabb, 1983; Graham et al., 1994; Graham et al., 1999; Korb, 2004; Neary et al, 2008; Curran 2005).

10. Under Alternative B, permanent road was designed to avoid steeper slopes; however, if areas of high parent material are encountered on slopes exceeding 55%, then, the construction would follow these guidelines: (a) full bench construction on areas having sustained slopes greater than 55%; (b) increased drainage density in areas having erosive parent materials; (c) cut slopes would be 1:1, and fillslopes would be 1.5:1; and (d) gravel would be applied as needed to the road to minimize surface erosion. Road design would consider road grade, and seed would be applied to all disturbed areas.

11. Under Alternative B, the permanent road would be constructed, used and placed into long term storage within a three year period. It would not cross streams, wetlands, areas with wet or poorly-drained soils, or areas with thin rocky soils to prevent adverse impacts to these sensitive areas. After use, the road would be outsloped to approximately 20% sideslope, except in areas that require full recontour to assure stability. The first approximately 300 feet (from the junction with Road 103) would be fully recontoured to maintain closure and maximize hydrologic and vegetative recovery on this segment located within 300 feet of streams.

12. On all new permanent and temporary roads, drainage dips and waterbars would be installed and maintained and surface grading would maintain an outslope to prevent concentrated flow on the road surface and minimize the potential for erosion and sediment delivery to streams. Slash-filter windrows would be placed on the fill-slope and cross drainage outlets below new permanent road located within 300 feet of streams to lower the risk of sediment delivery to streams (segments in Units C and D).

Road design and mitigation can decrease sediment production (Burroughs and King1989; Burroughs et al 1984) with use of slash windrows, application of gravel and application of seed to disturbed areas. Design of cut and fill slopes at gentler grades decrease likelihood of surface erosion. Increasing frequency of drainage structures minimizes the contributing area of surface erosion and sediment introduction to streams (Elliot et al.1999)

13. Temporary roads would be constructed and decommissioned within 3 years following use with machinery that does not need to leave the prism to decompact soil, recontour and place woody material. Temporary roads would be located outside of sensitive areas with wet or thin soils and roads would not cross any streams. Temporary roads would be fully obliterated through full recontour to original slopes and topography, decompaction, drainage stabilization, topsoil replacement, woody debris application, and revegetation. These roads would be closed to the public until they are decommissioned.

14. Segments of the temporary road on the north end of Unit E (Temp Rd. E3) are located upslope of an area with very high sediment delivery efficiency and low slope sediment storage capacity. This temporary road would be constructed, used and decommissioned during one summer/fall season to minimize erosion and the potential for sediment delivery to Middle Creek.

15. During culvert removal and/or replacement, road decommissioning or conversion to intermittent stored service, measures would be taken to prevent damaging levels of sediment from entering streams, such as: (a) placing removable sediment traps below work areas to trap fines; (b) when working instream, removing all fill around pipes prior to bypass and pipe removal (where this is not possible, use non-eroding diversion); (c) revegetating scarified and disturbed soils with grasses (weed free) for short-term erosion protection and with shrubs and trees for long-term soil stability; (d) utilizing erosion control mats on stream channel slopes and slides; (e) mulching with native materials, where available, or using weed-free straw to ensure coverage of exposed soils; (f) dissipating energy in the newly constructed stream channels using log or rock weirs; (g) armoring channel banks and dissipating energy with large rock whenever possible; and (h) timing of the activity to avoid spawning timeframes. (i) place fill material in stable areas outside of stream channels and floodplains, (J) clean external oil, grease, dirt and mud, repair leaks from equipment used for instream work prior to arriving at the project site.

    BMP audits show these measures to have a high effectiveness. Effectiveness of road design and decommissioning applies to both specified roads and temporary roads. Decompaction has been shown to decrease bulk density by 30-60% in comparison to compacted areas (Rone 2011, USDA 2005). Vegetative cover increases from 20% in the initial year of decommissioning to 40% in year 5 (USDA 2005). Monitoring has shown decommissioning and storage treatments to be effective at reducing surface erosion and mass failure risk while increasing water infiltration rates and vegetative ground cover (Foltz 2007, Lloyd et al. 2010, USDA 1999-2009).

16. Timber sale, stewardship or service contracts would include provisions to minimize the risk of an accidental spill of petroleum products, as well as to protect water courses and aquatic biota from adverse effects in the event of a spill.

    BMP audits show this measure to have a Moderate effectiveness. A plan insures foresight, but cannot eliminate the risk of materials being spilled and escaping into waters. (FPA Rule - 060.02.a, b, c and 060.04.a)

17. To minimize the spread of noxious weeds, road equipment would be cleaned of loose debris prior to moving on to the timber sale area (timber sale contract provision CT 6.26).

    Effectiveness is expected to be moderate, since it would not be possible to restrict all non-sale related traffic from entering the sale area.

18. If cultural resources were found during implementation of the project, project activities would cease. The Forest Archaeologist would be notified and assess the effect of continued activities on the newly identified cultural resource.
19. No harvesting would occur in old growth and stands within 20 years of achieving old growth status.
20. All post-sale fuel reduction treatments would be conducted according to the requirements of the Montana/North Idaho Smoke Management Guidelines and the Idaho Emergency Episode Rule.
21. To prevent conflicts with snowmobile use, snow plowing on Roads 103 and 555 would not be permitted except when necessary to facilitate reforestation efforts.
22. Ensure the trail prism for Trail 112 is left intact at any point where a section of the trail intersects with Road 553. Portions of this trail may follow segments of the road that are planned to be put into intermittent storage. Storage procedures would not eliminate use of the trail.
23. Log hauling would be restricted on Road 555 during weekends to reduce impacts to recreation.
24. Any active goshawk nests found during harvest activities would be protected by establishing a post fledging area (PFA) of 420 acres where a no-activity buffer zone would be implemented from April 15 to August 15.
25. The commercial and pre-commercial thinning proposed within the documented elk calving area (Units A, B and adjacent stands proposed for precommercial thinning) would not occur during the elk calving season (about May 15 through June 15).
26. All areas, 5 acres or larger of multi-storied snowshoe hare habitat in units B, C, D or E shall be left intact or maintaining suitable habitat quality within the harvest units.

Monitoring

The Middle Bugs Project would include the following monitoring activities.

1. Unit E would be monitored after activities to verify assumptions made about the extent of detrimental soil disturbance.
2. Forestwide INFISH compliance monitoring would be conducted annually by the Forest Fisheries Biologist in conjunction with BMP audits with the Forest Hydrologist. The monitoring is done on a sample of the completed activities.

Alternatives Analyzed but Not Considered in Detail

Alternative D: Watershed Improvement Only:

This alternative was developed and analyzed in response to a commenter that wanted an alternative that would not harvest trees. The commentor thought the proposed project was impractical due to low timber values and long haul distances. Alternative D would consider the aquatic needs but would not address vegetative needs, or provide goods and services as stated in

the purpose and need for action. Alternative D does not address the needs in this area to reduce tree densities, shift species composition, capture tree mortality and commercial value, and reduce insect and disease problems. An economic analysis completed for this project determined the project was economically viable. The CFP allocates the majority of this project area to MA C8S, with goals to manage these areas to maintain high quality wildlife and fishery objectives while producing timber from the productive Forest land. Watershed conditions do not preclude these types of actions; therefore, Alternative D was dismissed from further consideration. However, watershed improvement activities were included in all action alternatives.

Alternative E: No New Roads – Temporary and Permanent

This alternative was developed to address a request that no permanent or temporary roads be constructed for this project. This would restrict vegetative treatments to about 187 acres in harvest Units A, B, C and E that could be reached from existing roads with tractor and skyline systems. This would consist of about 62 acres of commercial thinning and 125 acres of regeneration harvest. Longer skidding distances would be required in some areas which could result in more soil disturbance. Bark beetle activity is evident in all proposed units.

While harvest could be economically viable, and provide goods and services, it would not meet the project purpose and need to improve vegetative conditions by improving species diversity and creating openings that would help better distribute successional stages. This alternative would create one approximate 100 acre opening as compared to the three openings ranging in size from 35 to 416 acres created by Alternatives B and C. This alternative would only increase early seral species of western larch and western white pine on 125 acres (2%) of the project area as opposed to 12% under Alternatives B and C. Currently, the early successional stage in the moist frost churned ridges LTA is 4%; far less than historic levels of 20 to 50%. Unit C, comprising 416 acres, offers the best opportunity to meet the purpose and need to balance successional stages but would not be treated under this alternative. This alternative would not change successional stages in this LTA. Project objectives to increase species diversity would not be met in Alternative E.

Alternative F: No Large Openings

An alternative with treatments that do not exceed 40 acres was analyzed, but dismissed from further consideration because treating patches less than or equal to 40 acres would not meet project vegetative objectives to improve species diversity to create conditions that are resilient and allow for rapid recovery after disturbances. Mountain pine beetle outbreaks can be prevented by creating a mosaic of age and size classes, which reduces the acreage susceptible to mountain pine beetles at one time (Amman and Safranvik 1984). Conversion to early seral species such as western larch and white pine in these larger openings would increase resilience and move the landscape closer to historic conditions. That would not be accomplished under Alternative F.

Within 10 to 20 years, stand replacing bark beetle-caused mortality could affect up to 1,465 acres (95%) of the lodgepole pine stands within the project area. Treating patches less than 40 acres would not meet the purpose and need to recover the economic value of these dead and dying trees.

Alternative G: Precommercial Thin

All action alternatives originally included an additional 105 acres of precommercial thinning. Further analysis revealed that these acres were located in areas of modeled potential lynx habitat; consequently, they were dropped from further consideration.

Alternative H: Decommission Additional Roads

Decommissioning of Roads 3100, 3101 103J and 103K was requested by a commenter as a means of offsetting potential impacts to elk habitat potential. A roads analysis determined that Roads 3100 and 3101 are needed for future management; all but 0.3 miles of Road 3100 would be placed into long term intermittent storage. The Deciding Official determined that decommissioning of Roads 103J and 103K would be included in all action alternatives to reduce current road densities, help remove the potential for sediment input into area streams and help to maintain high quality wildlife objectives. All proposed road decommissioning and 11.3 miles of long term storage opportunities identified in the roads analysis were included in all action alternatives to maximize potential benefits to all resources. Potential impacts to elk habitat potential were analyzed for all action alternatives. The project was designed to assure that Forest Plan standards for MA C8S would be met. Therefore, Alternative H was dismissed from detailed analysis.

Comparison of Alternatives

This section provides a summary of the effects of implementing each alternative. The following table presents a comparison of the proposed action to the purpose and need based on indicators established to measure responsiveness.

Table 2-2. Alternative Comparison by Response to the Purpose and Need

Indicators of Goods and Services	Alternative A	Alternative B	Alternative C
Harvest Related Jobs Generated	0	278	278
Harvest Income to Communities ($)	0	$7,898,000	$7,898,000
Volume Offered (CCF)	0	20,600	20,600
Appraised Value ($)	0	$716,000	$740,000
Present Net Value ($)	0	$50,000	$79,000

Table 2-3. Vegetation Improvement Alternative Comparison by Response to the Purpose and Need

Indicators of Vegetation Improvement	Alternative A	Alternative B	Alternative C
Acres planted with early seral species	0	642	642
Acres of overstocked stands thinned	0	63	63

Table 2-4. Watershed Improvement Alternative Comparison by Response to the Purpose and Need

Indicators of Watershed Improvement	Alternative A	Alternative B	Alternative C
Undersized culvert replacement	0	42	42
Roads placed into long term storage (miles)	0	11	11
Road decommissioned (miles)	0	3	3
Total Road Density (miles)*	1.3	1.3	1.2
Road Reconditioning (miles)	0	23	23
Road Reconstruction (miles)	0	1	1

*Figures are for Middle Creek (HUC6). See Chapter 3, Watershed section for more detailed discussion.

Table 2-5 provides a summary and comparison of the effects of implementing each alternative.

Table 2-5. Alternative Comparison by Resource Issue

Issues and Indicators	Alt A	Alt B	Alt C
Vegetation – Forest cover type (%)			
Lodgepole Pine	30	18	18
Western Larch	1	7	7
Western White Pine	<1	6	6
Ponderosa Pine	<1	<1	<1
Successional Stages (%)			
Early	12	27	27
Mid	52	40	40
Late	36	34	34
Landscape Pattern - # of Openings Created (>40 acres)	0	2	2
Reduced Stand Density (acres)	0	63	63
Water Quality			
Water Yield – ECA% in 7th code watersheds	1-6	1-13	1-13
Sediment Yield in tons as modeled by WEPP	0	0.24	0.17
Total road density (mi/mi²)	0.2 – 2.9	0.2 – 2.6	0.2 – 2.6
Impacts to Aquatic Species and Habitat			
Westslope Cutthroat Trout	NI	MIIH	MIIH
Redband Trout	NI	MIIH	MIIH
Bull Trout	NE	NLAA	NLAA
Western Pearlshell Mussel	NI	MIIH	MIIH
Soil Stability and Erosion Hazard Potential			
Acres of proposed activities on landtypes having high landslide hazard potential	0	2	2
Soil Productivity			
# of treatment units that exceed 15% Regional Soil Standards	0	0	0
Recreation			
Impacts on seasonal recreational access	None	Temporary	Temporary
Impacts on access to dispersed camping opportunities	None	Limited	Limited
Scenic Integrity – Objectives Met	Yes	Yes	Yes
Treatments to limit leave tree mortality	-	No	Yes
Roadless Areas			
Vegetative treatments in roadless areas	None	None	None
Impacts to Wilderness Characteristics	None	None	None
Old Growth and Mature Forest (130-150 years) - OGAUs 115, 116, 117, 118	No change	No change	No change
TES, MIS and Sensitive Wildlife Species			
Canada Lynx - LAU 38 – Standard VEG S1 (<30%)	4.8	7.4	7.4
Standard VEG S2 (<15%)	0.4	3.0	3.0
Elk Summer Habitat Effectiveness			
MA C8S Forestwide (%) 75% minimum	82	82	82
Beaver Dam EAU (%)	47	49	49
Rocky Ridge EAU (%)	65	65	65
Footrot EAU (%)	62	62	62
Zoe EAU (%)	86	81	81
Pileated Woodpecker Nesting habitat (acres) Foraging Habitat (acres)	1716 846	No change 794	No change 794
Northern Goshawk Nesting (acres) Foraging (acres)	1716 1822	No change 1552	No change 1552
Pine marten (acres)	3360	2867	2867
Black backed Woodpecker (acres)	3185	2543	2543
Flammulated Owl (acres)	53	No change	No change
Fisher Summer (acres)	471	242	242

Issues and Indicators		Alt A	Alt B	Alt C
	Winter (acres)	411	No change	No change
Fringed Myotis Bat (acres)		72	No change	No change
Coeur d'Alene Salamander		No change	No change	No change
Gray Wolf		No change	No change	No change
Wolverine	Foraging (acres)	2469	1917	1917
	Denning (acres)	0	No change	No change
Western Toad (acres)		2065	1977	1977

Chapter III. Affected Environment and Environmental Consequences

This chapter provides a summary of the affected environment and the environmental impacts of the alternatives considered in detail. More details regarding the affected environment, conclusion about potential effects and applicable Forest Plan and regulatory direction are available in specialist reports for each resource and other supporting documentation cited in those reports.

Vegetation

Affected Environment

The area assessed for vegetative conditions and effects to forest health is the 5,540 acre project area which consists entirely of National Forest System lands. At this scale, the effects would be measurable and accurately reflect the environmental condition. The following section discusses successional stages, stand densities, and forest composition for this area.

Analysis Methodology

Stand exams were completed for the proposed treatment units in accordance with national Common Stand Exam (CSE) protocol. The project silviculturist field reviewed all proposed treatment areas. The forest composition current conditions analysis was completed using the Major Species Code (MSC) data in the CNF GIS data. Basal area weighted average age (BAGE) from the Forest GIS data was used to analyze existing condition of successional stages of lodgepole pine within the project area. Successional stage, age class and Landtype Association (LTA) data was used as described in the Big Game Habitat Restoration on the Watershed Scale (BHROWS, 1999).

Resource Indicators

Proposed actions would affect ecosystem health and resilience. Impacts to ecosystem health and resilience are determined by measuring changes in successional stage, landscape pattern, stand density, and forest composition.

Current Conditions

1. **Successional Stages**

Vegetation successional stages reflect the effects that disturbances have had on forest vegetation. Fire, forest insects and diseases, and harvest are the most important disturbances affecting successional stages in this project area. This project proposes commercial thinning in mixed Douglas fir and western larch stands and regeneration harvest in homogenous lodgepole stands. Regeneration harvest is the only proposed harvest type that would affect successional stages.

The Middle Bugs project is located in the Weitas Creek watershed. Between 1910 and 1938, about 121,267 acres (87%) of this 139,736 acre watershed burned. These large fires initiated the 80-90 year old uniform lodgepole pine stands within the project area. This homogeneity in species and age composition causes stands to be less resilient to disturbances.

In northern Idaho and central Oregon, lodgepole pine stands begin to break up at 80 to 100 years (Lotan and Critchfield 1990). Stands more than 80 year old are more susceptible to mountain beetle infestations than any other age class (Gibson, 2004). Currently, of the 1,539 acres of stands dominated by lodgepole pine in the project area, 1,465 acres are 70 years old or older (see

Table 3-1). This indicates that within 10 years, 95% of the lodgepole pine stands in the project area would have reached the age class at which they are most susceptible to mountain pine beetle-caused mortality and the age at which they can be expected to begin breaking apart.

Fire and forest insects and diseases are closely related. Mountain pine beetle is the most severe insect pest of lodgepole pine and has played an historic role in the dynamics of lodgepole pine ecosystems. By periodically invading stands and creating large amounts of fuels, which are eventually consumed by fire, creating favorable conditions for regeneration, the beetle has increased the probability that lodgepole pine would reoccupy the site at the expense of other species" (Lotan and Critchfield 1990).

High concentrations of lodgepole pine, stand age and density have increased stand susceptibility, resulting in the mountain pine beetle being the most prominent disturbance agent in the project area. Mountain pine beetle are currently active throughout the project area; there are several patches of beetle caused mortality and evidence of current attacks in all proposed regeneration harvest units. Other insect and diseases occurring in the area include larch needle cast, fir broom rust and western hemlock looper. Hemlock looper is present in large numbers and can cause severe defoliation and mortality.

Landscape successional stages are shown compared to historic distribution by Landtype Associations (LTA). Landtype Associations are used because they indicate historic disturbance regimes (Cleland et al 1997). Moist frost churned ridges, and umbric low relief rolling hills represent 80% of the project area and are the only LTAs affected; therefore, they are the only ones discussed in detail. All proposed treatments would occur in these LTAs where the early successional stage is less than historic levels or the mid successional stage is over represented.

Table 3-1. Successional Stage Distribution by LTA

LTA Group	Successional Stage	Historic Distribution[1]	Alternative A Current Distribution[2]	Alternatives B and C Distribution
Moist Frost Churned Ridges	Early (0-40 years)	20-50%	4%	29%
	Mid (41-100 years)	15-35%	59%	39%
	Late (Over 100 years)	30-60%	37%	32%
Umbric Low Relief Rolling Hills	Early (0-40 years)	30-50%	19%	24%
	Mid (41-100 years)	15-50%	44%	41%
	Late (Over 100 years)	30-50%	36%	35%

Forests dominated by lodgepole pine comprise about 45% of the moist frost churned ridges LTA and 25% of the umbric low relief rolling hills LTA. Successional stage is extremely important when discussing ecosystem health in lodgepole pine forest types. The Northern Region Overview says "currently there is very little balance of structural stages in the lodgepole pine type in the Region with the exception of those areas that were harvested on the eastside Forests…This imbalance will continue to promote the wide swings in amplitude in the historical ranges of structural stages…" (USDA Forest Service 1998). This same report states that "most lodgepole pine forests in the Region are in the mature and old age classes except for recently harvested and burned areas. This is a significant departure from the historical composition of structural stages."

[1] USDA Forest Service, 1999.
[2] Clearwater National Forest GIS data.

(USDA Forest Service 1998) Observations within the project area confirm that these statements from the Northern Region Overview are applicable to this project.

Currently, 95% of the stands dominated by lodgepole pine are 70 years or older and would be most susceptible to mountain pine beetle caused mortality within 10 years. Project area stand exams verified mountain pine beetle infestations and stand deterioration.

Table 3-2. Successional Stage and Age Class of Lodgepole Pine in the Project Area

Successional Stage	Stand Age	**Alternative A** Acres of Lodgepole Pine	**Alternative A** % of Lodgepole Pine	**Alternatives B & C** Acres of Lodgepole Pine	**Alternatives B & C** % of Lodgepole Pine
Early	0-40	57	4%	699	46%
Mid	41-80	530	34%	531	34%
Late	81+	951	62%	309	20%

2. Landscape Pattern

Disturbance patterns affect landscape pattern, which were analyzed using LTAs. Turner and others (2001) state that "the size, shape, and spatial relationships of patches on the landscape influence the structure and function of ecosystems." Attempting to emulate historic disturbance patterns is likely to minimize adverse impacts on complex ecological processes that knit together the forest landscape (North and Keeton 2008).

Historically, fire was the primary disturbance in these LTAs. In the moist frost churned ridges LTA, fires historically created even-aged patches ranging in size from 500-1,000 acres (Mital, 2010). Currently there is 1000+ acre patch established following the 1919 fires and one 26 acre patch established by timber harvest in 1992.

The umbric low relief rolling hills LTA is characterized by even-aged patches ranging in size from ¼ acre to 1,000 acres or more (Mital, 2010). Patches within this LTA group are within the historic range of sizes. The Northern Region Overview states that within the Region, "stand patterns under (past) clearcutting have not replicated historical patterns created in areas associated with lethal fire regimes, which tended to be larger in extent and more irregular in shape" (USDA Forest Service, 1998).

3. Forest Composition

Forest composition refers to the dominant tree species present in a stand and is a measure of resilience. Resilience is one of the keys to responding to a changing climate (USDA Forest Service 2008). Resilience is defined as the capacity of a (plant) community or ecosystem to maintain or regain normal function and development following disturbance (Helms 1998). The existing condition of the vegetation in relation to a changing climate should be gauged in terms of the resilience of the vegetation. Resistance, "the ease or difficulty of changing the [ecological] system", is one of the attributes of resilience (Walker et al 2004). Holling (2001) asserts that resistance can be increased by increasing diversity.

The primary forest cover types within the project area are lodgepole pine, grand fir, and Douglas-fir (Table 3-3). Homogeneous stands of lodgepole pine dominate the southern half of the project area, whereas mixed specie stands of grand fir and Douglas-fir dominate the northern portion. The homogeneous species composition and successional stages in the lodgepole pine forests

indicate that resilience could be increased by increasing species diversity as well as increasing distribution of successional stages within the project area.

Table 3-3. Forest Cover Types in the Project Area

Forest Cover Type	Alternative A (%)	Alternatives B & C (%)	Desired Condition
Lodgepole Pine	30	18	15-35
Grand Fir	24	24	0-5
Douglas-fir	23	23	0-5
Western Redcedar	6	6	5-15
Engelmann Spruce	2	2	0-5
Subalpine fir	1	1	0-5
Western Larch	1	7	10-20
Western White Pine	<1	6	45-55
Ponderosa Pine	<1	<1	0-5
Other	12	12	10-15

4. Stand Density

Competition from excessive vegetation in mixed Douglas-fir and western larch stands has reduced stand vigor and increased susceptibility to mortality from insects and disease. These overstocked areas are declining in health and vigor. Stand density is used as a measure of stand vigor and susceptibility to insect and disease caused mortality. Stand densities are high on 746 acres, of which 63 acres are overstocked mixed Douglas-fir and western larch stands. Stocking levels in these mature stands range between 474 and 1,191 trees per acre. Stand densities are too high to maintain vigorous western larch growth.

Environmental Consequences

Direct and Indirect Effects

1. Alternative A

Successional Stages: The early successional stage would remain underrepresented relative to historic conditions in the moist frost churned ridges and umbric low relief rolling hills LTA. Homogeneous lodgepole pine stands within the project area would become increasingly susceptible to mountain pine beetle attack and subsequent stand replacing fire. Resilience of the landscape would continue to decline over time.

Within 10 to 20 years, stand replacing bark beetle-caused mortality could affect up to 1,465 acres (95%) of the lodgepole pine stands within the project area. This would result in a complete loss of the late successional stage, and a loss of about 514 acres (97%) of the mid successional stage. Within this time frame, 1,482 acres of the lodgepole pine stands in the project area would be reset to the early successional stage and 57 acres would progress from the early to mid-successional stage. None would remain in the late successional stage. Under this alternative, successional stage diversity would not increase, therefore resilience would not increase.

Landscape Pattern: Over the next ten years, landscape patterns would change as large patches of lodgepole pine die from mountain pine beetle activity, and new patches are created that would decrease the homogeneity of the landscape. This pattern would be expected throughout the 1,465 acres currently dominated by lodgepole pine that are over 70 years old.

In the longer term, trees that were killed to create these patches would eventually fall to the forest floor and create a fuel bed that would be conducive to stand replacing fire, which would create a young homogeneous patch of lodgepole pine.

In the moist frost churned ridges LTA group, existing patches would not be consistent with historic landscape patterns. Landscape patterns would remain consistent with historical conditions within the umbric low relief rolling hills LTA.

Forest Composition: Forest composition would change over the next 20 years as canopy gaps created by lodgepole pine mortality are regenerated with shade tolerant species, including grand fir, subalpine fir and mountain hemlock. Beyond the next 10-20 years, however, the landscape would be expected to return to a lodgepole pine dominated landscape. According to Lotan and Critchfield (1990), "By periodically invading stands and creating large amounts of fuels, which are eventually consumed by fire, creating favorable conditions for regeneration, the beetle has increased the probability that lodgepole pine will reoccupy the site at the expense of other species." This maintenance of homogeneous lodgepole pine would be expected in this project area under the no action alternative.

Mountain pine beetle-caused mortality would likely create high fuel loadings in the lodgepole pine, increasing the risk of a high intensity, stand replacing fire. This, in turn, would probably result in a new stand of lodgepole pine because of the intensity of the fire and lack of seed source for western white pine or western larch. Lodgepole pine would retain its dominance and forest composition would not change.

Stand Density: High stand densities on 746 acres of various forest types would continue to reduce growth and vigor and increase susceptibility to mortality from insects and disease. Approximately 62 of these acres are composed of mixed Douglas-fir and western larch stands where this decrease in stand vigor would cause the eventual loss of western larch. As these trees die, they would be replaced by shade tolerant grand fir.

2. Alternatives B and C

Successional Stages: Regeneration harvest would shift 642 acres from the late to the early successional stage and create a mosaic of age and size classes, which would reduce susceptibility to mountain pine beetle outbreaks (Amman and Safranyik 1984). Both action alternatives would increase diversity of successional stages in the lodgepole pine stands, which would increase resilience and reduce the probability that mountain pine beetle-caused disturbance would convert mid successional and late successional stands to early successional stands.

Landscape Pattern: Regeneration harvest proposed under both alternatives would create three patches of early successional forest, ranging from 35 to 416 acres, and decrease landscape homogeneity. Two of these openings would be larger than 40 acres and help trend landscape patterns toward historic conditions by increasing the diversity of successional stages of the lodgepole pine forest type and increasing resilience by emulating historic disturbance patterns.

Mountain pine beetle outbreaks can be prevented by creating a mosaic of age and size classes, which reduces the acreage susceptible to mountain pine beetles at one time (Amman and Safranyik 1984). Regeneration activities proposed under both action alternatives would decrease landscape homogeneity of the lodgepole pine and reduce the probability that mountain pine beetle-caused disturbance would convert mid successional and late successional stands to early successional stands. Landscape pattern created by both action alternatives would be within the range of patch sizes historically created by natural disturbances in both LTAs.

Turner and others (2001) state that "Recovery following disturbance can be very sensitive to spatial pattern created by disturbance and is strongly influenced by the spatial pattern of biotic

residuals left behind" (Turner et al, 2001). Attempting to emulate historic disturbance patterns is "likely to minimize adverse impacts on complex ecological processes that knit together the forest landscape" (North and Keeton, 2008).

Since lodgepole pine forests in Region One often "occur in large patches (200+ acres)" (USDA Forest Service 1998), the creation of large patches of young forest under Alternatives B and C would improve resilience because these patches would emulate more historic patch sizes and would increase diversity of successional stages of lodgepole pine within the project area.

The units that are proposed in this project that would exceed 40 acres are proposed in forests primarily comprised of lodgepole pine. Since regeneration treatments are proposed in lodgepole pine stands where mountain pine beetle mortality has occurred and an outbreak is imminent, the proposed units meet the criteria set forth in FSM 2471.1 to be exempt from requiring Regional Forester approval to exceed 40 acres.

Forest Composition: Alternatives B and C would increase western white pine and western larch on about 642 acres (11%) of the project, increasing species diversity and resilience. Treated areas would become less susceptible to insect and disease caused mortality.

Stand Density: Alternatives B and C would reduce stand densities on 62 acres, increasing vigor and improving resistance to insect-caused mortality. Improved vigor would maintain the overstory and delay encroachment by grand fir.

Cumulative Effects

Geographic Area: The cumulative effects geographic boundary considered for vegetation as determined by impacts to successional stages, landscape pattern, forest composition and stand density is the 5,540 acre Middle Bugs analysis area, which represents the smallest continuous area containing all of the proposed vegetative treatments. While large enough to give a landscape view of the effects, the area is not so large that changes become diluted or not measurable.

Time Frames: Approximately 40 years was considered for cumulative effects to successional stages and landscape pattern because that represents the time for young forest stands created by regeneration harvests to mature into the next successional stage. A five year time frame was considered for cumulative effects for tree species composition because this encompasses harvest, planting and successful certification as stocked stands. A twenty year time frame was considered for stand density because that is how long decreased stand density would improve stand vigor.

Past, Present, and Foreseeable Future Actions: Past actions considered for impacts to successional stages, landscape pattern, forest composition and stand density include timber harvest and wildfires. They are the basis for the existing condition. Cumulative effects can only arise when the effects of the proposed actions are combined with past, present and reasonably foreseeable actions. There are no other present or foreseeable activities in the cumulative effects area that would affect vegetation. Therefore, there can be no cumulative impacts to vegetation for any alternative.

Rare Plants

Affected Environment

For the purposes of this analysis, rare plant species include threatened, endangered, or sensitive species. This section contains the necessary determinations section and discussion of effects for

sensitive plant species to serve as the Biological Evaluation for rare plants as directed by the streamlined BE processes outlined in the FSM and discloses and documents the effects to the threatened plant species that potentially occurs on the Clearwater National Forest and serves as the Biological Assessment for this project. Threatened and endangered species are designated under the Endangered Species Act; known locations are well separated from the project area and no suitable habitat is present. Therefore, they are not discussed further in this analysis.

Potentially suitable habitat occurs for at least twelve sensitive plant species in the project area, though there are no documented occurrences. Given the extensive area of suitable habitat for some species of concern, it is anticipated that undocumented populations occur.

The 5,540 acre project area was considered for direct, indirect and cumulative effects because the effects would be specific and contained to those areas treated within the project area.

Analysis Methodology

Species information is based on the study of aerial photos and topographic and forest habitat maps to determine potential habitat for plants of concern in the project area. Individual species requirements were reviewed and appropriate modeling criteria selected to determine which species or corresponding habitat would be expected to occur in the project area.

Using GIS, the habitat units important to sensitive plants were identified and mapped for the project area. Locations of the proposed activities were evaluated against the habitat groupings to determine which activities would occur in those habitats. Each activity occurring in potential habitat was evaluated based on the criteria important for each species.

The basic mapping unit used is the Habitat Type Group (HTG). This classification groups similar forest habitats into functional categories based upon vegetative type, moisture and temperature characteristics. For some species, these units are useful to match species criteria to potential habitat.

Resource Indicators

Vegetation management or road construction/reconstruction and decommissioning could directly affect some plant species. Indirect effects for some species may include the expansion of weeds and the mitigating treatments of these infestations or changes to the forest canopy that may affect light and temperature regimes. Cumulative effects are the overall effects to species from past, present and reasonably foreseeable future projects. Past effects on general habitat conditions can be qualified and matched to species dependent on a particular habitat. For this reason, Habitat Type Groups are used for the cumulative effects discussion. The effect on potentially suitable habitat is the primary indicator used in the analysis.

Environmental Consequences

The effects analysis is based on evaluation of proposed activities occurring in potentially suitable habitat and the potential for those activities to directly or indirectly affect populations or habitat characteristics.

Direct and Indirect Effects

1. Alternative A

No management activities are proposed under this alternative; therefore, there would be no direct effects on plant species or habitats. Indirectly, changes in stand structure over time could alter habitats for some sensitive plant species. In some cover types, forest openings may occur as seral

species decline. In more mixed-conifer forest types, succession would continue to progress, resulting in a decline in size and frequency of small openings and forest gaps; however, this process may be reversed as openings occur in later seral species due to insect and disease.

In general, species requiring later seral forests would see an improvement in habitat quality, and species with poor dispersal mechanisms would have an increased opportunity for establishment. Species requiring more open conditions would decline, barring the absence of major fire or other forest clearing event such as severe wind or disease. The increased severity of wildfire is possible due to the increased fuel build up in areas of past fire exclusion.

2. Alternatives B and C

Timber harvest is the primary management activity that may affect sensitive plant species or habitats, particularly the regeneration harvests that subject the habitat to more mechanical disturbance and alter the light, temperature and moisture regimes. Early seral species may do well with such changes, but later seral species would generally decline. Commercial thinning has some potential for direct mechanical harm, but the overall habitat conditions likely would not change enough to harm most late seral species. Habitats preferred by later seral species are generally associated with riparian areas that are excluded from proposed units.

Precommercial thinning would occur in relatively young stands that do not provide habitat for most sensitive plant species. Individual plants may be mechanically harmed by this activity, however; the general habitat and structure of the stand would be maintained.

Road decommissioning and reconstruction would not affect rare plants because, generally, these roads do not provide any habitat for species of concern. Where these routes cross streams or low moist areas, there is the possibility for negative mechanical effects to any occurrences or suitable habitat that may be in the immediate vicinity of the road. However, such effects would be anticipated to be rare and negligible, because the work would be almost entirely limited to the road crossing itself with little impact to the adjacent grounds.

New temporary and permanent road construction would directly disturb suitable habitats. It is assumed that for each mile of road constructed approximately 2.5 acres of habitat would be reduced over the short term. Both the temporary or permanent roads would displace species or habitat; however, temporary roads may support native plant species, including rare species through time. Species utilizing edge habitats or disturbance may find suitable habitat along the edge of roads, where lighter disturbances such as road maintenance and brushing may maintain occurrences.

For all species, the proposed actions of Alternatives B and C would affect essentially the same amount of habitat. Alternatives differ in the amount and type of road construction and the type of site preparation after harvest.

Alternative B would construct 2 miles of permanent road and 4 miles of temporary road while Alternative C would construct 5.2 miles of temporary road. Alternative B would prescribed burn all regeneration harvested areas (642 acres) while Alternative C would prescribed burn on the skyline ground (241 acres) and excavator pile on the tractor ground (398 acres) to help protect leave trees. Under Alternative B, the effects on rare plants would largely depend on the time and intensity of the fire and may range from detrimental to beneficial depending on the species and timing of the burn. Alternative C would have greater effects on habitats where equipment disturbs the surface; however, there would be areas not burned or touched by the excavator, thus affected less. Thus the difference between the site preparations of the two alternatives is mixed.

Sensitive Plants Effects Determinations

Determination of effects on rare plant species are summarized by alternative below. The objective for managing sensitive plants is to ensure population viability throughout their range on National Forest lands and to ensure they do not become federally listed as threatened or endangered. The forest plan supports this direction but does not set specific standards and guides for sensitive plants. The alternatives are consistent with this direction to the extent that proposed management actions would not adversely affect viability of existing sensitive plant populations.

Table 3-4 – Summary of Effects for Threatened and Sensitive Plant Species

Plant Species	Known Occurrence	Habitat Present	Potential Habitat (acres)	Effects Determination			% Habitat Affected by Action Alternatives
				Alt A	Alt B	Alt C	
MacFarlane's four-o'clock	No	No	0	NE	NE	NE	0
Spalding's catchfly	No	No	0	NE	NE	NE	0
Deerfern	No	Yes	2,440	NI	MI	MI	3
Crenulate moonwort	No	Yes	678	NI	MI	MI	2
Lance-leaf moonwort	No	Yes	678	NI	MI	MI	2
Linear-leaf moonworts	No	Yes	678	NI	MI	MI	2
Mingan moonwort	No	Yes	678	NI	MI	MI	2
Mountain moonwort	No	Yes	678	NI	MI	MI	2
Northern moonwort	No	Yes	678	NI	MI	MI	2
Least moonwort	No	Yes	678	NI	MI	MI	2
Green bug-on-a-stick	No	Yes	2,352	NI	MI	MI	6
Clustered lady's-slipper	No	Yes	2,089	NI	MI	MI	7
Light moss	No	Yes	689	NI	NI	NI	0
Naked rhizomnium	No	Yes	5,329	NI	MI	MI	11
Evergreen kittentail	No	Yes	3,476	NI	MI/BI	MI/BI	13

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; BI = Beneficial Impact.

Cumulative Effects

Discussion of cumulative effects for rare plants is addressed through the general trend of the suitable habitat required by these species as a result of past, present and future management actions. Because all of these species occur predominantly in the mesic forest habitats that are common in the project area, the species have been grouped for this analysis.

Geographic Boundary: The 5,540 acre project area was considered for cumulative effects because the effects would be specific to those areas treated within the project area and would not extend beyond the boundaries.

Time Frame: These effects are considered only for the species potentially affected by this project and from the initial habitat transformations in the early 1900s through the proposed and reasonably foreseeable future. Because the historic changes in condition and abundance of specific habitats are largely unknown, the effects of these past projects can only be qualified through general discussions.

Past, Present, and Foreseeable Future Actions: Past human activities and fire history in the project area have been summarized in Appendix D. Timber harvest and road construction are the primary management activities that have influenced rare plant habitat in the area. Timber harvest

occurred primarily from the 1960s to the 1980s, with even-aged management as the primary method. Since the 1980's, trends of harvest activity have substantially declined with a corresponding decline in effects to plant habitat. In addition, advancement in harvest operations and logging technology has further reduced resource impacts.

Road construction generally mirrored timber harvest with most construction occurring in the 1960s, less in the following decades. Many of these roads are no longer used and have become overgrown. Over the years, some roads have received various levels of maintenance and reconstruction.

The fires of 1919 burned most of the areas in the Middle Creek basin where proposed harvest and road construction activities are concentrated. These large scale fire disturbances removed much of the tree canopy in the watersheds. Since 1919, fire suppression efforts have limited fire starts to 20, with less than 25 acres affected.

The only current and future actions in the cumulative effects area are recreation use, fire suppression, and road maintenance. Recreational use occurs throughout the summer months; dispersed campsites are located along the road system. The effects of trail work on sensitive species habitats are generally negative, but very small. Ongoing maintenance of these travel routes is considered routine and ongoing, with virtually no effects to the habitat which they pass through.

1. Alternative A

The no action alternative would produce no additional effects on potential rare plant habitat, as compared to past activity levels. The progression of forest succession would improve habitat for most sensitive plant species. However, the decline of successional tree species due to insect-caused mortality may cause localized openings and increases in light and fuel loads, which could lead to more intense wildfires and resource damage. In such cases, older habitat favored by these species could see localized declines, but the trend overall would be one of increasing habitat suitability. Progression of the decline in lodgepole pine would contribute to greater fuel loads and increase the potential of large scale wildfires that could reduce general habitats in the area.

2. Alternatives B and C

This alternative adds short-term disturbance to this landscape through harvest activities, permanent and temporary road construction. These activities along with ongoing activities would result in a slight decline of potentially suitable sensitive plant habitat for some species. Long-term trends would be static to slightly downward. A slight downward trend in habitat quality would not lead to concerns for population viability, since these habitats are common in much of the project area. In addition treatments may lessen risk of severe fires that would potentially offset downward trends.

Wildlife

The Middle Bugs analysis area provides a diversity of wildlife habitats that directly influence the variety, abundance, and distribution of various wildlife species. This section specifically addresses only those species identified by the 1987 CNF Plan, US Fish and Wildlife Service or Northern Region Forester as management indicator species (FP, II-24), threatened or endangered species or sensitive species. The 1987 CFP, National Forest Management Act, Endangered Species Act, Section 7 of the ESA; and Forest Service Manual 2670 provide the regulatory authority to address these species.

This analysis specifically addresses:

- Mature and old growth forest habitats, as well as compliance with Forest Plan direction;
- Management indicator species and their habitats, specifically elk, moose, white-tailed deer, pileated woodpecker, northern goshawk and pine marten.
- Threatened/endangered species and their habitats, specifically Canada lynx (USFWS species list, Clearwater and Idaho Counties, Idaho, dated August 17, 2011), and
- Sensitive species (Northern Region Sensitive Species List, February, 2011), known or expected to inhabit the project area and their habitats.

There may be habitat in the project area for belted kingfisher; harlequin duck, pygmy nuthatch, ringneck snake, and Coeur d'Alene salamander. However, these species are not discussed in the analysis because they would not be affected by project activities or are not likely to occur in the project area. The analysis area does not contain habitat for bald eagle, grizzly bear, American peregrine falcon, common loon, mountain quail, black swift, white-headed woodpecker, yellow billed cuckoo, big horn sheep, northern bog lemming or Townsend's big-eared bat; therefore, they are not discussed in this analysis. See the wildlife report in the project file for more information regarding these species. Table A-6 in Appendix A displays impacts and effects to all management indicator, threatened and endangered and sensitive animal species evaluated in this document, as well as their status and general habitat requirements.

Direct, indirect and cumulative effects analysis areas vary by species depending upon the species home range size, mobility and habitat requirements; habitat availability; habitat quality; and Forest Plan predetermined analysis units (old growth, elk habitat effectiveness units, lynx analysis units). Effects analysis areas are defined in each species analysis section.

Analysis Methodology

Existing vegetation was modeled using the Region One Vegetation Mapping project (Brewer et al. 2009) to describe abundance and distribution of vegetative cover and size classes for the project area. The Forest timber stand database was used to depict local, site specific data on vegetative structural/successional stages.

The definition of old growth on the CNF follows descriptions from Green et al. (1992). The Forest GIS database provided stand based information for mature (130-150 years) and old growth habitats. Some data are based on on-the-ground stand examinations and are considered highly accurate for determining if a stand meets the definitions of Green et al. (1992). Where stand exams are not available, data are based on the Most Similar Neighbor (MSN) model. The accuracy of estimates of mature and old growth forest habitat derived from this model has not been determined. In cases of stands that have both stand exam and MSN data, the stand exam data have priority, since they are based on field data, rather than modeled stand conditions.

A GIS analysis was used to determine if there is any overlap between the proposed treatments and mature or old growth forest habitats. Field exams were completed in many of the mature stands in 2011 as part of this project, which led to the modification of recorded characteristics for some stands.

Forest Inventory and Analysis Data (FIA) was used to determine availability of mature and old growth forest habitats down to the 5th-level Hydrologic Unit Code (HUC5) watershed; it does not allow examination of old growth stands down to the OGAU scale.

Suitable habitats for each MIS were described based on Forest Plan direction, the conditions of existing vegetation, and relevant habitat attributes. Suitable habitats for elk, moose, and white-tailed deer are qualitatively described based on reconnaissance of the analysis area. Additional quantitative analysis was conducted to determine elk habitat effectiveness, using the current

interagency guidelines (Servheen et al. (1997) or Gaines et al. (2003) were used to calculate wildlife security. The existing Forest open road and motorized trail network was mapped and a buffer widths was applied to each side of the route. The primary references for information for MIS are the CNF web site (http://www.fs.fed.us/r1/clearwater/terra_org/terra.htm) and the Idaho Conservation Data Center (ICDC, now IFWIS, IDFG 2011).

Elk cover and forage delineations was determined using GIS queries based primarily on tree stand type and age and is approximate. Some natural forage habitat is not identified in the GIS queries, so this analysis was supplemented with an examination of 2009 satellite photos for the Beaver Dam EAU, where almost all of the regeneration harvest would occur.

The analysis of effects on pileated woodpeckers is based on habitat associations and direction in USDA (1990) and Samson (2006a) and other scientific literature (primarily Bull and Jackson 1995). A CNF GIS-based habitat suitability model consistent with USDA (1990) and Samson (2006a) was used to identify potential suitable habitat. Potential effects to northern goshawk were assessed using direction in Reynolds et al. (1992) and Brewer et al. (2009).

For most species, suitable habitats were described qualitatively based on reconnaissance of the analysis area and current literature. Quantification of suitable habitats for many species was based on the USDA Forest Service Northern Region wildlife habitat relationship models (Samson 2006a, Samson 2006b) or on CNF-developed GIS models. Additional analysis was conducted using GIS software to determine the extent of suitable habitats for each species in the proposed treatment units for each alternative. Bark beetle infestation data is collected by the Forest Service's Forest Health Protection Division, which conducts annual aerial surveys of National Forests and estimates locations and types of forest insect and disease outbreaks (USDA FS, 2005). Fire data is collected by the CNF.

The primary references for wildlife information are the Clearwater National Forest web site http://www.fs.fed.us/r1/clearwater/terra_org/terra.htm) and the Idaho Conservation Data Center (ICDC, now IFWIS, IDFG 2011).

An analysis of snag densities for the Northern Region has been conducted by Bollenbacher et al. (2009) using Forest Inventory and Analysis (FIA) data. The FIA survey is a general purpose, national inventory that is designed for strategic assessments (Czaplewski et al. 2003). FIA provides a representative sample of all forests, regardless of their classification.

In addition to the GIS generated reports and maps and computer modeling, field review and observations by the project wildlife biologist in 2011 were used to analyze effects.

Old Growth Forest Habitats

1. Existing Conditions

Forest direction is to conduct project specific analysis of mature and old growth forest habitats at the Old Growth Analysis Unit (OGAU) scale. Forest Plan standards for old growth habitat are to maintain at least 10% of the Forest in old growth habitat and manage at least 5% of each OGAU as old growth habitat. Mature forest habitats are available and would not be harvested to insure that the standard would be met in the future.

The 5,540 acre Middle Bugs analysis area contains roughly half of OGAU 118 and small portions of OGAU's 115, 116 and 117. Stand exams have been conducted for many of the mature (130-150) and old growth stands in these OGAUs. Most harvest activities would occur in OGAU 118.

Table 3-5 displays the mature and old growth forest habitats identified in these OGAUs.

Table 3-5. Acres of Mature and Old Growth Forest Habitat

Old Growth Unit	Stand Type	% of OGAU
OGAU 115 (10,932 acres)	Old Growth	3%
	Mature Forests (130-150 years)	15%
	Total	**17%***
OGAU 116 (10,561 acres)	Old Growth	4%
	Mature Forests (130-150 years)	28%
	Total	**32%**
OGAU 117 (9,444 acres)	Old Growth	10%
	Mature Forests (130-150 years)	14%
	Total	**24%**
OGAU 118 (10,274 acres)	Old Growth	5%
	Mature Forests (130-150 years)	33%
	Total	**38%**

*Number is based on total acreage, not addition of both percentages. Total percentage does not equal sum of percentages due to rounding.

This project would not harvest old growth or 130 to 150 year (stepdown) mature habitat. Each unit considered for harvest had a field review by qualified specialists to ensure that it was not old growth habitat.

2. Environmental Consequences – Direct and Indirect Effects

All Alternatives: No old growth habitat would be harvested in this project under any alternative. All existing old growth in the project area would be retained. The treatment units in all action alternatives avoid mature (130-150) and old growth forest habitats. Implementation of any alternative would not affect the amount of existing old growth or mature (recruitment) habitat in the Middle Bugs project or at the Forest level.

Retention of old growth stands would maintain habitat for old-growth dependent species under all alternatives. All alternatives comply with Forest Plan direction to maintain at least 10% of the Forest in old-growth habitat and to manage at least 5% of each OGAU within forested, nonwilderness areas as old-growth habitat (II-23).

3. Cumulative Effects

Cumulative effects result when the effects of the proposed actions are combined with past, present and reasonably foreseeable effects. Since there would be no direct or indirect effects on old growth levels from the proposed activities, there can be no cumulative effects.

Management Indicator Species

Management Indicator Species (MIS) addressed in this section are elk, moose, white tailed deer, pileated woodpecker, northern goshawk, and pine marten.

Elk, Moose and White-tailed Deer

1. Affected Environment

The Clearwater Forest Plan established a minimum standard of 75 percent elk habitat potential (III-54) for MA C8S, forestwide. There are 5,152 acres of MA C8S in the project area. All proposed vegetation treatments are in MA C8S. Across the Forest, the calculated elk habitat effectiveness (EHE) for the approximate 320,000 acres of MA C8S is 82% (CNF 2008).

For each alternative, EHE was calculated using *The Guidelines for Evaluating and Managing Summer Elk Habitat in Northern Idaho* (Serveen et al. 1997) as required in the Clearwater Forest Plan (II-23) to predict impacts to elk. Open road density, proportions of cover, forage and security habitat are considered in the model. This model was used to disclose effects and to compare alternatives at the Elk Analysis Unit (EAU) scale.

The project area contains all or portions of seven EAUs. Each EAU ranges from 3,000 to 7,000 acres in size. The 19,552 acre analysis area for elk consists of the Beaver Dam, Rocky Ridge, Footrot, and Zoe EAUs. Small portions of the Camp and Yoosa EAUs lie within the project area, but no activities are proposed within them, so they were not considered in this analysis. A small portion of the Middle Creek EAU also lies in the project area and some road decommissioning and storage may occur there, but none of the activities would affect elk model calculations, so this EAU was also not used in this analysis. The table below lists the relevant EHUs, Forest Plan Objectives and EHE for all alternatives.

Table 3-6. Changes in Elk Habitat Effectiveness by Alternative. EHE Forest Plan objective for all EAUs is a minimum of 75%.

EAU	Acres	Elk Analysis Unit Objectives (%)	Elk Habitat Effectiveness (%)	
			Alt A	Alts B and C
Beaver Dam	5,092	75	47	49
Rocky Ridge	6,843	75	65	65
Footrot	4,423	75	62	62
Zoe	3,194	75	86	81

In the project area, cover is abundant, with many dense, widely distributed, mid and late seral stands. Foraging habitat is available in relatively low proportion in meadows and other natural openings, as well as in areas harvested in the 1990's. For elk and moose, habitat effectiveness is compromised because of the open road density and less than desired security in the Beaver Dam EAU. Elk typically move to lower elevations in the winter.

Elk habitat use appears moderate to high in the Weitas Creek watershed. The project area is in the southwest corner of Idaho Department of Fish and Game (IDFG) Unit 10, in the Lolo Zone, where both cow and bull numbers are well below objectives (IDFG 2011). The relative lack of abundance of elk is primarily attributed to reduced habitat quality and high predation levels.

2. Environmental Consequences – Direct and Indirect Effects

The short term period for this analysis is five to seven years; the time in which the direct and indirect effects of the project would occur. The long term is defined as 20 years, because that is how long it would take for harvested areas to develop dense hiding cover.

Alternative A: Alternative A would have no direct or short-term indirect effect on elk, white tailed deer or moose because no treatments would be conducted. No management actions would occur along roads; hiding cover would be retained and forage areas would continue to exists, although likely slowly diminishing in size. Road densities would remain unchanged; unneeded forest roads would not be decommissioned, possibly providing motorized disturbance in otherwise suitable habitat. Elk habitat effectiveness levels would not change, remaining below Forest Plan objectives for three of the four EAUs analyzed.

In the long term (>7 years), forest succession would continue in the analysis area, as modified by natural processes and, potentially, human actions. Existing open patches (i.e., elk, moose, and deer forage areas dominated, by grasses, forbs, shrubs, and young trees) would continue to decrease in area as trees grow and mature in old openings; conifers would potentially encroach in

riparian meadows. If wildfires or extensive windstorms occur in the area, forage areas could be replenished, but existing cover would decrease. As the mountain pine beetle infestation continues in lodgepole pine stands, areas that currently provide cover would become too open to serve that function. In these stands, as numerous dead trees fall to the ground, debris may become too deep for elk to move through in certain areas. Downed logs, shading from snags, and lack of seed sources may delay the regeneration of new trees relative to harvested areas, but so too, might the growth of grasses and shrubs be delayed. Small canopy openings are created when snags are created and fall, allowing sunlight to the forest floor and creating opportunities for elk forage in the form of shrubs, forbs and grasses. Because the events and processes that might affect forest succession (and therefore summer elk habitat) in the analysis area are either unknown or highly variable in frequency and size, the long term indirect effect on elk, moose, and deer of Alternative A is not predictable.

All Action Alternatives: For all action alternatives, elk habitat effectiveness would improve in the Beaver Dam EHU, decrease in the Zoe EHU and stay the same in all others. The projected decrease from 86 to 81% EHE in the Zoe EHU would still remain above Forest Plan objectives. The decrease is a biologically insignificant artifact product of the elk model. Only 8 acres of regeneration harvest are proposed in the 3,194 acre Zoe EAU; no road decommissioning or storage activities are proposed. The reduction in EHE is due entirely to about 0.3 mile of Road 555 that would be included in regeneration harvest unit E. The baseline standard road density for this EAU would be 0.14 miles/mile² and the action alternatives would be 0.17 miles/mile². When rounded to tenths, though, this rounding turns a 21% increase into a 100% increase in density in the model. Both 0.1 and 0.2 miles/ mile² are very low road densities, but because the curve used in the EHE model to calculate potential elk use is very steep at the upper end, the tiny increase in standard road density models out to a misleadingly large decrease in EHE, although both numbers are well above the standard for the management area. Actual open road mileage would not increase.

Cover and Forage. Proposed harvest and fuel treatments would increase forage on 642 acres under all action alternatives, primarily in the Beaver Dam EAU. Since current levels are low, this increase in forage habitat would be beneficial to elk. Regeneration harvest would remove cover and forage in the short-term. In the long-term, forage would develop because grasses, shrubs, and forbs would grow in the newly open ground. Over time, trees and shrubs would increase in size and density; increased growth of shrubs and younger trees would replace the lost cover within 20 years. Fuels treatment following harvest would improve cover and forage growth and would enhance accessibility to the units compared with harvest without fuels treatment.

Commercial thinning would improve the ability of elk to move through currently dense vegetation. Subsequent post-harvest fuel treatments would also improve cover and forage growth and unit access.

Cover or forage would not change in areas proposed for pre-commercial thinning.

Road Density. Changes in standard road density would be minor; increasing from 1.3 miles/mile² to 1.4 miles/mile² in the Beaver Dam EAU and from 0.1 miles/mile² to 0.2 miles/mile² in the Zoe EAU; road density would remain the same in all other EAUs. The increase in standard road density is because some of the existing roads would travel through regeneration harvest units and so cover habitat would be transformed into forage habitat, which has a higher coefficient in the elk model. Standard road density would not be affected by proposed temporary road construction because these roads would be decommissioned after use. There would be a temporary loss of cover or forage until vegetation re-established on the obliterated road prism. The construction of 2.1 miles of permanent road in Alternative B would result in a permanent loss of about an acre of vegetation that would be unusable by elk as either cover or forage. The new permanent road

would be placed into intermittent storage use after project activities, so there would be no increase in standard road density associated with its construction. Because the changes in standard road density in the Beaver Dam EAUs would be small and primarily associated with existing motorized use, changes in elk behavior that would affect survival or persistence should not be measurable.

Elk Security: Both action alternatives would decommission 3.5 miles of road and place 11.3 miles of road into long-term storage. Almost all of this road mileage is brushed in, gated, barred or otherwise already closed to motorized use; therefore, proposed treatments would not increase modeled elk security. The 2.1 miles of new system road proposed under Alternative B would not affect security habitat because it would be put into long term intermittent storage and not accessible by motorized vehicles after use in the project. Temporary roads proposed under both action alternatives would not affect long-term security habitat because they would be closed to public use and decommissioned after project use. Because there would be no new road open to motorized use under either action alternative, and because almost all road proposed for decommissioning or storage is already closed to motorized use, the elk security areas within the project area would not be affected in any EAU.

In summary, individual elk may be directly disturbed by project activities and by road use associated with the project. However, this disturbance is not expected to affect their survival or reproduction in the short term because any animals disturbed would move away from areas of active treatment and would not be injured or killed. Sufficient suitable habitat would be available outside of the proposed units to support the local population during treatment. Proposed activities should have minor short-term negative impacts and generally small but positive long term effects on the elk population in the project area.

Moose and White-tailed Deer: The direct and indirect effects of each of the alternatives would be similar to elk due to the increase in forage habitat and the security area size in the Beaver Dam EAU. The reduction in cover and increase in forage would be minor at the project scale, but potentially beneficial, and changes to access would generally maintain open road density at a relatively low level, substantially increasing security areas and overall habitat effectiveness for both species.

3. Cumulative Effects

The geographic boundary for assessing cumulative effects on elk, moose and white tailed deer habitat is the combined area of the Beaver Dam, Rocky Ridge, Footrot, and Zoe EAU because these EAUs lie within the project area and all proposed regeneration harvest, road construction, access management and road storage and/or decommissioning would occur within them. Also, these EAUs, as designated by the 1987 CNF Plan are sufficiently large enough to meet the habitat and home range needs for elk. The Forest Plan established the minimum standard for habitat effectiveness for this management area based on restricted motorized access and the availability of large patches of hiding cover. Given that these EAUs are adjacent to one another, combining them demonstrates the effects of the entire project on overall elk habitat effectiveness. Projects occurring outside of this area have been or would be required to also meet the Forest Plan standard. They would not affect the ability of the project area EAUs to meet the Forest Plan standard.

The time frame for cumulative effects is 20 years, which is the time it takes for new plantations to restore big game hiding cover in the harvested areas.

Past timber harvest increased the availability of early seral habitats, which provided foraging opportunities for cervids. Road construction increased open road density and caused the loss of security areas, increasing vulnerability to hunting and decreasing habitat effectiveness. More

recently, roads have been closed, stored, or decommissioned, causing a trend toward increased security, decreased vulnerability, and increased habitat effectiveness.

There are no other ongoing or proposed future activities that may affect elk habitat effectiveness within the cumulative effects area.

Alternative A: Alternative A would have no cumulative effects on elk, moose, or white-tailed deer because there would be no direct or indirect effects to these species from this alternative. The current population trends would not be affected.

All Action Alternatives: Past harvest and road construction was considered in the existing condition. Alternatives B and C would provide some additional forage while reducing cover as a consequence of the proposed treatments. These two effects would balance each other to some extent but would likely be slightly beneficial because cover is abundant while forage habitat is somewhat limited. The BHROWS assessment (CNF 1999) noted that the Weitas Creek watershed in particular and most of the other watersheds in Game Management Unit 10 were below the natural range for early-seral habitat and recommended vegetation manipulation that would restore or expand forage areas for big game. There are no other ongoing or proposed projects in the cumulative effects area that could affect these species. There would be no cumulative effects to elk habitat effectiveness or elk, moose and deer habitat or populations from the action alternatives.

Irreversible and Irretrievable Commitment of Resources: None of the alternatives would cause the irreversible commitment of resources relative to elk. Vegetative treatments proposed under all action alternatives would provide a better balance between cover and forage after treatment.

Forest Plan and Regulatory Consistency: Forest Plan Standards to manage MA C8S **Forestwide** for a minimum of 75 percent of elk habitat potential are being met. All action alternatives would maintain or increase elk habitat effectiveness in each of the EAUs, and consequently at the Management Area Unit and Management Area scales. (The decrease in EHE modeled in the Zoe EAU is a result of modeling parameters, not actual activities). Forestwide, the Forest Plan standard for elk habitat effectiveness in MA C8S would continue to be exceeded under all alternatives.

Pileated Woodpecker

1. Affected Environment

The pileated woodpecker was selected as an indicator species to represent the quantity and quality of old growth dependent animals (FP, Appendix H-1, EIS Vol. 1, p. III-22. Pileated woodpeckers are often associated with late successional forests but they also use young and fragmented forests with abundant remnant old structure (Bull and Jackson 1995). Pileated woodpeckers require tall, large-diameter dead (>15 inches) or living defective trees within forested stands for nesting (USDA 1990). With an average dispersal distance of 148 miles, habitat/territory distribution at this project level or at the Forest level is not an issue (Samson 2006a). They forage on large snags and down dead wood and feed mostly on carpenter ants. They prefer dense canopy for nesting. Large trees, canopy cover, and the number and size of feeding sites (e.g. dead trees greater than 10 inches diameter) are all important features of quality pileated habitat (USDA 1990). Activities that reduce these habitat features may affect pileated habitat suitability.

Much of the project area consists of second growth that is just beginning to develop trees of sufficient size to provide suitable snags and down logs for nesting and foraging. Mature forest habitats are limited because of past timber harvest and large scale wildfires in the early 1900's. No specific surveys for pileated woodpeckers were completed and none have been observed in

the Middle Bugs project area. In 2011, signs of foraging activity were observed where there were larger snags and diseased trees so it is reasonable to conclude that pileated woodpeckers are present in the project area.

There are 1,716 acres of nesting habitat and 846 acres of foraging habitat in the 5,540 acre project area. (Nesting habitat is typically also suitable as foraging habitat.) Table 3-7 displays the amount of habitat available at the regional and Forest levels and the amount of these habitats that would be affected by the project. Population viability for pileated woodpecker has been addressed at the regional level by Samson (2006b), who concluded that well-distributed habitats exist in Region 1 and that these habitats are present at levels well in excess of the amounts required to support minimum viable populations.

The pileated woodpecker is rated secure across its range (global rank G5) and apparently secure (state rank S4) in Idaho (Digital Atlas of Idaho 2012). Current Breeding Bird Survey (BBS) data show that populations of the pileated woodpecker are increasing nationally (Sauer et al. 2008). Based on habitat requirements and trends (Samson 2006a), local populations (estimated at 1,000-10,000 individuals on the CNF (2009)) are likely stable or increasing. Habitats on the Forest contribute to a viable population at a regional scale (Samson 2006b). The Idaho Department of Fish and Game (IDFG) Animal Conservation Database (ACD 2011) does not list any occurrence records within the Weitas Creek watershed or a 25 mile radius of the project area, but ebird.org (2012) records several recent observations in the North Fork Clearwater and Lochsa River drainages and pileated woodpecker sign was present in the project area.

2. Environmental Consequences - Direct and Indirect Effects

Alternative A: Alternative A would have no direct or indirect effects on pileated woodpeckers because no treatments would be conducted. In the long term, woodpecker habitat would continue to be altered by natural events such as succession, insects and disease, and potential wildfire. Wildfire and/or insect and disease activity would likely leave behind greater numbers of snags than exist now but would also reduce canopy cover that may create unsuitable conditions. Some stands would develop old growth characteristics while those affected by the mountain pine beetle infestation would revert to young forest conditions.

In predominantly lodgepole pine stands, additional trees would die as a result of the mountain pine beetle infestation, and dead trees would eventually fall to the ground. These standing and down trees would attract carpenter ants thus creating foraging opportunities for pileated woodpeckers. In areas with excessive dead and dying, canopy closures could become too open to serve as effective foraging sites for pileated woodpeckers. Fuel build-up resulting from fire suppression and insect activities would continue, thereby increasing the likelihood of a stand-replacing fire, and stand-replacing fires could potentially create unsuitable areas for pileated woodpeckers across the project area.

All Action Alternatives: All action alternatives would reduce available mid seral foraging habitat by 51 acres (Wildlife Specialist Report (WSR, pgs. 36-39, Figure 4). The project area would continue to provide ample foraging and nesting habitats after treatment. Because no old growth habitats would be treated with this project; it can reasonably be assumed that the old growth stands would continue to provide ample foraging and nesting habitats.

Individual woodpeckers may be disturbed by project activities under the action alternatives; however, this disturbance is not expected to measurably affect their survival or reproduction because adults and advanced juvenile woodpeckers could easily avoid direct injury (and early juveniles would be in unaffected nesting habitat) while sufficient habitats are available outside the treatment units to support the local population during project implementation (WSR, pgs. 36-39, Figure 4).

Pileated woodpeckers and their foraging sign are commonly seen and documented across the Forest. Based on the best available science, the pileated woodpecker population trend is increasing and its habitat appears to be abundant and well-distributed across the Forest and Region (Samson 2006a, 2006b).

In summary, the proposed action should have no indirect effect on individual pileated woodpeckers and little effect on woodpecker abundance or persistence because late seral (i.e. nesting) habitat would not be affected, while mid-seral (i.e. foraging) habitat would continue to remain abundant outside of proposed harvest units.

3. Cumulative Effects

OGAU 118, totaling 10, 274 acres, was used to analyze cumulative effects for the pileated woodpecker. This area was selected because the project area lies almost entirely (~90%) within this OGAU and because this MIS is an indicator of old-growth habitats. Any effects would be diluted at a larger scale. Activities considered for cumulative effects are those that have the potential to reduce habitat, such as timber harvest and fuels treatments. The timeframe for cumulative effects is 50 to about 150 years until mid- to late seral stage succession types are achieved.

Past timber harvest slightly decreased the availability of mature and old growth forest habitat that provide the highest quality foraging and nesting sites for this species. Some of the past regeneration harvest may have directly reduced the amount of old growth forest habitat, while other regeneration harvest in mature forest habitat reduced the availability of stands that could develop into old growth habitat in a relatively short period of time. Because a relatively small amount of this OGAU (<10%) has been harvested, many of the harvest units have achieved or will soon achieve mid-seral development and recruitment into pileated woodpecker foraging habitat. At the same time, many mid-aged stands are maturing and beginning to provide nesting and foraging habitats. The likely long-term trend is an increase in nesting and foraging habitats.

There are no ongoing or reasonably foreseeable projects other than the proposed action within the cumulative effects area.

Alternative A: Alternative A would have no cumulative effects on pileated woodpeckers because there would be no direct or indirect effects to this species from this alternative. The current population trend would not be affected.

All Action Alternatives: No measurable effects to populations at the local or regional scale, or alteration of current population trend, are expected from the cumulative effect of any of the action alternatives, or in combination with future activities, based on the availability of unaffected suitable habitats in the project analysis area, OGAU 118, and across the Forest and Region. This is due to the limited potential effects from this project, the maintenance of existing suitable habitat and home ranges in the analysis area, the retention of existing mid-seral stands that would succeed to suitable habitat, compliance with the Forest Plan standards for old growth (to provide for viable populations of old-growth dependent and MIS), the abundance and distribution of nest site habitat and winter forage habitat across Region 1 and the CFN (Samson 2006b), and the apparent increasing pileated woodpecker population trend (IPNF 2010).

Northern Goshawk

1. Affected Environment

The northern goshawk was selected as an indicator species to represent the quantity and quality of old growth dependent animals (FP, Appendix H-1, EIS Vol. 1, p. III-22). Goshawk nest in mature timber stands with high canopy cover and open understory. Post-fledging areas (PFA) are more structurally diverse, providing security from predators and high prey density. Foraging areas are diverse forested and open habitats.

Currently, there are 1,716 acres of nesting habitat and 1,822 acres of foraging habitat in the project area. (Nesting habitat is typically also suitable as foraging habitat.) At 5,540 acres, the project area represents one goshawk home range. Assessment areas of 5,000 acres at a minimum (USDA 1990) and 5,400 acres not including nest areas, post fledging area, and natural or created openings (Reynolds and others 1992) are recommended for evaluation of potential goshawk suitability.

Mature forest habitats are limited in the project area; many forested areas are just beginning to develop trees of sufficient size to provide suitable nesting habitat. Younger stands are often too dense for goshawks to fly.

Goshawk populations are expected to be low to moderate in the project area because, while modeled habitat is common and well-distributed, many of the stands that make up this habitat have only recently begun to display attributes of suitable nesting habitats and so are potentially less attractive to goshawks than areas of the Forest less affected by early 20th century fires. No signs of goshawk were observed in the summer/fall of 2011.

From 2000 to 2005, goshawk nesting surveys were conducted in Region 1. No goshawks were observed at those survey sites (Kowalski 2006) closest to the project area; about 30 miles east and northeast in the Lochsa and Upper North Fork Clearwater River drainages. Although the presence of goshawks in a given area can be difficult to determine even with a survey, Kowalski (2006) estimated that there were several thousand locations in the Region with goshawk present, and that the CNF (as well as all other Forests in the Region) supported goshawks. Based on literature descriptions (USDA 1990; Reynolds et al. 1992, Kennedy 2003, Samson 2006a, and Brewer et al. 2009), there is suitable habitat available within the Middle Bugs project area.

No specific population data are available for the northern goshawk. Goshawks are rated secure across its range (global rank G5) and are apparently secure (state rank S4) in Idaho (Digital Atlas of Idaho 2012). Based on habitat requirements and trends (Samson 2006a), local populations (estimated at 100-1,000 individuals on the CNF (2009)) are likely stable and may be increasing. Habitats on the CNF contribute to a viable population of goshawks at a regional scale (Samson 2006b. The IDFG ACD does not list any occurrence records within OGAU 118, but several records exist within a 25 mile radius of the project area over the past few decades from both the ACD (2011) and ebird.org (2012); therefore, individuals likely inhabit the area.

Based on the best available science as summarized by IPNF (2010), the goshawk population trend is stable and its habitat appears to be abundant and well-distributed across that Forest and Region (Kowalski 2006, Samson 2006b). Additionally, abundant habitat is distributed throughout the Forest to support a minimum viable population of northern goshawk (Samson 2006b). Northern goshawks and active nest sites have been documented widely across the Forest (Kowalski 2006).

2. Environmental Consequences – Direct and Indirect Effects

Alternative A: Alternative A would have no direct or short-term indirect effects on the goshawk because no treatments would be conducted. This alternative would maintain sufficient and relatively well-distributed nesting, foraging, and post fledging area habitat. In the long term, goshawk habitat would continue to be altered by natural events such as succession, insects and disease, and potential wildfire. Wildfire and/or insect and disease activity would likely leave behind greater numbers of snags than exist now but would also reduce canopy cover that may create unsuitable conditions for goshawks.

In general, nesting habitat would increase and foraging habitat would decrease as forest succession continues to fill in understories and increase stand canopy closure. In predominantly lodgepole pine stands, additional trees would die as a result of the mountain pine beetle epidemic, and dead trees would eventually fall to the ground. This process would create openings and gaps that could be utilized as foraging habitat by goshawks. High densities of downed logs, shading from snags, and lack of seed sources may delay the regeneration of new trees relative to harvested areas.

Fuel build-up resulting from fire suppression activities would continue, thereby increasing the likelihood of a stand-replacing fire. Stand-replacing fires could potentially reduce nesting habitat across the project area. However, the size and severity of the disturbance could eliminate or create the various elements of goshawk habitat, depending on the size and severity of the disturbance.

All Action Alternatives: Under all action alternatives, proposed harvest would remove 270 (~15%) acres of goshawk foraging habitat in the project area. After treatment, this home range would still provide more that the minimum 420 acres of suitable post fledgling area habitat and 3,000 acres of foraging habitat necessary per goshawk pair (Table 3-7; WSR, pg. 39-42, Figure 5)). No treatments would occur in and there would be no effect to nesting habitats.

Individual goshawks may be disturbed by project activities under both action alternatives (although any active nests detected during project implementation would be protected with a 420-acre no entry buffer—Chapter 2, Mitigation Measure 24). However, this disturbance is not expected to affect their survival or reproduction because late seral (i.e. nesting) habitat would not be affected, adults and advanced juvenile goshawks could easily avoid direct injury (and early juveniles would be in unaffected nesting habitat) while mid-seral (i.e. foraging) habitat would continue to remain abundant outside of the harvest units and well in excess of the recommended 60% in the project area (WSR, pg. 39-42, Figure 5). No harvest is proposed in old growth. Existing old growth would be retained under all action alternatives. Mature habitats within 20 years of meeting old growth criteria would be retained as recruitment habitat in all action alternatives. Both alternatives would continue to comply with Clearwater Forest Plan direction to retain or perpetuate suitable northern goshawk habitat, well distributed throughout its range in National Forest System lands. Planned actions would also comply with northern goshawk management guidelines presented by USDA Forest Service 2007b.

In summary, the proposed action should have no direct effect on individual goshawks and little effect on goshawk abundance or persistence because late seral (i.e. nesting) habitat would not be affected, while mid-seral (i.e. foraging) habitat would continue to remain abundant outside of proposed harvest units.

3. Cumulative Effects

OGAU 118 totaling 10,274 acres was used to analyze cumulative effects for northern goshawk. This area was selected because the project area lies almost entirely within this OGAU and because the goshawk was selected as an MIS as a representative of an old growth associated species. Any effects would be diluted at a larger scale. Activities considered for cumulative effects are those that have the potential to reduce habitat, such as timber harvest and fuel treatments. The timeframe for cumulative effects is 50 or more years until mid- to late seral stage succession types are achieved.

Past timber harvest slightly decreased the availability of mature and old growth forest habitat that provide the highest quality foraging and nesting sites for this species. Some of the past regeneration harvest may have directly reduced the amount of old growth forest habitat, while other regeneration harvest in mature forest habitat would have reduced the availability of stands that could develop into old growth habitat in a relatively short period of time. Long-term, nesting and foraging habitats would increase because less than 10% of this OGAU has been harvested and many of the harvest units have achieved or will soon achieve mid-seral development and recruitment into goshawk foraging habitat. At the same time, many mid-aged stands are maturing and beginning to provide nesting and foraging habitats.

There are no ongoing ore reasonably foreseeable projects other than the proposed action within the cumulative effects area.

Alternative A: Alternative A would have no cumulative effects on goshawks because there would be no direct or indirect effects to this species from this alternative. The current population trend would not be affected.

All Action Alternatives: No measurable effects to populations at the local or regional scale, or alteration of current population trend, are expected from the cumulative effect of any of the action alternatives, or in combination with future activities, based on the availability of unaffected suitable habitats in OGAU 118 and across the Forest and Region. This conclusion is based on the limited effects from this project, documented goshawk activity relatively near the project area, the stable and well-distributed population across the Region, and adequate amounts of habitat in the project area and across the Forest.

Population viability for goshawk has been addressed at the regional level by Samson (2006b), who concluded that well-distributed habitats exist in Region 1 and that these habitats are present at levels well in excess of the amounts required to support minimum viable populations. The proposed project, in combination with past, present and reasonably foreseeable projects would not affect the viability of populations of northern goshawk.

Pine Marten

1. Affected Environment

The pine marten was selected as a CNF MIS to represent mid-to-high elevation, mature forests (FP EIS Vol. 1, p. III-22). They are members of the weasel family and closely related to fishers. Pine martens inhabit dense mid- and late seral mixed and coniferous forests, which usually include abundant fallen logs, stumps, and shrubs. Modeled habitat consists of timber stands over 4,000 feet in elevation.

In the project area, many forested areas are second growth and only just beginning to develop trees of sufficient size to provide suitable habitat. No signs of marten were observed in the summer or fall of 2011, but 2005-2009 IDFG surveys document their presence in and near the project area (Albrecht 2012, IDFG 2011). Dozens of individuals were detected on the CNF

(Albrecht 2012, IDFG 2011) and the species is well documented as relatively abundant on the Idaho Panhandle National Forest to the north, where substantial efforts have been made to detect the species (IPNF 2011). Based on proximity and apparently suitable habitat, it seems very likely that marten inhabit the project area. There are 3,360 acres of habitat available in the 5,540 acre project area (See Table 3-7).

Since marten average home ranges vary widely from 146 to almost 7,000 acres per animal, the project area could potentially support 2-4 male martens and up to 10 females or juveniles (WSR pg. 42).

Samson (2006b) showed that habitat on the CNF is more than sufficient to contribute to a viable population of the marten at a regional scale.

2. Environmental Consequences – Direct and Indirect Effects

Alternative A: Alternative A would have no direct or short-term indirect effects on the pine marten because no treatments would be conducted. This alternative would retain approximately 3,360 acres of suitable marten habitat which would continue to be altered by natural events such as succession, insects and disease, and potential wildfire. As succession and fire suppression continue in the project area, mosaic patterns currently on the landscape would decline; openings would fill in and canopies would close further. As the mountain pine beetle infestation continues, dead trees would fall to the ground increasing structural diversity at the ground level which in turn would create suitable niches and habitats for marten prey. Small canopy openings are created when snags are created and fall allowing sunlight to the forest floor and creating opportunities for shrubs, forbs and grasses to grow. The increase in down and standing fuels would slightly increase the likelihood of a stand-replacing fire. Wildfire could result in the loss of mature and old growth stands that provide potential resting, denning, and foraging habitat for marten. Wildfire and further insect and disease activity would leave behind greater numbers of snags than exist now and would reduce canopy cover that may create unsuitable areas for marten. Some habitats would develop old growth characteristics while those affected by the mountain pine beetle infestation would revert to young forest conditions.

All Action Alternatives: Both action alternatives would decrease marten denning and foraging habitats in proposed regeneration harvest units by approximately 493 acres (15%). Proposed post-harvest prescribed burning could reduce down logs and snags. Individual martens may be disturbed by project activities under both action alternatives. However, this disturbance is not expected to affect their survival or reproduction on more than a sub-project area scale because adults and advanced juvenile martens could easily avoid direct injury while sufficient habitats are available outside the treatment units to support local marten population during project implementation and because polygyny should ensure full recruitment (Table 3-7, WSR pg. 42-44, 61-62, Powell et al. 2003). It would be possible that individual juvenile marten (with low mobility) could suffer injury from project activity if it coincides with individual dens.

Regarding effects on habitat, Powell et al. (2003) cited three studies which found a fairly consistent upper limit to the amount of openings in the forest (including clear-cutting and natural openings) tolerated by martens: 25-30% of a marten's home range; based on the CNF's stand database plus regeneration harvest area, the proposed project area would have less than 15% in a sapling or smaller size class after project implementation (WSR pg. 24-26). Given that the larger, contiguous swaths of marten habitat in the rest of the project area would not be affected by harvest activities; neither action alternative should affect the ability of marten to occupy the project area. Thousands of acres of modeled habitat is available directly north and south of the elongated project area; therefore, it is reasonable to assume that the proposed activities would have no effect on the survival of any martens that might use part of the project area. Marten

habitat would remain available within the project in untreated mature forest stands. In summary, the proposed action should have little to no direct effect on individual martens and little effect on marten abundance or persistence because suitable habitat would continue to remain abundant outside of proposed harvest units.

3. Cumulative Effects

The cumulative effects area for pine marten is OGAU 118 totaling 10,274 acres. This area was selected because the project area lies almost entirely within this OGAU and because the marten was selected as a MIS to represent mature and old growth associated species. Any effects would be diluted at a larger scale. Activities considered for cumulative effects are those that have the potential to reduce habitat such as timber harvest and fuels treatments. The timeframe for cumulative effects is 50 to about 150 years until mid- to late seral stage succession types are achieved.

Past timber harvest slightly decreased the availability of mature and old growth forest habitat that provide the highest quality foraging and nesting sites for this species. Although the species was chosen as an indicator of old growth viability (USDA 1987), modeled pine marten habitat includes some mid-seral stands. Because of this, a large proportion of the cumulative effects area that is over 4,000 feet elevation qualifies as suitable habitat for the species.

There are no ongoing management activities within the cumulative effects area. Proposed activities include the Lolo Insect and Disease and French Larch, projects; however, proposed actions have not yet been developed for either project. It is assumed for this analysis that these projects would harvest diseased trees in some capacity, thus reducing marten habitat.

Alternative A: Alternative A would have no cumulative effects on the marten because there would be no direct or indirect effects. The current population trend would not be affected.

All Action Alternatives: Proposed treatments would reduce marten habitat by about 6% in the cumulative effects area in the short-term. No measurable effects to marten populations at the Forest or regional scale, or alteration of current population trend, are expected from the cumulative effects of any of the alternatives, based on the widespread availability of suitable habitats across the Forest and Region.

Pine marten are widely distributed in northern North America in general and in moderate to high elevation forests in Idaho in particular, where they are abundant enough to be legally trapped for the fur trade (nearly 1,000 statewide in the 2009-2010 season, IDFG (2010). Population viability for pine marten has been addressed at the regional level by Samson (2006b), who concluded that well-distributed habitats exist in Region 1 and that these habitats are expected to remain available and substantially above the habitat needed to support minimum viable populations.

The combination of standing live and dead trees in timber harvest units, riparian and mature/old forest habitats would continue to provide suitable marten habitat, well distributed, in both the project area and cumulative effects area. The Forest Plan standard and Forest direction for mature and old growth forest habitats has been met in OGAU 118. These habitats would remain available to support the local and regional populations of martens under both alternatives.

Table 3-7. Habitat Availability and Change for Selected MIS and Sensitive Species at the project, Forest and Regional level

		Habitat Threshold for a Minimum Viable Population in Region 1 [3]	Habitat Available on the Clearwater National Forest (acres)	Habitat available in the Project Area (acres)	Habitat available in the Regen and CT Units (acres) Alt B and C	Change in Available Habitat in the Project Area (acres)	Change in Available Habitat on the Clearwater National Forest (%)
Northern Goshawk	**Nesting**	30,150	31,801	1,716	0	0	0
	Foraging		575,596	1,822	291	-270	-0.05
Pileated Woodpecker	**Nesting**	90,439	268,718	1,716	0	0	0
	Foraging		338,680	846	51	-51	-0.02
Pine Marten		17,297	903,146	3,360	493	-493	-0.05
Black-backed Woodpecker		29,405	454,753	3185	642	-642	-0.14
Fisher	**Summer**	100,076	365,710	471	229	-229	-0.06
	Winter		686,899	411	9	0	0
Flammulated Owl		4,695	15,900	53	0	0	0
Fringed Myotis Bat		None Given	None Given	72	0	0	n/a
Western Toad		None Given	667,972	2,065	-88	-88	-0.01

Threatened, Endangered, Proposed and Candidate Wildlife Species

Canada Lynx

1. Affected Environment

The U.S. Fish and Wildlife Service (USFWS) lists Canada lynx as threatened on the CNF. The CNF is recognized as secondary, occupied Canada lynx habitat (USFWS 2005) but none of the CNF has been identified as critical habitat by the USFWS.

Lynx are associated with relatively high-elevation moist conifer forest. Lynx habitat includes mesic coniferous forests that experience cold, snowy winters and provide a prey base of snowshoe hare. It primarily consists of lodgepole pine, subalpine fir, and Engelmann spruce forest, but may also consist of cedar hemlock forests in northern Idaho (USFS 2007). Areas within the LAU but not defined as lynx habitat are referred to as “matrix” (USFWS) 2009).

Lynx habitat in this analysis was first mapped based on the CNF’s GIS database and lynx model (which take into consideration timber stand characteristics and elevation). Lynx habitat in the project area is relatively abundant. Lynx denning habitat (a subset of the modeled general habitat) is more restrictive, focusing on relatively dense stands of relatively large trees within the

[3] Adapted from Samson 2006, Table 1

general habitat sideboards. The CNF used stand exams conducted in 2011 to modify the classification of some of the GIS-modeled lynx habitat in the regeneration and commercial thinning units.

The CNF has defined Lynx Analysis Units (LAUs) to evaluate direct, indirect and cumulative effects. The Middle Bugs project is mostly confined to LAU 38 (totaling 26,377 acres). Based on the CNF GIS model about 89% of LAU 38 is lynx habitat; the remainder of the LAU is too dry or does not contain the snow depths to support lynx. About 3,660 acres (about 66%) of the project area is lynx habitat, while about 1,323 acres of the project area is either within an LAU, but is too dry, not forested, or too recently harvested to be considered lynx habitat; or is too low in elevation (does not support deep snow) to be included within an LAU.

About 3,997 acres of LAU 38 are within the project area, while about 220 acres of the project area lies within LAU 37 (19,648 acres). Of those 220 acres, only about 9 acres is lynx habitat. Lynx habitat within LAU 37 will not be further discussed in this document because the only project activities there would be about 0.2 miles of intermittent road storage, which should not affect the quality or quantity of lynx habitat.

Although no records of lynx occurrence exist in the project area or in LAUs 37 or 38, the Idaho Animal Conservation Database (IDFG 2011) lists about a dozen occurrence records for Canada lynx within 25 miles of the project area with one as recent as 2005.

In a literature review, Ruediger et al. (2000) noted that lynx inhabit forest which support their primary prey, snowshoe hares, and that forest disturbance (including both natural mortality and tree harvest) creates dense early successional stage vegetation which is favored by hares. Less-dense, later succession stage vegetation also provides habitat for secondary lynx prey species such as red squirrels, while accumulations of large woody debris provide the best maternal denning habitat for lynx. Ruediger et al. (2000) cited studies where lynx inhabiting southern montane forests (e.g., Idaho) average home ranges varied from about 10,000 to over 90,000 acres per animal, with female home ranges being typically smaller than those of males. Lynx appear to be relatively tolerant of human presence and the existence of low-use forest roads does not appear to affect habitat use (Ruediger et al. 2000).

Lynx require certain habitat elements to persist in a given area. Lynx productivity is highly dependent on the quantity and quality of winter snowshoe hare habitat. Winter snowshoe hare habitat may be found in dense young regenerating forests – where the trees protrude above the snowline and in multistoried forests where limbs of the overstory touch the snowline, in addition to shorter understory trees that provide horizontal cover. Certain activities, such as timber harvest, prescribed burning and wildfires, can affect the amount and distribution of these habitat elements, which can in turn affect lynx productivity. Timber harvest can be beneficial, benign, or detrimental depending on the harvest method, the spatial and temporal occurrence on the landscape and the inherent vegetation potential of the site (Northern Rockies Lynx Management Direction (NRLMD) FEIS, Vol. 1, Appendix P; USFS 2007). Timber management can be used in conjunction with, or in place of, fire as a disturbance process to create and maintain snowshoe hare habitat (Ruediger, et al. 2000).

In order to provide for lynx needs the NRLMD established objectives that define desired conditions for lynx habitat, and standards that are management requirements designed to meet objectives. There are four standards specific to vegetation management. Two standards address the **quantity** of winter snowshoe hare habitat. They are designed to provide sideboards for projects in order to meet the objectives of (1) managing vegetation to mimic or approximate natural succession and disturbance processes; and (2) providing a mosaic of habitat conditions through time that support dense horizontal cover. The 30 percent per LAU limit on stand initiation phase habitat (VEG S1) and the 15 percent change per-decade limit on timber harvest

(VEG S2) promote a balance, a mosaic, of young and older stands within each LAU (FWS 2007, NRLMD BO p. 42). VEG S1 and S2 are based on a cumulative effects analysis of the past, present, and reasonably foreseeable actions in addition to the proposed action.

The NRLMD Record of Decision (ROD) (USFS 2007) requires:

- If more than 30 percent of the lynx habitat in an LAU is currently in a stand initiation structural stage that does not yet provide winter snowshoe hare habitat, no additional habitat may be regenerated by vegetation management projects. (Standard VEG S1)
    - Currently up to about 4% of LAU 38 is in a stand initiation structural stage that does not provide winter snowshoe hare habitat. These areas were regenerated within the 30 years prior to the proposed decision on this project (since 1983). No substantial fires or prescribed burning has occurred since 1983; therefore, these types of events have not created young regenerating forests in LAU 38.
- Timber management projects shall not regenerate more than 15 percent of lynx habitats on NFS lands in an LAU in a ten-year period (Standard VEG S2).
    - About 101 acres have been regenerated in ten years prior to the proposed decision on this project (since 2003) within lynx habitat in LAU 38. This equates to about 0.4 percent of the LAU.
- With relatively rare, specific exemptions, that precommercial thinning not be performed in lynx habitat (Standard VEG S5).
    - No precommercial thinning is proposed in lynx habitat. Areas proposed for precommercial thinning are outside of LAUs (see wildlife specialist report).
- With relatively, rare, specific exceptions, that vegetation management projects not reduce snowshoe hare habitat in multi-story or late successional forests (Standard VEG S6).
    - No vegetation management is proposed in predominantly multi-story or late successional forest lynx habitat. The areas to be regenerated are lodgepole pine and are primarily in the stem exclusion structure stage. The NRLMD Guideline VEG G1 states that priority for treatment should be given to this structural stage to enhance habitat conditions for lynx and its prey. Areas of multistory habitat within the proposed regeneration and commercial thinning units would be protected with retention areas or treatment methods that maintain snowshoe hare habitat characteristics.

2. Environmental Consequences – Direct and Indirect Effects

Alternative A: Alternative A would have no direct or short-term indirect effects on Canada lynx because no treatments would be conducted. In the long term (>7 years), forest succession would continue in the analysis area, as modified by natural processes and, potentially, human actions. Existing open patches (i.e., areas of grasses, forbs, shrubs, and young trees) would continue to decrease in area as trees grow and mature in old openings; conifers would potentially encroach in riparian meadows. This succession would tend to reduce lynx foraging habitat, but would increase lynx denning habitat. If wildfires or extensive windstorms occur in the area, foraging habitat could be replenished, but would these events may decrease denning habitat. As the mountain pine beetle infestation continues in lodgepole pine stands, numerous dead trees fall to the ground, and may provide high quality denning habitat if downed logs are densely layered. On the other hand, downed logs, shading from snags, and lack of seed sources may delay the regeneration of new trees relative to harvested areas which would reduce the regeneration of high quality foraging habitat. Because the events and processes that might affect forest succession (and therefore lynx habitat) in the analysis area are either unknown or highly variable in frequency and size, the long term indirect effect on lynx of Alternative A is not predictable.

Table 3-8. Percent of lynx habitat not providing winter snowshoe hare habitat in LAU 38 (Standard VEG S1)

Standard VEG S1	Existing Condition[1]	Alternative A No Action	All Action Alternatives	Cumulative Effects
<30	4.8	4.8	2.6	7.4

[1]Based on past regeneration harvest since 1983 (no substantial wildfires or prescription burning has occurred in the LAU since that time).

Table 3-9. Regeneration harvest – Past (last 10 years) and Proposed in lynx habitat in LAU 38 (Standard VEG S2)

Standard VEG S2	Existing Condition	Alternative A No Action	All Action Alternatives	Cumulative Effects
<15	0.4	0.4	2.6	3.0

All Action Alternatives

Standard ALL S1. *New or expanded permanent development and vegetation management projects must maintain habitat connectivity in an LAU and/or linkage area.*

Habitat connectivity is defined as those areas that consist of an adequate amount of vegetation cover arranged in a way that allows lynx to move around (NRLMD definition). Maintaining habitat connectivity means to provide enough of this cover to conserve lynx. It does not mean to keep the status quo (NRLMD definition). The word "maintain" is used in the standards because habitat conditions change, trees grow and die; the habitat is not static. Some habitat connectivity can be removed or affected as long as there is enough connectivity for lynx to move through an area (NRLMD FEIS, Volume 2 response to comment, p. 23). Management direction found in the land management plans to retain riparian cover provides for lynx movement between and within vegetation management units (NRLMD FEIS p. 97-98).

The action alternatives would maintain lynx habitat connectivity because there would be no timber harvest in the riparian areas. These areas would be retained for aquatics purposes but they also provide movement corridors for lynx.

Standard VEG S1. *If more than 30 percent of the lynx habitat in an LAU are currently in a stand initiation structural stage that does not yet provide winter snowshoe hare habitat, no additional habitat may be regenerated by vegetation management projects. Exception: Fuel treatment projects in the WUI, as defined by HFRA, subject to the following limitation – fuel treatment projects in the WUI that do not meet Standards VEG S1, S2, S5 and S6 shall occur on no more that 6 percent (cumulatively) of lynx habitat on each National Forest. In addition, fuel treatment projects may not result in more than three adjacent LAUs exceeding this standard. For fuel treatment projects in the WUI, see guideline VEG G10.*

Standard VEGS1 was developed to **provide a distribution of age classes across a landscape**, in this case a lynx analysis unit (LAU). All action alternatives would regenerate 642 acres in LAU 38 resulting in a total about 7.4% in the stand initiation structural stage. Over the next 15-30 years the trees in these regenerated forests would grow and would eventually provide winter snowshoe hare habitat. The other areas that are currently too short to provide winter snowshoe hare forage will soon be growing into that successional stage. It is desirable to have a mosaic of successional stages for lynx.

Standard VEG S2. *Timber management projects shall not regenerate more than 15 percent of lynx habitat on NFS lands within a LAU within a 10-year period. The same exception described in standard VEG 01 for fuels projects in the WUI applies to this standard.*

Standard VEGS2 was developed to limit the rate of **management induced change** in lynx habitat. About 101 acres in LAU 38 have been regenerated in the past 10 years. This project would regenerate an additional 642 acres, resulting in about 3 percent of the LAU regenerated in the past 10 years.

Guidelines VEG G1, G4, G5, G10 and G11: *Create lynx habitat where it is not providing winter snowshoe hare habitat; do not create permanent travel routes that facilitate snow compaction; provide habitat for alternate prey species for lynx, provide for denning habitat where lacking.*

Guidelines VEG G1 through VEG G11 generally provide suggestions for design features for developing a proposed action. These guidelines were considered in this case. The following summarizes how the alternatives considered these guidelines.

- Regeneration harvest would occur on 642 acres in the stem exclusion structural which would improve lynx habitat conditions by providing a mosaic of structural stages.
- No firebreaks would be located on ridges or saddles. Prescribed burning would not create permanent travel routes for snowmobiles
- Habitat for alternate prey is abundant in LAU 38 because of the amount of mature and over mature forests. Habitat would continue to be provided.
- There are no fuel treatments in the wildland urban interface.
- Denning habitat is located throughout the LAU in older mature forests. In addition, because so much of the LAU was burned in the early 1900's much of these forests will provide for future denning habitat as they continue to mature and age. Based on 2011 stand exams, no denning habitat is proposed for treatment; therefore denning habitat would continue to be provided.

In summary, individual lynx may be disturbed by project activities under all action alternatives; however, this disturbance is not expected to measurably affect their survival or reproduction. Sufficient habitats are available outside the treatment units to support any local population during project implementation.

3. Cumulative Effects

The cumulative effects area for lynx is LAU 38, which includes all modeled lynx habitat in the LAU because specific standards are established to recover Canada lynx and their habitat within LAUs. Cumulative effects for LAU 37 are not considered because only road storage is proposed in this LAU. No vegetative parameters would be affected. The time frame for the cumulative effects assessment for Canada lynx is approximately 25 years because that is the amount of time required after a stand replacing disturbance to restore sufficient horizontal cover for snowshoe hare habitat.

More than 96% of LAU 38 has either not been harvested or was harvested more than 30 years from the proposed project implementation. Timber harvest up until about 1983 has regenerated enough to be considered as winter snowshoe hare habitat. About 1,127 acres have been regenerated since 1983 and may still be in a stand initiation structural stage that would not yet provide winter snowshoe hare habitat. However, within the next 10 years most or all the trees in these areas should be tall enough to protrude about the snow in the winter.

Continued fire suppression has likely reduced the amount of large woody debris concentrations. The elevation and dominant vegetation types suggest that this area is as likely as ever to support sufficient habitats to sustain a local lynx population.

The proposed French Larch and Lolo Insect and Disease projects are the only foreseeable future actions within LAU 38. Proposed actions have not been developed for these projects so analysis

is speculative. Any proposed harvest could potentially affect lynx habitat, but would be constrained by the habitat parameters established in the NRLMD and ESA Section 7 guidelines (USDA FS 2007) and so should have minimal to beneficial effects on the species.

All Alternatives: Alternative A would have no cumulative effects on the lynx because there would be no direct or indirect effects. Past timber harvest has affected well less than 10% of habitat in the LAU and the proposed actions in all action alternatives would increase that proportion only slightly. Under all action alternatives, the NRLMD would continue to be met in LAU 38.

Cumulatively about 7.4 percent or less of the lynx habitat in LAU 38 would be in a stand initiation structural stage that does not yet provide winter snowshoe hare habitat[4]; therefore it meets Standard VEG S1. Cumulatively, about 3.0% of lynx habitat in LAU 38 would be regenerated within 10 years of the decision document for this project; therefore, it meets Standard VEG S2.

Vegetation in proposed harvest units would likely return to winter foraging habitat in 15 to 30 years. As forest succession continues, and assuming no large increase in timber harvest rates and the absence of a large scale wildfire, the amount of denning habitat in the LAU should steadily increase. Existing Canada lynx habitat and snowshoe hare winter habitats are expected to remain available, well distributed and connected, within LAU 38. No measurable effects to lynx populations at the Forest or regional scale, or alteration of current population trend, are expected from the cumulative effects of any of the alternatives based on the widespread availability of suitable habitats across the Forest and region (USDA FS 2007).

Sensitive Species

No specific Forest plan standards, guidelines or other regulations apply to most sensitive species. The Forest plan (Appendix H) contains a standard to provide habitat for snag-dependent indicator species.

The project area contains habitat for black-backed woodpecker, fisher, flammulated owl, fisher, fringed myotis bat, wolf, wolverine and western toad. These species are discussed below.

Due to a lack of suitable habitat, and the lack of confirmed species use in or near project area, there are no known or anticipated effects to the bald eagle, American peregrine falcon, common loon, mountain quail, black swift, white-headed woodpecker, bighorn sheep, northern bog lemming or Townsend's big-eared bat; therefore, they are not discussed in this analysis. Due to lack of habitat, proposed activities would have "No Impact" on these species. See Appendix A, Table A-6 for more detailed information regarding these species.

Black-backed Woodpecker

1. Affected Environment

There are approximately 3,185 acres of modeled burned or suitable beetle infested habitat in the project area. Black backed woodpecker habitat is associated with the abundance of bark beetles and wood boring beetles. They are abundant in recently burned landscapes or other areas of epidemic bark beetle infestations and uncommon but widespread elsewhere. Based on habitat

[4] 1,127 acres regenerated since 1983 (past action) in addition to 642 acres in the proposed action.

availability, it is likely that low levels of use are occurring, although site-specific surveys have not been conducted.

The black-backed woodpecker is rated abundant and secure across its range (global rank G5) and is considered vulnerable (state rank S3) in Idaho (Digital Atlas of Idaho 2012). Based on habitat requirements and trends (Samson 2006a), local populations are likely stable or increasing.

The IDFG's ACD (2011) does not list any occurrence records within the Weitas Creek watershed, but black-backed woodpeckers were observed near Dworshak Reservoir about 30 miles northwest of the project area in 1977 and individuals have been observed at various locations in north central Idaho and western Montana in recent years and reported on ebird.com. Habitats on the CNF contribute to a viable population of black-backed woodpeckers at a regional scale, based on the availability of unaffected suitable habitats across the Forest and region (Table 3-7).

2. Environmental Consequences – Direct and Indirect Effects

Alternative A: Alternative A would have no direct or short-term indirect effects on black-backed woodpeckers because no treatments would be conducted. In the long term, woodpecker habitat would continue to be altered by natural events such as succession and insects/disease and the area would continue developing conditions that support stand replacing and mixed severity wildfire. Fire, insect, and disease would be primary disturbances necessary to produce and maintain suitable habitat conditions through time. Fire suppression would continue to occur which reduces the probability of developing suitable habitat. However, the ongoing mountain pine beetle activity would continue to create habitat for black backed woodpeckers in lodgepole pine. Firewood gathering would continue.

All Action Alternatives: Proposed harvest and burning activities in both Alternatives B and C would reduce suitable black-backed woodpecker habitat by 642 acres (20%). Proposed activities would have a negligible impact on woodpeckers ongoing beetle kill within the project area outside of the project units would increase over time and because substantial un-modeled habitat is likely present in the project area due to increasing mountain pine beetle infestations. Consequently, proposed timber harvest and fuels treatments should not affect the persistence or viability of the species within the project area.

It is possible that individual woodpeckers outside of modeled and mapped habitat may also be disturbed by project activities under the action alternatives; however, this disturbance is not expected to affect their survival or reproduction unless active nests are within activity areas.

Proposed temporary or permanent road construction and road decommissioning would have no impact on any aspects of suitable habitat.

In summary, the proposed action should have little to no direct effect on individual black-backed woodpeckers and little or no effect on woodpecker abundance or persistence because suitable habitat would continue to remain abundant outside of proposed harvest units.

3. Cumulative Effects

The geographic area for assessing cumulative effects for black backed woodpeckers is the 5,540 acre project area because any incremental effects associated with the action alternatives would not be detectible at a larger scale. The time frame for cumulative effects is 50 years, which is about the time when forested stands begin to thin themselves and create snags either through natural processes or active management.

Dead and dying trees attract the insects that black backed woodpeckers feed on. Activities considered for cumulative effects are those that remove existing or future dead or dying trees that

would provide foraging habitat for black backed woodpeckers. This would include harvests of all types and prescribed burning.

Past timber harvest decreased the availability of mature forest habitats that are most susceptible to fire, insects and diseases. Some of the past harvest may have directly reduced the amount of suitable habitat, while other harvest may have reduced the availability of stands that could develop into suitable habitat through fire, insect or disease related mortality in a relatively short period. There are no other present or foreseeable projects within the cumulative effects area that would be considered for this analysis.

Alternative A: Alternative A would have no cumulative effects because there would be no activities that would cause direct or indirect effects. The current population trend would remain unaffected.

All Action Alternatives: The Middle Bugs project would affect about 642 acres of modeled habitat. There are no other ongoing or proposed projects within the project area. The relatively small proportion of modeled habitat in the analysis area that would be harvested and continued tree mortality from mountain pine beetle infestations should ensure that abundant potential habitat continues to exist at the cumulative effects scale. No cumulative effects to the species or its habitat are expected. Suitable nesting and foraging habitats would be retained in untreated mature forest stands and forested riparian habitat conservation areas.

There would be no measurable effects to black backed woodpecker populations at the local or regional scale, or alteration of current population trend from the cumulative effects of any of the action alternatives, based on the availability of unaffected habitats in the analysis area and across the Forest and Region. Other areas of the Forest have and will burn, thus creating habitat for black backed woodpeckers. This species is capable of responding quickly to favorable conditions created by large, intense fires and insect outbreaks, and they can move several miles to take advantage of such opportunities.

Flammulated Owl

1. Affected Environment

There are approximately 53 acres of modeled suitable habitat for the flammulated owl in the project area. The available habitat is poor as this species prefers lower elevation, dryer habitat consisting of mature ponderosa pine/Douglas-fir forest with open, shrub understories for nesting; which is not common in the project area. There are no records of flammulated owls in the project area but it may occur in suitable habitats.

The flammulated owl is rated apparently secure across its range (global rank G4) and is considered vulnerable (state rank S3) in Idaho (Digital Atlas of Idaho 2012). The IDFG's ACD (2011) does not list any occurrence records within the North Fork Ranger District, but several flammulated owls were observed near Dworshak Reservoir about 25 miles northwest of the project area in 2001 and more recently along the Lochsa and Middle Fork Clearwater rivers 15 to 20 miles to the south. Based on habitat requirements and trends (Samson 2006a), local populations are likely stable and may be increasing. Habitats on the CNF contribute to a viable population of flammulated owls at a regional scale (Samson 2006b) (Table 3-7).

2. Environmental Consequences – Direct and Indirect Effects

Alternative A: Alternative A would have no direct or short-term indirect effects on flammulated owls because no treatments would be conducted. In the long term, owl habitat would continue to be altered by natural events such as forest succession, insect and disease, and potential wildfire.

Substantial wildfire or insect/disease activity would potentially and eventually allow development of mature ponderosa pine stands (preferred owl habitat) in the few favorable sites in the project area but may also reduce canopy cover that may create unsuitable conditions in existing habitat.

All Action Alternatives: Under all action alternatives, no vegetation treatments would occur in modeled flammulated owl habitat. Proposed road related activities would not affect this species because little or no vegetation outside of the road prisms should be disturbed. In the long term, reduced access to closed roads may reduce human disturbance, although there is no evidence this type of disturbance is occurring, that these birds are currently nesting near open roads, or that open road density is reducing the suitability of habitats.

3. Cumulative Effects

The cumulative effects area for flammulated owls is the project area because any incremental effects associated with the action alternatives would not be detectible at a scale larger than this. The time frame for cumulative effects is up to 150 years, the amount of time required for stands to develop into an old growth condition, which provides the best habitat for this species.

Activities considered for cumulative effects are those that would decrease the amount of large diameter trees. This would include harvest of all types. There are no other proposed or ongoing projects within the cumulative effects area that would be considered for this analysis. All past management activities are considered in the existing condition.

There would be no cumulative effects for this species for any alternative. Since there are no direct or indirect effects, and no other ongoing or future project to consider, there can be no cumulative effects.

No measurable effects to flammulated owl populations at the local or regional scale, or alteration of current population trend, are expected from the cumulative effects of any of the alternatives, based on the availability of unaffected suitable habitats across the Forest and Region. Habitat across the Forest would remain substantially above that needed to support minimum viable populations (Table 3-7). All alternatives would be consistent with the Forest Plan and applicable direction and regulations.

Fisher

1. Affected Environment

Fishers are closely associated with forested riparian areas, which are used extensively for foraging, resting, and travel corridors. They prefer diverse, moist, mature forests at low to moderate elevations, with high canopy cover, often along riparian areas, and abundant large diameter woody debris. Samson (2006b) describes fisher habitat modeling considerations and further discussion is provided in the project's WSR (pgs. 48-49, 65-66). There are approximately 471 acres of modeled summer habitat and 411 acres of modeled winter habitat (winter habitat is also considered to be suitable for summer use by fishers) in the project area. There are a multitude of documented fisher sightings on the North Fork Ranger District and over 200 within a 25 mile radius of the project area (Albrecht 2012, IDFG 2011).

Samson (2006b) showed that habitat on the CNF is more than sufficient to contribute to a viable population of the marten at a regional scale.

2. Environmental Consequences – Direct and Indirect Effect

Alternative A: Alternative A would maintain existing summer and winter habitat. This alternative would have no direct or short-term indirect effects on the fisher because no treatments

would be conducted. In the long-term, fisher habitat would continue to be altered by natural events such as succession and insects/disease. Fire suppression would continue. Snag and large down wood habitat elements would remain available as trees die (and fall) from natural causes. The current mountain pine beetle infestation in lodgepole pine provides ample downed wood in those stands. A pulse of large logs on the ground due to fire or insect epidemics could provide denning structures and cover for fisher and several prey species, but these areas are likely to be avoided until the living canopy cover again exceeds 40 percent. Substantial wildfire or insect/disease activity would leave greater numbers of snags and large down wood than exist now but would also reduce canopy cover, especially in lodgepole dominated areas. These more open areas would provide less suitable conditions for fisher. Ongoing fire suppression may be beneficial for this species because it can help maintain mature and older habitats on the landscape longer. However, fire suppression reduces the mosaic vegetative pattern created by wildfires with which this species has evolved.

All Action Alternatives: Alternatives B and C would reduce summer habitat by 229 acres; there would be no reduction in winter habitat. Regeneration harvest and prescribed burning would remove snags and down wood which would reduce the quality of available denning and foraging habitats, but commercial and precommercial thinning would not adversely affect summer or winter habitat because substantial wood would remain. Summer habitat in the project area consists of rapidly dying lodgepole pine stands of marginal suitability which would be reduced in density below the model criteria in the near future. Further, winter habitat is more restrictive in quality than winter habitat, so it is likely that the quantity of the latter is the controlling influence on fisher populations. This relatively small, transient change in habitat availability (up to about 26% of combined modeled summer and winter habitat in the project area) would not affect the ability of a fisher population to occupy the analysis area now or in the future because substantial habitat would remain and many stands are succeeding into a suitable condition, nor would it affect the availability of habitat at the Forest or regional levels.

Individual fishers may be disturbed by project activities under both action alternatives. However, this disturbance is not expected to affect their survival or reproduction on more than a sub-project area scale because adults and advanced juvenile fishers could easily avoid direct injury while sufficient habitats are available outside the treatment units to support fisher populations during project implementation, and because polygyny should ensure full recruitment (Table 3-7, WSR pg. 42-44, 61-62, Powell et al. 2003). It would be possible that individual juvenile fishers (with low mobility) could suffer injury from project activity if it coincides with individual dens.

Proposed road decommissioning and storage would generally decrease open road densities, increase security areas, and increase habitat effectiveness.

In summary, the proposed action should have little to no direct effect on individual fishers and little effect on fisher abundance or persistence because suitable habitat would continue to remain abundant outside of proposed harvest units.

3. Cumulative Effects

The cumulative effects area for fisher is the project area because any incremental effects associated with the action alternatives would not be detectible at a scale larger than this. The time frame for cumulative effects is up to 150 years, the amount of time required for stands to develop into mature or old growth condition, which provides the best habitat for this species. Activities considered for cumulative effects are those that would decrease wood levels, both live and dead. This would include regeneration harvest and prescribed burning because other types of vegetation manipulation would retain substantial woody material. There are no other proposed or ongoing

projects within the cumulative effects area that would be considered for this analysis. All past projects are considered in the existing condition.

Alternative A: There are no other proposed or ongoing activities in this area that would affect fisher habitats; therefore, there can be no cumulative effects.

All Action Alternatives: This project would affect up to 229 acres (26%) of the approximate 882 acres of suitable fisher habitat within the cumulative effects area. The proposed actions represent a negligible change in available fisher habitat. Suitable nesting and foraging habitats would be retained in untreated mature forest stands and forested riparian habitat conservation areas. Existing fisher habitats are expected to remain available, well distributed and connected within the project area and beyond. These habitats would remain available to support local and regional populations of fisher under both alternatives. No measurable effects to fisher populations at the local or regional scale, or alteration of current population trend, are expected from the cumulative effects of any of the alternatives, based on the availability of unaffected suitable habitats across the Forest and Region.

Fringed Myotis Bat

1. Affected Environment

Fringed myotis Bat is associated with open areas (grasslands and shrub lands), interspersed with mature forest habitats (pinyon-juniper, ponderosa pine, mixed oak and pine, Douglas fir) in a mosaic pattern with ample edges and abundant snags. Large snags, hollow trees, buildings, mines, rock crevices and bridges are used for roosting.

There are approximately 72 acres of suitable habitat in the project area. There are no records of fringed myotis bat habitat in the project area, but this species is secretive and surveys have not been conducted.

Little data exist on fringed myotis populations at any scale; however, anecdotal evidence suggests increases in some areas and decreases in others, possibly confounded by short-term fluctuations (Keinath 2004). The fringed myotis is rated secure across its range (global rank G5) and is considered critically imperiled (state rank S1) in Idaho (Digital Atlas of Idaho 2012). The IDFG's ACD (2011) does not list any occurrence records on the CNF.

2. Environmental Consequences – Direct and Indirect Effects

Alternative A: Alternative A would have no direct or short-term indirect effects on the fringed myotis bat because no treatments would be conducted. In the long-term, bat habitat would continue to be altered by natural events such as succession and insects/disease. Fire suppression would continue. Substantial wildfire or insect/disease activity would leave greater numbers of snags and large down wood than exist now but would also reduce canopy cover, especially in lodgepole dominated areas. These more open areas would provide less suitable conditions for bat roosting, but potentially better conditions for bat foraging. Ongoing fire suppression may be beneficial for this species because it can help maintain mature and older habitats on the landscape longer. However, fire suppression reduces the mosaic vegetative pattern created by wildfires with which this species has evolved.

All Action Alternatives: Regeneration harvest and commercial thinning proposed in all action alternatives could potentially reduce the number of snags and live trees that could become snags over time, decreasing roosting opportunities for bats and reducing recruitment of down wood, but the proposed action would not affect any modeled habitat for this species. Prescribed burning associated with harvest units could reduce down woody debris and eliminate some snags and

directly injure individuals outside of modeled habitat, although adult and advanced juvenile bats likely could avoid injury. Burning would create other snags and have no net effect on availability of bat roosting sites. Mature and old growth forest habitats would be protected under all alternatives; they represent the best available roosting habitats for the fringed myotis. The potential to be affected is low because preferred habitats are not present in the treatment units.

3. Cumulative Effects

The cumulative effects area for fringed myotis bat is the project area. Any incremental effects associated with the action alternative would not be detectable at a scale larger than this. Regeneration harvest is the only activity considered that could affect snag habitat used by bats. This project would follow Northern Region Snag Management Protocols for tree retention in harvest units. There are no other present or foreseeable projects within the cumulative effects area that would be considered for this analysis. The time frame for cumulative effects is 40 years which is about the time when forested stands begin to thin themselves and create snags either through natural process or active management.

All Alternatives: No measurable effects to fringed myotis populations at the local or regional scale, or alteration of current population trends, are expected from the cumulative effects of any of the alternatives, based on the limited extent of suitable habitats and the low potential for this species to be present in the treatment units. Since there are no direct or indirect effects to fringed myotis habitat, there would be no cumulative effects. The effects of planned actions on this species are considered immeasurable. Habitat across the Forest would remain substantially above that needed to support minimum viable populations. All alternatives would be consistent with the Forest Plan and applicable direction and regulations.

Gray Wolf

1. Affected Environment

In the project area, suitable gray wolf habitats are present and widespread. Four known wolf packs (Hemlock Ridge, Kelly Creek, Eldorado Creek, and Bimerick Meadow) inhabited the area near the project area in 2010 (Holyan et al. 2011). The Kelly Creek pack is known to use the project area and it is possible that the Hemlock Ridge pack may use the project area on occasion; however, none of the packs are known to den or rendezvous in the project area (Holyan 2011).

Wolves occupy broad territories and travel extensively in search of prey, generally medium to large ungulates, especially elk in Idaho. They are adaptable to many habitat types and to human and land management activity in general, but sensitive to disturbance at denning and rendezvous sites.

The gray wolf has a global rank of G4 (apparently secure) and an Idaho State ranking of S1 (critically imperiled) (Digital Atlas of Idaho 2012). Wolves were reintroduced into north central Idaho beginning in 1995. Wolf populations have since multiplied dramatically throughout the state and were removed from the list of threatened species in Idaho in May of 2011.

2. Environmental Consequences – Direct and Indirect Effects

Alternative A: Alternative A would have no direct or short-term indirect effects on the gray wolf because no activities would be conducted. Long-term wolf habitat would continue to be altered by natural events such as succession, insects/disease and potential wildfire, but wolves have evolved to exist in a variety of habitats. There would be little to no change to elk habitat effectiveness or wildlife security areas with the No Action alternative, but indirect effects from continued motorized use may occur including potential mortality and disturbance.

All Action Alternatives: The temporary increase of human activity in the project area associated with project activities under all action alternatives could increase the possibility of human-wolf interactions and influence how wolves use the project area, as well as their prey species. There would generally be little risk of direct or indirect effects to individual wolves from either of the action alternatives because of their high mobility and large territories. Wolves in the area would avoid areas of active treatment. All habitats would remain suitable for wolves and their prey (see elk, deer, and moose discussions in MIS sections). Although some disruption in behavior may occur with the action alternatives, the reduction in road densities that is common to the action alternatives would slightly reduce the extent of human activities in the long term and effects on prey species should be neutral to beneficial.

In summary, the proposed action should have little to no direct effect on individual wolves and little effect on wolf abundance or persistence because the full project area would remain suitable habitat for the species.

3. Cumulative Effects

The cumulative effects area for the wolf is the project area because any incremental effects associated with the action alternatives would not be detectable at a scale larger than this. Activities considered for cumulative effects are those that would affect the wolves prey base or security from human disturbance. Stand replacing effects that would affect elk forage or hiding cover, such as regeneration harvest, and activities that would affect security were considered. There are no other present or foreseeable projects within the cumulative effects area that would be considered for this analysis. The time frame for cumulative effects is 20 years, which is about the time it takes for new plantations to restore elk hiding cover in the harvested areas.

All Alternatives: The potential for cumulative effects associated with management activities is considered very low. There are no known denning or rendezvous sites within the area. No other stand replacing activities are proposed that would affect prey habitat; therefore, foraging would not be affected. No other road construction, decommissioning or access changes are proposed that would affect the wolf prey base or the number of wolf-human interactions. None of the alternatives, in combination with ongoing or reasonably foreseeable projects are expected to measurably affect populations of the gray wolf and, therefore, would not affect viability of wolf populations.

Wolverine

1. Affected Environment

Wolverines are solitary animals, which range widely over a wide variety of habitats. They are mostly found in higher elevation areas of alpine forest. They inhabit remote areas where human disturbance is minimal, often in timber near rock slides, avalanche areas, cliffs, swamps and meadows. They inhabit primarily montane, mature forests associated with subalpine rock/scree habitats in areas of low human occurrence (Copeland and Hudak 1995) but are known to forage at lower elevations in many types of habitat. Wolverines are opportunistic scavengers and ungulate carrion is considered an important food source. There are 2,469 acres of modeled potential foraging habitat and no denning habitat within the project area. The ICDC does not have any recorded sightings of wolverine in the project area; however, there have been relatively recent sightings on the district. Suitable habitat, combined with the general remote character of this landscape, indicate that wolverine probably use the area.

2. Environmental Consequences – Direct and Indirect Effects

Alternative A: Alternative A would have no direct or short-term indirect effects on the wolverine because no treatments would be conducted. Long-term wolverine habitat would continue to be altered by natural events such as succession, insects/disease, and potential wildfire, but wolves have evolved to forage in a variety of habitats. There would be little to no change to large undulate habitat effectiveness or wildlife security areas with the No Action alternative, but indirect effects from continued motorized use may occur including potential mortality and disturbance.

All Action Alternatives: Alternatives B and C would regeneration harvest about 551 acres (22%) of the potential modeled foraging habitat within the project area. This modification of habitat type would not affect the ability of wolverine to occupy the analysis area now or in the future because the early succession habitat that would be created by regeneration harvest is suitable for foraging, while denning habitat is non-existent and so any wolverine use would almost certainly be transient. Individual transient wolverines may be disturbed by project activities under both action alternatives. This disturbance is not expected to affect their survival or reproduction because denning habitat would not be affected, adults and advanced juvenile wolverines could easily avoid direct injury (and early juveniles would be in denning habitat which does not occur in the project area) while undulate habitat would be improved. The project would not affect the availability of habitat at the Forest or regional levels. Proposed road decommissioning, storage, and access changes would benefit wolverine survival and persistence in the long term by decreasing open road density, increasing security areas, and increasing habitat effectiveness.

In summary, the proposed action should have little to no direct effect on individual wolverines and little effect on wolverine abundance or persistence because all of the treatment areas would remain suitable habitat for the species.

3. Cumulative Effects

The cumulative effects area for wolverine is the 5,540 acre project area because wolverine use in transient and any incremental effects associated with the action alternative would not be detectable at a scale larger than this. Activities considered for cumulative effects are those that would alter forage and denning habitat. The time frame for cumulative effects is 10 years. This is the estimated time frame for completion of all project activities within the area. There is no other present or foreseeable action in this area that would affect wolverine habitat. There are no other ongoing or proposed activities within the project area.

All alternatives would be consistent with the Forest Plan and applicable direction and regulations to perpetuate or retain suitable wolverine habitat well distributed throughout its range on National Forest System lands.

Western Toad

1. Affected Environment

Western toads are found in a diversity of aquatic and moist terrestrial habitats. They prefer ponds, pools and slow moving streams. There are 2,065 acres of modeled habitat in the analysis area. There are no recent documented sightings of this species, but based on habitat availability, it is likely that low levels of toad use are occurring, although site-specific surveys have not been conducted. Primary risk factors for boreal toads are those that affect breeding habitat through reductions in size and quality of riparian areas. Activities that result in the elimination of key

vegetation and increase water turbidity in turn reduce the quality of riparian areas as breeding habitat.

2. Environmental Consequences – Direct and Indirect Effects

Alternative A: There would be no direct or short-term indirect effects to this species because no activities would occur. Regarding long-term indirect effects, large down wood habitat components would remain available as trees fall from natural causes. Canopy openings created when snags develop and fall allow sunlight to the forest floor. These micro sites may be locally important in otherwise closed canopy forests not preferred by toads.

All Action Alternatives: Habitat losses would be relatively minor, considering that western toads do not primarily occur in upland habitats and there would be little to no loss of riparian habitats under any of the alternatives due to implementation of stream buffers. Individual toads in upland habitats (outside riparian buffers) may be injured or killed by some project activities; however, this risk would only be present in the short-term, during ground-disturbing activities. In the long-term, proposed harvest, thinning and prescribed burning activities would remove vegetative cover, creating warmer and drier exposed soils and reducing the quality of suitable habitat. As vegetation recovered and became re-established over the next several years, suitable upland toad habitat would again become available.

Riparian areas, which represent the highest quality toad habitat, would be protected from harvest activities under all action alternatives through implementation of INFISH buffers. The risk of injury or mortality to toads from project activities within the riparian buffers is low. Proposed road construction would not cross stream channels, so no direct injury to toads should occur. Road reconstruction, storage, and decommissioning and culvert removal and replacement would take place during the dry season to minimize the potential for effects to all riparian species. Some human-created habitats (e.g., puddles in the road surface and wet areas impounded by road fill) could be altered or destroyed by these activities, but the area of impact to habitat would be relatively small. In the long-term, storage and decommissioning of roads in riparian areas would benefit toads by reducing the potential for injury or mortality caused by motor vehicles, and culvert replacement and road drainage work would reduce the potential for stream sedimentation.

In summary, the proposed action may have direct effects on individual toads in upland habitat, but little to no direct effect in preferred riparian and stream habitat because of INFISH buffers; similarly, effects on preferred toad habitat should be minor. As a result, the proposed project should have little effect on western toad abundance or persistence because suitable habitat would continue to remain abundant largely unaffected in areas of preferred habitat.

3. Cumulative Effects

The geographic area of assessing cumulative effects for western toad is the 5,540 acre project area because boreal toad range is relatively small. The timeframe assessed is 20 years because this is typically how long it takes dense shrub and young conifer to re-establish following stand replacing disturbance and toads are associated with moderate to dense undergrowth, slow moving streams and mud bottomed shallow pools. There are no other ongoing or proposed projects in this area. Activities considered include ongoing road and trail maintenance.

Past timber harvest and road construction may have contributed to degradation and loss of western toad habitats. At the same time, road construction created small habitat patches in roadside ditches and other areas of ponded water. More recently, the use of stream buffers has minimized the effects of new activities on toads and their habitat.

Alternative A: Alternative A would have no cumulative effects on the western toad because there would be no direct or indirect effects. Current population trends would remain unaffected.

All Action Alternatives: Short-term, road and trail maintenance could increase risk of toad injury and mortality. In the long term, these activities would contribute to improved watershed conditions. No measurable effects to toad populations at the local or regional scale, or alteration of current population trend, are expected from the cumulative effects of any of the alternatives, based on the limited extent of effects to suitable habitats and protection of the highest quality habitats with stream buffers.

Water Quality

Affected Environment

Geographic Area

The 5,540 acre Middle Bugs project area lies mostly in the approximate 17,500 acre Middle Creek watershed (6th field Hydrologic Unit Code (HUC 6), with a minor portion (310 acres) located in the 21,400 acre Hemlock Creek watershed (HUC 6). The project includes activities in the Upper Middle Creek, Lower Middle Creek, Beaver Dam Creek, Felix Creek, Rocky Ridge Creek, Upper Hemlock and Lower Hemlock Creek subwatersheds (HUC 7). The Larch Creek HUC 7 subwatershed is not analyzed separately since no new activities are proposed there and conditions are incorporated into the Hemlock Creek HUC 6 analysis. Both Middle Creek and Hemlock Creek flow into Weitas Creek in the Upper North Fork Clearwater Subbasin. In the Hemlock Creek watershed, 35 acres of harvest and 264 feet of temporary ridgetop road construction are proposed. Therefore, this analysis focuses on the Middle Creek watershed and subwatersheds which contain over 95% of the project area and proposed activities. The analysis area is the HUC 6 and HUC 7 watersheds and subwatersheds in which project activities are proposed or are located downstream of project activities.

Direct and indirect effects are assessed in the HUC 6 and HUC 7 watersheds and subwatersheds. All proposed harvest and road construction activities are located in the Upper Middle, Beaver Dam, Upper Hemlock and Lower Hemlock Creek subwatersheds with road decommissioning, storage and culvert replacements distributed throughout the project area subwatersheds, including Felix Creek and Rocky Ridge Creek.

Analysis Methodology

In 2011, the project hydrologist reviewed perennial streams, and visited proposed harvest units and adjacent areas to locate and assess the condition of headwater channels, ephemeral swales, springs/seeps, and wet areas. Proposed permanent and temporary road locations were reviewed. All open roads were surveyed for drainage and culvert conditions to develop recommendations for drainage improvements, culvert replacements and road reconditioning. Roads currently closed to motorized traffic were reviewed and appropriate stabilization methods for long-term storage or decommissioning were determined.

Data sources include the Clearwater National Forest GIS Database, Land System Inventory (USDA 1983), Middle Creek Drainage Aquatic Survey Report (Isabella Wildlife Works 1998), StreamStats (USGS 2012), BURP data (IDEQ, 2006), North Fork Clearwater River TMDL (IDEQ, 2003), Forest BMP implementation and effectiveness data (USDA 2002-2009), field surveys and aerial photos. Historic files of past projects, surveys and activities in the project area were also referenced and used to estimate effects. Equivalent Clearcut Area (ECA) calculations, GIS generated reports and the WEPP:Road model (version 2010.100; Elliot et. al. 1999) were used to compare the predicted effects of the alternatives on water quality and quantity.

GIS generated reports, Equivalent Clearcut Area (ECA) calculations, and the WEPP model were used to compare the predicted effects of the alternatives on the related indicators. Calculations for ECA include timber harvest and roads.

Resource Indicators

Water yield and **sediment yield** are the primary influences on stream water quality and quantity characteristics. These issue indicators are used to assess watershed and stream conditions. No activities are proposed that would affect stream temperature so it is not discussed in detail.

1. Water Quantity/Yield

Water yield refers to stream flow quantity and timing and is a function of water, soil, and vegetation interactions. Changes in amount or distribution of vegetation, through natural disturbance (e.g. wildfire) or human-induced disturbance (e.g. timber harvest, road construction) can affect water yield and can result in changes in stream channel conditions if streams flow outside of normal ranges for long durations. The potential risk for channel alteration in 3rd to 5th order drainages increases when peak flow increases are 15 to 20 percent or average annual flows increases are over 10 to 15% (Patten and Jones 2005)(USDA 1974). Predicted changes in water quantity are typically assessed using the Equivalent Clearcut Area (ECA) method.

- The indicator used to assess potential effects on water quantity or yield is the ECA expressed as a percent of a watershed area.

2. Water Quality

Active erosion of the landscape yields sediment to streams and occurs naturally. An excess of sediment diminishes the stream's ability to route sediment out of the system and reduces water quality. Harvest, slash treatment, and road-related activities have the potential to increase sediment production and delivery into streams.

- The indicators used to assess effects on water quality are sediment yield (tons) from road and harvest activities and road density (mi/mi^2).

Current Conditions

1. Watershed Characteristics

The Middle Creek HUC 6 watershed encompasses 17,537 acres with elevations ranging from 3,500 to 5,900 feet. Most of the proposed harvest and road activities are located above 4,500 feet in elevation where precipitation mostly falls as snow in the winter months. The major streams in the basin flow mostly from south to north and have a snowmelt-dominated hydrograph, with low flows typically occurring in October and high flows in May.

Soils are generally deep with granitic parent materials and sandy loam subsoils. Surface soils are typically silts loams dominated by volcanic ash with low bulk densities and high water-holding capacities. Slopes are variable at less than 10% on ridgetops to 60% on the steepest breakland inclusions. Eleven landslides related to roads, one related to a partial-cut harvest and one natural-cause landslide occurred in the Middle Creek watershed in the 1995-1996 rain-on-snow events. Ten of these slides were located in the lower reaches of Upper Middle Creek and the other three were in Rocky Ridge Creek. One recent culvert and road fill failure on Road 103 occurred in winter 2010-2011 in the Rocky Ridge Creek watershed**.**

2. Past Activities

Past activities in the analysis area include timber harvest (1965-1999), wildfire (1910-2008) and road construction (1965-1999) and are summarized below.

Table 3-10. Past activities, Road Density and Existing ECA in Middle Bugs Analysis Area Watersheds

	Watershed Size (acres)	**Past Harvest (acres)**		**Fire Activity** (Acres) (% of watershed area)	**Miles of Road**	**Road density** (mi./mi.^{2})	**ECA** (%)
		Regen.	Interm.				
6th Code (HUC 6) Watershed							
Middle Creek	17,537	1043	215	11,947 (68)	36.6	1.3	3
Hemlock Creek[1]	21,412	1091	160	19,267 (81)	47.9	1.4	2
7th Code (HUC 7) Watersheds							
Upper Middle Creek	4,976	763	80	1,455 (29)	22.6	2.9	6
Lower Middle Creek	5,530	0	0	4,599 (82)	1.7	0.2	1
Beaver Dam Creek	2,117	9	0	1,432 (68)	3.8	1.4	1
Felix Creek	1,835	45	0	1555 (85)	1.4	0.5	2
Rocky Ridge Creek	3,080	215	35	1857 (60)	7.1	1.5	3
Upper Hemlock Creek	7,715	64	1	7451 (97)	7.4	0.6	1
Lower Hemlock Creek	9,908	60	483	8273 (83)	16.3	1.1	2

[1]*includes Larch Creek HUC 7 subwatershed not analyzed separately since no new activities proposed in the subwatershed*

Regen. - Regeneration harvest; Interm. - Intermediate harvest

Past harvest, fire occurrence and roads result in existing ECA of 3% in the Middle Creek HUC 6 watershed. The smaller HUC 7 watersheds have ECAs ranging from 1 to 6 %. The range of ECAs in the analysis area indicate overall high or good watershed condition (0-15% ECA) (NMFS 1996) and are well under the 20-30% threshold generally recognized as the point where water yield is increased beyond acceptable limits (Gerhardt 2000). Given the past large-scale fires disturbances that removed much of the tree canopy in the project area watersheds, most notably the 1911 wildfires, current ECA conditions are within the range of historical variation in canopy openings.

3. Roads

Road construction in the watershed began in 1968, and 37 miles of system road exists in the basin. Approximately 21 miles of road is currently open to motorized traffic with the remaining 16 miles closed to motorized use. Many of the closed roads are overgrown with vegetation and several roads have unstable segments and deteriorating or nonfunctional culverts and drainage ditches.

Total road density (roads open and closed to motorized traffic) in the Middle Creek HUC 6 watershed is 1.3 mi/mi² roads. Road densities in the smaller HUC 7 watersheds range from 0.2 to 2.9 mi/mi². The Matrix of Pathways and Indicators of Watershed Condition (NMFS 1996) suggests watershed condition categories based on road densities. These are not forest plan standards or guidelines, and are only used here for comparative purposes. A watershed with a total road density of less than 1.0 (mi/mi²) is considered in “High” or good condition; road density greater than 3.0 (mi/mi²) is considered “Low” or poor condition; and road density between 1.0 and 3.0 (mi/mi²) is considered “Moderate” or fair condition. All watersheds at the HUC 6 or HUC 7 watershed scale are in the high to moderate condition range using the road density indicator.

4. Existing Stream Conditions

In the Middle Creek watershed and subwatersheds, most streams are considered stable by channel type and by measured stability parameters. Streams are generally 3-8% gradient with mostly cobble-dominated channel bottoms (Isabella Wildlife Works, 1998) and the ability to transport fine sediments. Adjacent to and within harvest units, especially units C and E, many small perennial first order streams originate from forest or meadow springs and seeps to form shallow channels. The channels are moderately steep at 3-8% and have predominately gravel stream bottoms, mostly-vegetated banks, slight entrenchment, and intermittent access to the floodplains. These headwater channels found across the project area are considered stable.

Field measurements of channel and bank stability documented that 74% of the entire length of Middle Creek had good to fair channel stability ratings (Pfankuch 1975, Rosgen 1996) with 90% of the total bank length rated as stable (Isabella Wildlife Works, 1998). The entire length of Beaver Dam Creek is considered to have good to fair channel stability and 94% of streambank length was rated as stable. Survey data from 1997 for Rocky Ridge Creek documented poor stream channel stability and lower bank stability than other streams in the analysis area. Three 1995-1996 landslides originating from Road 103 occurred in Rocky Ridge watershed may have contributed to the instability observed in Rocky Ridge Creek.

Minimal activity that would have adversely affected stream channels has occurred in the Middle Creek watershed since it was surveyed in 1997, and is mostly limited to road maintenance and recreational use. Surveys from 1997 were performed after the 1995-1996 rain-on-snow events thus findings reflect the influence of those events on stream channels. No known major channel-influencing events have occurred since 1996 in the watershed except for the recent 2010-2011 Road 103 culvert and fill failure that delivered sediment to Rocky Ridge Creek. The 2006 BURP data for cobble embeddedness at two sites in Middle Creek are consistent with the findings from the 1997 results (IDEQ 2010a).

Current measured sediment data in the analysis area streams is not available, yet previous data suggest that sediment conditions in Middle Creek and its tributaries are meeting water quality criteria and desired conditions for these waterbodies and that sediment is being sufficiently routed through the stream system. Existing evaluations of sediment loading in Hemlock Creek are limited to the determination that Hemlock Creek did not have any sediment loading above natural (USDA 1997). Idaho DEQ reviewed sediment conditions in Middle Creek in 2003 and determined that Middle Creek meets the Idaho water quality standards for sediment and the stream is not threatened by the erosion taking place in the watershed. Idaho DEQ also concluded that salmonid spawning is not impaired by sediment in Middle Creek (IDEQ 2003). Cobble embeddedness data from 1997 and 2006 for Middle Creek ranged from 18 to 23%, below the desired condition of 35-40% (Isabella Wildlife Works, 1998, IDEQ 2010a, Jones and Murphy 1997). Sediment modeling results from 1997 determined Middle Creek was at 17% over background sediment loading (USDA 1997), which was well below the maximum allowable 150% increase over natural sediment loading criteria for this stream listed in the Forest Plan. All project area streams meet forest plan desired conditions; therefore, the stipulation agreement does not apply. Implementation of design criteria, INFISH buffers and BMPs minimize the risk for sediment input into streams.

Environmental Consequences

Direct and Indirect Effects

1. Alternative A

In the no action alternative, harvest activities, road construction, reconditioning, reconstruction, decommissioning, long-term storage or culvert replacement would not occur. There would be no increase in ECA. Vegetation would continue grow in areas previously harvested or burned and canopy and evapotranspiration processes that influence water yield would continue to recover. Road densities would continue to range from 0.2 to 2.9 mi/mi² and in high (good) to moderate (fair) condition using the road density indicator (NMFS 1996). Surface drainage problems on Roads 555 and 103 would continue to present an erosion and sedimentation risk.

Road drainage systems would continue to alter hillslope hydrology which would perpetuate the elevated risk of stream instability in some stream types. Mass failure (landslide) risk associated with unstable roads and improperly sized or poor condition culverts would continue to present risks to channel integrity, water quality and aquatic organisms. Bare cut and fill slopes and compacted road surfaces currently in a poorly vegetated condition would continue to have impaired water infiltration capacity and continue be a risk of concentrated water flow, surface erosion and sediment delivery to streams.

In the longer-term, it is expected that beetle infestations in the stands proposed for harvest would continue to occur and would result in tree mortality and an increased risk of wildfire in the watersheds where harvest activities are proposed. It is difficult to quantify the temporal or spatial extent of openings created from future tree mortality from insects, disease and wildfire, but it is reasonable to expect these disturbances would result in vegetation changes and ECAs similar to those observed under historic conditions with water yield and channel responses within the natural range of variability. Tree mortality from disease could increase the risk of wildfire and post-wildfire erosion in the watersheds where harvest activities are proposed. Post-fire erosion followed by sediment delivery to streams can be high, depending on the severity and intensity of burn, site characteristics and climatic conditions (Larson et al.2009, Moody and Martin 2009).

2. Alternatives B and C

Water Yield and ECA: Alternatives B and C would produce the same post-project ECA from harvest activities, which are the primary activities that increase ECA in this project. Due to the small increases in ECA, low cumulative ECAs and stable streams in the project area, increases in water yield and peak flows are expected to be within acceptable limits and not result in adverse effects on stream channels or downstream road infrastructure (i.e. culverts). Post-project ECAs in the analysis area would remain in the range of ECAs associated with overall high or good watershed condition (0-15% ECA) (NMFS 1996) and well under the 20-30% threshold generally recognized as the point where water yield can be increased beyond acceptable limits (Gerhardt 2000).

The proposed activities assessed for ECA include regeneration harvest, commercial thinning, temporary road construction and permanent road construction. Each of these activities has been listed in acres affected by alternative, summed with existing ECA (%) and displayed as a percent of the watershed area (Table 3-11).

Table 3-11. ECA and Related Activities in Middle Bugs Analysis Area Watersheds

	Proposed Harvest (Acres)		Temp. Rd. (Acres)	Perm. Rd. (Acres)	Existing ECA (%)	Post-Project ECA[1] (%)
	Regen.	Comm. Thin				
6th Code (HUC 6) Watersheds						
Middle Cr. (Alt. B)	617	45	13	6	3	6
Middle Cr. (Alt. C)	617	45	15	0	3	6
Hemlock Cr. * (Alt B and C)	24	16	0.05	0	2*	2
7th Code (HUC 7) Watersheds						
Upper Middle Cr. (Alts. B, C)	407	45	6	0	6	13
Lower Middle Cr. (Alts. B, C)	0	0	0	0	1	1
Beaver Dam Cr. (Alt. B)	210	0	7	6	1	9
Beaver Dam Cr. (Alt. C)	210	0	9	0	1	9
Felix Cr. (Alts. B, C)	0	0	0	0	2	2
Rocky Ridge Cr. (Alts. B, C)	0	0	0	0	3	3
Upper Hemlock Cr. (Alts. B, C)	24	0	0.05	0	1	1
Lower Hemlock Cr. (Alts. B, C)	0	16	0	0	2	2

**includes Larch Creek HUC 7 subwatershed not analyzed separately since no new activities proposed in the subwatershed*
[1]: includes adjustment to incorporate ECA accounted for in the regeneration harvest ECA calculation

Middle Creek and Beaver Dam Creek could experience potential increases in flow from proposed activities. Both streams have stable channels and banks and the ability to accommodate potential flow increases; therefore, any potential increases in water yield or peak flows from project activities are expected to be within the natural range of variability in these watersheds. The extent of vegetation removal proposed in this project is not expected to produce increases in canopy openings or streamflows that would exceed those that resulted from past natural disturbances.

Road decommissioning and storage activities would support recovery of hydrologic properties and natural flow networks, volumes and rates currently altered by roads. Decompaction and recontouring of road surfaces would encourage water infiltration into soil, decrease rapid concentrated surface flow to channels and restore slower subsurface flow currently intercepted by road cutslopes. Compacted surfaces and cut and fill slopes with limited vegetation would be decompacted to facilitate growth of native plants and trees which would aid in recovery of evapotranspiration and canopy-interception processes. Road reconditioning would have small, but beneficial indirect effects on water flow as improved drainage of roads would decrease and disperse concentrated flows away from stream channels.

Road Density: In Alternative B, road density in Beaver Dam Creek would increase from 1.4 to 1.8 mile/mile² due to the construction of 2.1 miles of new permanent road and the absence of road decommissioning in this watershed. There would be no increase in road density in Alternative C because no new permanent road construction is proposed.

In both Alternatives B and C, all watersheds would remain in the high (good) to moderate (fair) condition using the road density indicator (NOAA 1998). In both Alternatives B and C, road decommissioning would slightly decrease road densities from 2.9 to 2.6 mile/mile² in Upper Middle Creek and from 1.5 to 1.4 mile/mile² in Rocky Ridge Creek.

At the Middle Creek HUC 6 scale, road density would not change in Alternative B, but would decrease from 1.3 mile/mile² to 1.2 mile/mile² in Alternative C.

Proposed permanent road construction and road decommissioning are assessed by the road density indicator. These are considered permanent changes to the Forest road system. Although the stabilization and rehabilitation techniques used for long-term road storage would provide notable improvements to watershed conditions very similar to those expected from full-obliteration road decommissioning (removal of drainage structures, restoration of stream crossings, decompaction and partial recontouring of road surfaces, revegetation), these improvements are temporary for long-term storage roads, which remain on the Forest transportation system and would likely be reconstructed and used again in the future. Temporary roads are not included in this road density assessment since they would have short-term effects, would be fully obliterated after use and are not considered permanent additions to the Forest road system.

The new permanent road construction proposed in Alternative B would have negligible effects on hillslope hydrology and water quality because it would be located in an upper hillslope and ridgetop location, would not cross any water and would be placed into a hydrologically-stable condition following use long-term storage techniques (decompaction, recontouring, revegetation).

Table 3-12. Road Densities

Watershed Level	Watershed Name	Alt A Current Road Density (mi./mi.^{2})	Alt B Road Density (mi./mi.^{2})	Alt C Road Density (mi./mi.^{2})
HUC 6	Middle Creek	1.3	1.3	1.2
HUC 6	Hemlock Creek	1.4	1.4	1.4
HUC 7	Upper Middle Creek	2.9	2.6	2.6
HUC 7	Lower Middle Creek	0.2	0.2	0.2
HUC 7	Beaver Dam Creek	1.4	1.8	1.4
HUC 7	Felix Creek	0.5	0.5	0.5
HUC 7	Rocky Ridge Creek	1.5	1.4	1.4
HUC 7	Upper Hemlock Creek	0.6	0.6	0.6
HUC 7	Lower Hemlock Creek	1.1	1.1	1.1

Sediment Yield from Permanent and Temporary Road Construction : The WEPP:Road model estimated higher annual road erosion rates for Alternative B (7.8 tons/year) compared to Alternative C (6.3 tons/year) due to permanent road construction in Alternative B. The WEPP model predicted the amount of sediment to leave buffers and enter streams was 0.24 and 0.17 tons/year for Alternatives B and C, respectively. No measureable increase in sediment delivery to streams from proposed permanent or temporary roads is expected for Alternative B or C.

The proposed location and design of the new permanent road and application of construction and maintenance BMPs indicate a low potential to deliver sediment to streams. Following use, the road would be stored in a hydrologically stable, maintenance-free condition which would further minimize the potential for sediment delivery.

Temporary roads would be constructed to access units C, D and E. Temporary roads generate the most erosion when they are first constructed and it is expected to decrease rapidly over time (Megahan and King 2005). It is expected that these roads would stabilize two years after decommissioning occurs. Forest monitoring has observed the trend for decreased erosion on decommissioned and stored roads over time as vegetation reestablishes (USDA 1999-2009).

The effects from temporary roads would be short term (0 to 5 years), since they would be built, used and decommissioned in a one to three year time period; are located on low gradient, dry ridges or upper slopes and are away from water with no stream crossings. Given these

conditions, the WEPP:Road model (Elliott et al. 1999) predicted approximately 6 to 8 tons of erosion being generated from the temporary roads. Although the model predicts erosion and some very minor delivery, the results are not absolutes. The potential for sediment delivery to streams is low based on field review of temporary and permanent road locations which supports the conclusion that the proposed temporary roads in both Alternatives B and C have a very low potential to deliver sediment to streams.

Project design features for temporary roads would minimize the erosion produced over the short life of these roads. For example the temporary road would be closed to public motorized use during project activities, reducing the chance of increased erosion produced when vehicles drive on wet roads and rut surfaces

The modeled estimates are used here to assess the potential for erosion and sediment delivery from roads and to compare alternatives. The modeled estimates indicate a very low potential for sediment delivery to streams for either alternative, consistent with the conclusions from literature, landtype ratings, field observations and monitoring results. Past BMP monitoring has shown that BMPs to prevent sediment delivery from roads constructed or used for timber harvest activities have high implementation and effectiveness rates, averaging 99% from 1990-2009 (USDA 1990-2009).

Table 3-13. WEPP:Road model estimates for Proposed Permanent and Temporary Roads

Road	Road Length (miles)		Road Prism Erosion (tons/year)		Sediment Delivery Through Buffer (tons/year)	
	Alt. B	**Alt. C**	**Alt. B**	**Alt. C**	**Alt. B**	**Alt. C**
Permanent Road Unit C	2.1	0	3.2	0.0	0.09	0.0
Temporary Road Unit C	3.4	4.7	3.9	5.6	0.04	0.06
Temporary Road Unit D	0.1	0.1	0.1	0.1	0.0	0.0
Temporary Road Unit E	0.4	0.4	0.6	0.6	0.11	0.11
Totals			**7.8**	**6.3**	**0.24**	**0.17**

** WEPP:Road results version 2011.03.25 based on WEPP VERSION 2010.100. Model inputs include: Climate simulation of 30 years; precipitation of 66 inches; 14 ft. rd. width; 5-12% gradient; silt loam soil; native road surface; outsloped, unrutted design.*

Sediment Yield from Timber Harvest and Site Preparation: The implementation of timber harvest and site-preparation design criteria and BMPs would minimize soil disturbance, exposure and erosion in the harvest units. Transport of eroded sediments from the units to streams would be controlled by vegetation, ground cover, surface roughness, and downed debris in INFISH buffers. No measureable increase in sediment delivery to streams from timber harvest and site preparation activities is expected for Alternative B or C.

Sediment can originate from ground-disturbing activities that remove ground cover and expose and/or compact the soil (skidding, yarding, site-preparation, prescribed burning), yet erosion and sediment delivery from these activities are generally minimal due to practices used to minimize surface disturbance, control erosion and trap use of vegetated buffers (Megahan and King 2004; Belt et al. 1992).

In Alternative B within regeneration harvest units, a prescribed burn would be used to prepare the units for planting. In proposed harvest units, the expected low-severity mosaic burn would retain adequate ground cover, root mats, live grasses, survivor shrubs and trees and woody debris to protect the soil from erosion and vegetated buffers would prevent movement of potentially eroded sediment to streams.

In Alternative C, mechanical site preparation would be accomplished using a tracked mounted machine (i.e. excavator) to pile slash and brush followed by burning or to create plantable spots approximately 3 feet in diameter through the use of a mulching head. The machine would be used on the tractorable ground that is less than 35% slope, but it may be used on up to 45% slopes as long as soil disturbance is minimal (machine shall travel up and down the slope without midslope turns). Detrimental soil impacts and erosion potential would be minimized by using skid trails as travel routes where possible. Site-preparation would remove ground cover, root mats and woody debris in small, localized sites separated by undisturbed areas. The exposed soil at these mulched or burned sites would have increased erosion potential from increased rain-drop splash and from areas of hydrophobicity if piles burn at a high intensity. This increased erosion potential is anticipated to be limited to these small scattered sites where bare areas are expected to be small, rough and discontinuous. The undisturbed areas between the prepped sites would serves as buffers that would limit the transport of eroded soils or concentrated flows between these prepped sites. Additional vegetated buffers around riparian areas and unit boundaries would sufficiently prevent delivery of eroded sediments to streams.

Implementation of project design features and adherence to BMPs would reduce the potential for erosion in harvest units and prevent channelized flow from originating in the harvest units. As ground cover reestablishes in disturbed areas (0 to 3 years), hillslope erosion potential in harvested areas would also diminish. In harvested areas where erosion does occur, topography, retained woody material, and INFISH buffers would capture and store eroded material before reaching stream channels.

Vegetated buffer strips located between ground-disturbing activities and streams have been shown to be highly effective at preventing sediment delivery to streams in numerous different locations and conditions (Belt et al. 1992, Megahan and King 2005). Since 1994, BMPs used on the Forest have averaged 99% implementation and effectiveness rates for preventing harvest-related sediment delivery to streams through soil and stream protection measures and the proper design, location and maintenance of skid trails, yarding corridors and landings (USDA 1990-2009)

Through design and mitigation, project activities should maintain or improve water quality and would not increase bacteria, nutrients, oil and grease, inorganics, or temperature in streams. Proposed project activities are expected to produce no measureable increase in sediment delivered to streams.

Effects of Other Activities Common to Both Action Alternatives B and C: Proposed pre-commercial thinning, road reconstruction, road reconditioning, road maintenance, culvert replacement and road decommissioning activities are the same for Alternatives B and C. Minor short-duration sediment increases may be observed during road-related activities, but these activities would provide a net benefit to water quality and flow by improving existing road drainage and restoring hydrologic function through road decommissioning or storage activities.

Pre-commercial Thinning: Pre-commercial thinning activities do not include any ground-disturbing activities or alteration of forest canopy cover, thus would not increase erosion, sediment delivery potential or runoff.

Road Reconstruction: Surface graveling has been shown to be effective at reducing erosion from road surfaces, especially at road/stream crossings. Studies have found gravel reduces sediment by 70-79 percent (Burroughs and King 1989). Although the reconstruction activities are designed to reduce sediment input over the long-term, there is the potential for a minor increase in sediment production in the short term during reconstruction activities, particularly culvert replacements (one year).

Road Reconditioning: These activities would improve road surface drainage and are expected to decrease the potential for sediment delivery from roads.

Road Maintenance: All roads used for harvest activities and haul would be maintained to minimize erosion, prevent sediment delivery to streams and provide proper drainage through surface blading, installation of drainage dips, and ditch and culvert maintenance.

Culvert Replacements: Culvert replacements are expected to produce minor and short-term increases in sediment and turbidity at and immediately downstream from activities. Sediment increases could be measureable in the short-term (12-24 hours) immediately after and immediately downstream from culvert replacement (100-300 feet), but effects would be very localized and minor compared to the potential sediment inputs that could result from culvert failure. Overall net beneficial effects to streams and sediment conditions would occur with culvert replacement activities and no measureable increase in sediment is expected.

Road Decommissioning and Long-term Storage: These activities may produce short-term (0 to 3 years) and localized sediment increases, but would produce both immediate and long-term beneficial effects through reductions in sediment sources, reduced culvert and fill failure risk and restored hillslope water flow processes. Design features, mitigation measures and BMPs would minimize sediment delivery to stream channels, and no measureable increase in sediment is expected from these activities.

Cumulative Effects

Geographic Boundary: The cumulative effects area is the Middle Creek and Hemlock Creek HUC 6 watersheds which encompasses the entire project area. An area larger than this would dilute effects to an immeasurable scale. The extent of cumulative watershed effects is dependent on the scale of the watershed. The magnitude of changes in water and sediment yield is inversely proportional to stream order (MacDonald 1989), so detectable changes are expected at smaller scales. The cumulative effects analysis focuses on the Middle Creek watershed which contains 95% of the project area and proposed activities. Because only 35 acres of harvest and 264 feet of temporary road construction are proposed on ridgetops and away from water in the Hemlock Creek watershed and would not produce any measurable effect to watershed resources, cumulative effects for this watershed are not discussed further. All land in the cumulative effects analysis area is Forest ownership.

Time Frame: The temporal scope for effects is from implementation (estimated 2015) to 2059. The beginning of scope is based on when harvest and road construction activities in the watershed first began. Evidence from past harvest events is still noticeable on the landscape in the form of old skid trails and landings, the current road system and the mixed canopy stages on previously harvested areas. The scope continues to year 2059, which is approximately 45 years after project implementation and the amount of time estimated for hydrologic effects from vegetation removal to fully recover.

Past, Present, and Foreseeable Future Actions: Harvest and associated road building activities have occurred throughout much of the Middle Creek and Hemlock Creek drainage. Early timber sales conducted between the mid-1960s and late 1980s resulted in widespread and persistent impacts because they involved new road construction, little to no tree retention in regeneration harvest areas, and riparian harvest. Some roads were constructed in unstable locations. These activities caused increased stream sedimentation, reduced woody material recruitment; increased water temperature caused by harvest in riparian areas and increased water yields due to clearcuts that removed most of the canopy from some smaller subwatersheds. Culvert and road fill failures have occurred and have contributed sediment to streams. Many culverts installed in the 1960s are still in place and in a deteriorated condition or undersized by modern standards.

Forest practices have changed over the last two decades. Project design measures, BMPs, and Forest Plan guidelines reduce ground-disturbing activities, compaction, erosion and sediment delivery. Common practices now include operating during dry conditions, implementing INFISH buffers, retaining trees in regeneration harvest units and limiting ground-based yarding to slopes less than 35 percent. Wildfires have burned in the watershed but effects of fire and canopy openings on sediment and water yields have diminished with regrowth and soil and channel stabilization. Currently, ECAs are below recognized limits where adverse increases in stream flow are possible, current sediment conditions are considered within Forest Plan standards, stream channels and banks across the Middle Creek watershed are considered stable.

Present and future actions include recreation use, fire suppression, road maintenance and prescribed burning. Recreational activities produce little to no measurable impacts to water quality or quantity or floodplain/wetland functions. Most effects from recreation are primarily due to associated road use, especially during wet conditions. Fire suppression activities are infrequent and limited in size, and road maintenance has minimal short-term effects and long-term benefits (Burroughs and King 1989). Because recreation use, fire suppression, and road maintenance have no measurable effect on sediment yield, ECA, or road density, they are not included in the cumulative effects analysis.

The ongoing Weitas Fuels prescribed burning project area includes 1,249 acres of prescribed burning in the Middle Creek (HUC 6) watershed and project activities are expected to be completed in 2013. Sediment delivery to streams and increases in water yield were expected to be minor and negligible due to the design features and mitigation measures implemented with the prescribed burn activities (un-burned riparian buffers along streams, mosaic burn pattern, retention of duff layers, dominantly low to moderate burn severity, and the timing of ignition of the units (USDA 2003). There are no other proposed activities in the cumulative effects area.

Water Yield, Sediment Yield and Road Densities: No stream channel alteration is expected from the Middle Bugs project based on results from the ECA analysis and implementation of project design measures. There would be no direct effect or indirect effects, therefore there would be no cumulative effects to water yield based in ECA. Direct and indirect effects of both alternatives are expected to produce no measureable increase in sediment delivered to streams, thus there would be no cumulative effects to sediment yield. In the cumulative effects area, road densities would remain the same or decrease with the Middle Bugs Project. All watersheds would remain in the high (good) to moderate (fair) condition using the road density indicator (NOAA 1998). There are no other past, present of reasonably foreseeable actions that would impact road densities; therefore, there would be no cumulative impacts.

There are no effects to watershed resources in the Middle Creek and Hemlock Creek HUC 6 watershed level from this project that would be considered fully irreversible or irretrievable. Applicable Forest Plan water quality standards found in the Clearwater National Forest Plan on pages II-27 through II-29 (USDA 1987) that apply to this project would be met.

Fisheries

Affected Environment

The project area is mostly located in the 17,500 acre Middle Creek subwatershed with a minor portion (310 acres) in the 21,400 acre Hemlock subwatershed. These two subwatersheds (HUC 6) were analyzed for direct, indirect and cumulative impacts to fisheries because they include all proposed activities and are of a size to accurately measure effects to aquatic resources. A larger area would dilute any effects to immeasurable levels. These two subwatershed lie within the 140,000 acre Weitas Creek watershed of the Upper North Fork Clearwater River Subbasin.

Analysis Methodology

Habitat surveys were completed in the project area (Clearwater BioStudies 1992, Isabella Wildlife Works 1998) and at many other sites in the Weitas Creek watershed. Suitable habitats and access to the project area were determined based on the physical presence of each fish species. Additional fish distribution information was found at the Idaho Conservation Data Center (ICDC, now IFWIS, IDFG 2011). PACFISH/INFISH monitoring and Idaho Department of Environmental Quality BURP monitoring has also been conducted in the area.

The fisheries biologist field reviewed project area streams during the 2011 field season. GIS analysis of distances between project activities and fishbearing streams, Forest monitoring observations and BMPs were used to determine potential effects to species from project activities.

Resource Indicators

Management activities can affect threatened, sensitive, or management indicator fish species through reduction in habitat quality (primarily increases in instream sediment) or through direct mortality where stream crossings are replaced or removed and fish are present.

Issue Indicator: Determination of effects for all aquatic management indicator and threatened, endangered and sensitive species that may occur in the analysis area.

Current Conditions

This section describes the baseline condition and likely effects of action alternatives on the aquatic habitat attributes of the project area which are specifically related to consistency and compliance with the Clearwater Forest Plan (CNF 1987) and its amendments and other Federal laws. The specific attributes analyzed in this section are 1) CNF management indicator species; 2) ESA listed species, and 3) Forest Service Region 1 sensitive species.

Westslope cutthroat trout, redband trout, Western pearlshell mussel and bull trout are the only aquatic species with special status likely to occur in the project area and are the only ones included in this analysis. Bull trout are listed as threatened under ESA and are a CNF management indicator species. Westslope cutthroat trout are a Forest Service sensitive and CNF MIS species. Redband trout and Western pearlshell mussels are both considered Forest Service Sensitive species.

Westslope cutthroat trout: Cutthroat trout require cold water and relatively low levels of fine sediment to breed and survive (McIntyre and Rieman 1995), so the presence of individuals of the species, especially juveniles, indicates relatively high water quality.

Westslope cutthroat trout have been the only special status fish species found in the project area (CBS 1992, IWW 1998). They were observed in Middle Creek, Rocky Ridge Creek, Felix Creek, Beaver Dam Creek, and an unnamed tributary of Beaver Dam Creek. Clearwater National Forest, PACFISH/INFISH Biological Opinion (PIBO) and IDEQ Beneficial Use Reconnaissance Program (BURP) monitoring shows that the habitat quality is relatively good and more than adequate to support substantial WCT populations. The Idaho Department of Environmental Quality (IDEQ) also found westslope cutthroat trout downstream in Middle Creek.

Redband trout: Redband trout were found downstream of the project area in the main stem of Middle Creek and in Hemlock Creek (CBS 1992, IWW 1998). Given that the surveys on Middle Creek were conducted nearly 15 years ago and not comprehensive, it is certainly possible that individual redbands exist in Middle Creek or one of its tributaries within the project area. Redband trout have similar habitat requirements to westslope cutthroat trout.

Western pearlshell mussel: Surveys have not been completed in the Weitas Creek watershed for this species and no individuals have been documented in the project area or watershed. Populations have been observed in the adjacent Lolo Creek watershed, which lies only a few miles southwest of the project area. Suitable habitat for the species is not expected to occur in the project area due to moderate to high stream gradients. There is no suitable habitat for this species near the culvert removal or replacement sites.

Bull trout: Bull trout are the only ESA listed aquatic species that may occur in or near the project area (www.fws.gov/idaho/species/IdahoSpeciesList.pdf.)

Bull trout have not been observed in the project area or in the streams that immediately drain it, but are present downstream in Weitas Creek. The USFWS has designated critical habitat for the species in Weitas Creek (75 FR 63898, Figure 3). Bull trout are mostly migratory in behavior and can sometimes be found in streams which do not presently support breeding populations. It is possible that one or more bull trout would exist in project area streams during project implementation.

Environmental Consequences

Direct and Indirect Effects

1. **Alternative A**

There would be no harvest, road obliteration, culvert replacement or removal and road reconstruction and reconditioning under the No Action Alternative. There would be no direct or short-term indirect effects on westslope cutthroat trout, redband trout, western pearlshell mussel or bull trout because no treatments would be conducted. Any watershed improvement activities (culvert replacements, road obliteration) would require additional NEPA analysis prior to implementation. In the long term, aquatic habitat in the analysis area would vary over time in quality depending primarily on hydrologic and riparian vegetative conditions, but upland conditions and human activities could also have some effects.

There would be no predictable change, positive or negative, from the existing aquatic habitat condition with the No Action Alternative. Instream and riparian processes of habitat development would continue on their current trajectory, and previously disturbed areas would continue to improve as trees grow and age, providing shade and large woody debris recruitment. Fires, windstorms, and large-scale insect/disease outbreaks have some potential to kill large swaths of upland trees in the subject subwatersheds, which could affect water yield and channel morphology, as could conditions conducive to mass soil movement. Existing features such as riparian roads or stream crossings that are currently or potentially contributing sediment to streams upon failure would remain in place. Fish passage would not be restored at stream crossings where barriers exist.

There are increased risks of sediment input to streams from road surfaces and road fill failures at stream crossings over time as the culverts age and reach or exceed their life expectancy. We can expect some of these road crossings and fills to fail in the future, although we cannot accurately estimate when, where, or how much sediment would be delivered. Fill failures can lead to increased sediment in fish spawning and rearing areas, reduced egg survival and a reduction in winter rearing habitat (Meehan, 1991).

The No Action Alternative does not meet the intent of INFISH (USDA S and USDI BLM 1995) as well as the action alternatives because it does not propose any activities that could reduce sediment delivery.

2. Alternatives B and C

Under Alternatives B and C, potential effects would be similar for all aquatic species and habitats considered. No timber harvest would occur within INFISH stream buffers. The only activities proposed within these buffers are culvert replacement, road reconditioning and road decommissioning which are expected to reduce sedimentation and have long term beneficial effects to aquatic habitats.

Timber Harvest: Since 1995, all management activities in the Upper North Fork Subbasin have implemented INFISH buffers and Best Management Practices in order to eliminate or reduce impacts to riparian areas and streams. The implementation of timber harvest and site-preparation design criteria and BMPs would minimize soil disturbance, exposure and erosion in the harvest units. The implementation of buffers, and the design and location of project activities would minimize potential effects to stream shading from trees, stream temperature, large woody debris recruitment, and fine sediment transmission. There would be no measurable changes to stream temperature from project activities. Transport of eroded sediments from the units to streams would be controlled by vegetation, ground cover, surface roughness, and downed debris in the buffers.

Past monitoring from 1990-2009 (USDA 1990-2009) has shown that BMPs used to prevent sediment delivery from roads constructed or used for timber harvest activities have high implementation and effectiveness rates, averaging 99%.

The implementation of INFISH buffers would protect aquatic species and habitats from potential impacts of proposed regeneration harvest, commercial thinning, and precommercial thinning activities (including yarding and post-harvest fuels reduction) under all action alternatives. The risk of direct injury or mortality to fish from vegetation management-related project activities would be non-existent. The RHCAs would act as “filter strips” to reduce or eliminate sediment transmission to streams from harvest units (Snyder 2012). See the Hydrology Section for a discussion of water quality and sediment production.

Culvert Replacement, Road Reconditioning and Road Decommissioning: Project road-related activities, such as culvert installation and removal during road reconstruction, storage, and decommissioning, would take place within stream channels, and would have some potential to cause direct injury or mortality to aquatic species.

Potential impacts to aquatic and riparian species and habitats from road-related activities within stream buffers would be minimized and mitigated through design features described in Chapter 2 and Best Management Practices (Appendix C). BMPs and design features would also reduce the potential for or minimize soil disturbance and sediment transmission to stream channels associated with road-related activities. Nearly all of the instream work proposed would occur in low-order, non-fishbearing streams, where direct mortality to fish or mussels could not occur.

Up to three proposed culvert replacements on Road 103 and equipment fording of Middle Creek at the Road 3100 crossing could potentially kill or injure aquatic individuals during project implementation. The remaining 39 culverts proposed to be removed/replaced would be on non-fishbearing tributaries, where sediment transmission and ensuing temporary high turbidity would likely be diluted prior to reaching fishbearing streams (CNF 2009). Proposed road storage and decommissioning and culvert replacements in riparian areas should provide long term benefits by reducing the potential for culvert or fillslope failure.

Three existing culverts on the Middle Creek unnamed tributaries may pose upstream barriers to aquatic passage. Both action alternatives would remove culverts on the roads to be decommissioned or stored; undersized culverts would be replaced on Road 103 and 555. No

culverts would be replaced on the one mile of road proposed for reconstruction. None of the proposed temporary or permanent new road construction would cross stream channels.

Implementation of BMPs would minimize sediment inputs to streams during instream and riparian work. BMPs include dewatering of the site during crossing culvert manipulation and the placement of sediment catching devices (straw bales, brush dams, settling basins) around the work area and in the stream channel.

Culvert removal and/or replacement activities would contribute to short-term increases in stream sediment and turbidity levels. This is caused by the disturbance of existing instream and road fill sediments during excavation, fill, channel recontouring, and rewatering activities. Forest monitoring has shown that peak sediment input occurs when culverts are removed and immediately after the water is released back in the stream. This is followed by a decrease in sediment transport and turbidity within several hours. Typically visible effects are only seen within 300 feet of the site due to small stream size and the low flow during the dry season when work would occur. Minor short-term sediment input is expected to occur over a short time frame (1 to 5 days per site) as the channel adjusts. Subsequent rain and snowmelt events through the following one or two springs are expected to cause short-term increases in sediment and turbidity at the crossing as vegetation reestablishes and stream channels stabilize.

In summary, culvert replacement, road storage and decommissioning activities in riparian areas should benefit aquatic habitats by reducing the potential for sedimentation and culvert fill failure. Since no measurable/detectable sediment would be produced by harvest and proposed road construction has a low potential for sediment delivery to streams, sediment yield from the project activities should be minimal and non-measurable (see Hydrology section).

Potential impacts to individual aquatic species or their habitats in the project area from all project activities are temporary and localized. There should be no direct and little to no indirect effects to aquatic species from vegetation treatments due to design features and RHCA buffers. There should be no long-term effect at the population scale. Road related activities would provide long term improvements to watershed conditions and aquatic habitats.

Based on the above, direct effects to individual westslope cutthroat trout should be unlikely or greatly limited in spatial and temporal scope. Given that the westslope cutthroat trout population of the project area is substantial (CBS 1992, IWW 1998) and the reproduction potential of the species is high, the implementation of action Alternatives B or C should have no detectable impact on the size or persistence of the population. The project therefore “may impact individuals but would not lead to their listing under ESA”.

Potential effects to redband trout would be similar to those of westslope cutthroat trout. Redband trout occur downstream from the project area boundary. Any effects from project activities would be only a fraction of those sustained by westslope cutthroat trout. Potential effects on redband trout individuals, populations, or habitat would likely be low to non-existent. The project therefore “may impact individuals but would not lead to their listing under ESA”.

Bull trout and their designated critical habitat occur downstream from the project area, and individuals could migrate in and out of the area. The potential effects to bull trout are the same as those noted for westslope cutthroat and redband trout. There is a slight risk that individuals may be affected by project activities. The project, therefore, has a “may effect, not likely to adversely affect” ESA determination for bull trout and its critical habitat.

There would be no effects to pearlshell mussels or their habitat from timber harvest activities due to INFISH buffer retention. Potential effects to mussels from road/culvert work could be similar to those of westslope cutthroat trout. Effects to mussels or their habitat are expected to be minimal due to the implementation of BMPs during culvert work. Individual mussels could be

directly harmed by instream work or their habitat could be affected through sediment transmission. BMPs would minimize sediment input to streams. The project therefore "may impact individuals but would not lead to their listing under ESA".

Cumulative Effects

Geographic Boundary: The cumulative effects analysis area consists of the 40,000 acre combined Middle and Hemlock Creek subwatersheds. This area is large enough to accurately reflect effects of past, present and proposed activities to fish and their habitats. An area larger than this would dilute sediment effects to an immeasurable level (see Hydrology section). All land in the cumulative effects analysis area is Forest ownership.

Time Frame: The time frame for cumulative effects is five years from project implementation. This represents the time it would take for vegetation to sufficiently establish and minimize surface erosion from soil disturbed by the timber harvest, road construction, culvert replacement and decommissioning and storage activities.

Past, Present and Foreseeable Future Actions: Past and ongoing activities considered in this analysis are timber harvest, wildfire, recreational use, and livestock grazing as these activities can potentially impact aquatic species and their habitats.

Past human activities and fire history in the project area have been summarized in Appendix D. Past timber harvest has occurred on less than 7% of the combined Middle and Hemlock subwatersheds. Since most of it was regeneration harvest and occurred before 1995 when INFISH buffers were implemented, these activities may have caused a reduction of riparian habitats and increased ECA.

Wildfires since 1910 have burned 68% of the Middle Creek watershed area. The fires of 1919 burned most of the areas in the Upper Middle Creek and Beaver Dam Creek where proposed harvest and road construction activities are concentrated. These large scale fire disturbances removed much of the tree canopy in the watersheds. Some fires caused loss of stream shading resulting in increased water temperatures and sediment in stream channel and reduced fish habitat. Wildfires also increased instream wood levels. Since 1919, fire suppression efforts have limited fire starts to 20, with less than 25 acres affected. Because of their limited size, these fires have had immeasurable effects to stream shading, water temperatures or sediment in the cumulative effects area.

A small portion of the ongoing Weitas Fuels project remains to be completed in the cumulative effects area. Sediment delivery to streams and increases in water yield are expected to be minor and negligible due to the design features and mitigation measures implemented within the prescribed burn activities (unburned riparian buffers along streams, mosaic burn pattern, retention of duff layers, dominant low to moderate burn severity, and the timing of ignition of the units (USDA 2003).

Recreational activities produce little to no measurable impacts to water quality or quantity or floodplain/wetland functions and are not included in the cumulative effects analysis.

The proposed French Larch project is the only foreseeable activity that could potentially affect aquatic species within the cumulative effects area. Proposed for 2017, this project has not yet been scoped and there is no definitive proposed action. The location and amount of any timber harvest, or watershed rehabilitation work proposed with this project is currently unknown; therefore, impacts cannot be analyzed. There are no other ongoing or foreseeable timber harvest, road construction, reconstruction or decommissioning that might have the potential to affect aquatic species within the analysis area.

All Alternatives: There are no actions associated with Alternative A. There would be no cumulative effects on aquatic species or their habitats because there would be no direct or indirect effects to any aquatic species. Local or regional populations would not be affected.

For Alternatives B and C as described in the Hydrology cumulative effects section, there would be no measurable effects to watershed resources in Hemlock Creek. Proposed activities would produce no measurable increase in sediment delivered to streams, thus there would be no cumulative effects to sediment yield in Middle Creek or Hemlock Creek. Because there would be no measurable impacts to sediment, there would be no negative cumulative impacts to aquatic species, their populations, or their respective habitats. Positive cumulative effects would be realized from road decommissioning, storage, and culvert replacement activities in combination with road maintenance activities.

Fuels

Affected Environment

The geographic analysis boundary for fuels is the Middle Bugs project area because the proposed activities would have localized effects on fuels and fuel continuity and this area is sufficient to display effects. At this scale, the effects would be measurable and accurately reflect the environmental condition.

The following section discusses fire behavior as it relates to live and dead fuel loadings and ladder fuels. The type and abundance of surface fuels present also influences fire behavior. Reducing both ladder fuels and surface fuels is essential to effectively changing fire behavior.

Although topography and weather may play a more important role than fuels in governing fire behavior (Bessie and Johnson 1995), topography and weather cannot be realistically manipulated to reduce fire severity. Fuels are the leg of the fire behavior triangle (Countryman 1972) that land managers can change to achieve desired conditions (Pollet and Omi 2002).

Analysis Methodology

Fuels specialists conducted field reconnaissance in 2010 and 2011 to determine fuel models and loadings within the proposed project area. Forest records and GIS database provided information regarding fire histories and occurrences. Forest stand data was used to interpret the extent of fuel models and loadings across the project area.

Resource Indicators

The issue indicator used for this resource is surface fuel loading as measured by tons per acre.

Current Conditions

The Middle Bugs project area is located within the 139,736 acre Weitas Creek watershed. According to the BHROWS Assessment, 121,267 acres (about 87%) of this watershed burned 1910 and 1938 (USDA Forest Service 1999). Stand replacing fire burned over approximately 2,410 acres in the project area in 1919, initiating most of the lodgepole pine stands in the area. Since 1919, fire suppression efforts have limited fire starts to 20, with less than 25 acres affected. Mountain pine beetle are currently active in these mature lodgepole pine stands, with several patches of beetle -caused mortality evident. Dead and dying trees, coupled with high tree densities are resulting in increasing accumulations of surface fuels. Without further management

to break up continuity and to create some age class diversity, at the rate insects are currently attacking the stands, there would be an increased potential, in both size and severity, for wildfire within the next 5 years.

Vegetation within the project area is represented by Fuel Model 8 (Anderson 1982) which is generally comprised of smaller diameter Douglas fir and grand fir with an understory of forbs, and shrubs with lighter amounts of dead woody fuel. Fires in this fuel model are characterized by slow burning ground fires with low flame lengths. Under weather conditions involving high temperatures, low humidity's, and high winds, the fuels can pose a severe fire hazard (Anderson 1982). In these dry to moderate habitats, fuels tend to be more productive and have heavier fuel loadings of downed woody fuels; usually ranging from 2.5 to 27.5 tons per acre. Based on field reviews, fuel loads in the project area are at the low end of this range with approximately 5 to 7 tons per acre.

Dense regeneration increases fuel loadings, as does natural thinning, snow breakage, blowdown, and insect and disease mortality. Prior to the 20th century many of these stands burned frequently with low to mixed severity fire effects as well as an occasional stand replacement fire, such as the fires of 1919 that burned the majority of the project area. The lower intensity fires likely would have been nonlethal. Studies indicate that changes are occurring in these stands with an absence of disturbance since the pre-settlement era (Kapler-Smith and Fischer 1997). Fire behavior is related to stand structure as well as climatic conditions (Kapler-Smith and Fischer 1997).

Historically, the majority of the project area would be characterized as Mixed Severity, Long Interval fire regime with a mean fire return interval of 40-120 years with a Fire Regime Condition Class (FRCC) of 1 or 2. Currently, the project area is within this historic range. A FRCC is a classification of the amount of departure from the historic natural fire regime. This departure results in changes to one (or more) of the following ecological components: vegetation characteristics, fuel composition, fire frequency, severity, pattern, and other associated disturbances (e.g. insect and disease caused tree mortality and drought). FRCC has three classes; Class 1, low departure from historic regimes, Class 2-moderate departure and Class 3-high departure.

Fire exclusion in fire-adapted ecosystems can cause many changes in vegetation and potential fire behavior, which are well documented. Large stand-destroying wildfires have become common in the dense stands that have developed as a result of fire exclusion. These dense stands provide abundant fuel ladders that allow fires to increase in intensity and burn explosively through the tree crowns (Arno et al. 1996). The increased potential for crown fire as a result of fire exclusion is of concern to fire managers. Crown fires are the most difficult fires to suppress and as a result of this crown fires are more likely to become large fire events.

Environmental Consequences

Direct and Indirect Effects

1. **Alternative A**

Under the no action alternative, trees would remain crowded and suppressed. Mortality from mountain bark beetle activity would continue in these 80-90 year old uniform lodgepole pine stands, resulting in increasing accumulations of surface fuels. This combined with successional changes in stand structure that affect fire behavior, would shift the fuel model from the desired fuel model 8 to fuel model 10. In this fuel model, fire burns in the surface and ground fuels loads are greater thus burn with greater fire intensity than other timber litter models such as fuel model

8. Dead-down fuels include greater quantities of 3-inch or larger limb wood resulting from over maturity or natural events that create a large load of dead material on the forest floor. Crowning out, spotting, and torching of individual trees are more frequent in this fuel situation leading to potential fire control difficulties (Anderson 1982)

Under Alternative A, canopy base heights would remain near or at ground level. Increasing ladder fuels would increase the risk of crown fire initiation. Predicted changes to surface fuel loadings and a shift in fuel models would show increases in expected flame lengths, and higher fire intensities over time, given no action. These conditions would increase the potential for wildfire. Under Alternative A, forest stands would progress into FRCC 3 which is a high departure from historic regimes.

2. Alternatives B and C

Both action alternatives propose the same harvest activities; they only differ in proposed road construction and methods of post-harvest site preparation.

Alternative B would burn activity fuels generated by regeneration harvest to prepare the sites for planting of western white pine and western larch. Activity fuels would be broadcast burned, underburned, jackpot burned and/or landing pile burned. To ensure a more continuous fuel bed for these burning activities, some non-merchantable material may be slashed and limbs and tops may be required to stay within the units during harvest.

Alternative C would mechanically treat activity fuels on tractor ground to better protect leave tree clumps. It would burn activity fuels on skyline ground. Under both action alternatives, post-harvest, before activity fuels are treated, the project area would resemble Fuel Model 11 with fuel loadings of approximately 10 to15 tons per acre. For both action alternatives, after the activity fuels are treated, treated areas would resemble a Fuel Model 8 with 5 to12 tons per acre. Fuel loadings at these desirable levels, would reduce the potential risk for high intensity wildfire.

Under both action alternatives, ignitions would not take place within riparian areas, though fire would be allowed to back into and spread through these riparian areas. Fire may move outside of the harvest units after ignition provided it stayed within the management area.

Some mortality in leave trees would occur during the burning of activity fuels, especially if the trees are less fire-resilient species. Some mortality is acceptable for snag recruitment. Under both action alternatives, to minimize this mortality, some leave clump protection may be completed.

Commercial thinning activities would target overtopped and suppressed trees, reducing the potential for diseased, dead and dying trees that could provide additional fuels in the future. Studies of fuels reduction through thinning indicate that treatments reduced surface fire behavior parameters, bringing them down and closer to limits of direct attack methods. Crown fire potential would be decreased not only because of canopy removal, but also as a result of potential reduction in heat generated by surface fuels. (Kalabokidis and Omi 1998; Scott 2003).

Under both action alternatives, in the short term, slash created by proposed commercial thinning could increase surface fuel loading, which would increase flame lengths until these fuels are treated (1-2 years).

Precommercial thinning activities would change fire behavior characteristics and intensities through fuels management. The result would be less intense surface fires which would allow for more successful, and direct, fire suppression actions.

Cumulative Effects

Geographic Area: Since vegetation would not be treated outside of the project area, vegetation outside of this area was not analyzed as part of the cumulative effects area. However in the event of a wildfire, the area within and surrounding the project area has potential to burn; but based on the management area direction to suppress fires, and the multitude of roads in the area that provide suppression access, the project area is appropriately considered for the cumulative effects analysis.

Time Frame: The time frame for cumulative effects is 10 years as this is how long treatments would remain effective before surface and ladder fuels would once again become a concern.

Past, Present and Foreseeable Activities: Fire suppression, timber harvest, and fuels reduction projects are the only past, present, and reasonable foreseeable activities considered in combination with proposed activities.

Aggressive fire suppression has been the Forest Service policy since the destructive fire season in northern Idaho and western Montana in 1910. By restricting fire spread through suppression, fuels that would have been reduced by wildfire have been allowed to accumulate, increasing the probability of large, more intense fires. Past actions were included in the existing condition discussion.

CFP direction for Management Area C8S is to limit size of individual wildfires, treat logging and thinning slash to prepare sites for reforestation, to break up continuous fuel beds, to remove barriers to big-game movement and improve forage and to use prescribed fires from planned and unplanned ignitions as needed to achieve Forest Plan direction. This will continue into the foreseeable future. There are no other present or foreseeable activities in the cumulative effects area that would affect fuel suppression. Therefore, there can be no cumulative impacts.

Soils

Affected Environment

All proposed harvest and prescribed burn units and associated temporary roads, skid trails and landings were assessed for soil concerns for this project. Regional soil standards do not apply to Forest system roads, designated trails or intensively developed sites such as mines, developed recreation sites, administrative sites or rock quarries; therefore, activities affecting roads and trails (such as decommissioning and reconditioning) were not analyzed in detail.

Analysis Methodology

GIS –generated queries, maps and reports, aerial photos and field monitoring reviews were used in the soils analysis. Landtypes mapped and described in the Land System Inventory of the Clearwater National Forest (Wilson, et al., 1993) were used in the erosion hazard assessment. All proposed units were analyzed for landslide risk and the findings were confirmed during field reviews. Areas of high erosion hazard were identified, and road location and harvest unit prescriptions were modified to minimize those risks.

Existing detrimental soil damage in all proposed activity areas was determined by database queries of past activities followed by field visits. In 2011, soil specialists completed field reviews following the protocol outlined in Region 1 Approach to Soils NEPA Analysis Regarding Detrimental Soil Disturbance in Forested Areas (2009) and USDA Soil Disturbance Monitoring Protocol (SDMP) (Page-Dumroese et al., 2009). Detrimental damage is based on the severity of

the impacts as determined by the soil scientist with consideration given to the definitions in FSM 2500-Watershed and Air Management R-1 Supplement 2500-99-1. A full discussion of the methodology, copies of field notes and data collected, are available in the project file. Roads that are proposed outside of the treatment unit are added to the disturbed area for that unit.

Data limitations: The detrimental soil disturbance (DSD) estimates of proposed project activities are based on local monitoring and research results (Archer, CNF Monitoring Report 2008) and assume that BMPs would be implemented and that soil recovery occurs over time.

Resource Indicators

1. **Soil Stability and Landslide Hazard Potential.**

Mass wasting and surface erosion impact soil productivity, water quality and channel morphology. Removal of vegetation and/or ground disturbance associated with timber harvest, site preparation or road construction can increase erosion on certain landtypes. At least a dozen landslides, mostly associated with roads, have occurred in the project area.

Issue Indicator: Acres of proposed activities on landtypes having high landslide hazard potential resulting from slope steepness, parent material, landform, aspect or elevation.

2. **Soil Productivity**

Past management activities have caused detrimental soil disturbance (loss of organic matter and compacted or displaced soil conditions) and decreased soil productivity. The ash-derived soils common in much of the project area have low bearing capacity and therefore are highly susceptible to compaction, displacement and loss of site productivity.

The Region 1 Soil Quality Standards require that detrimental management disturbance does not exceed 15% of an activity area and that coarse woody material retention is appropriate to the habitat type. In areas that exceed 15 % detrimental disturbance, the combined detrimental disturbance effects of the current project (implementation and restoration) should not exceed the disturbance levels present before the activity and activities should be directed toward a net improvement in soil quality.

Issue Indicator: Number of treatment units that exceed 15% Regional soil standard after treatment.

Current Conditions

Landforms and Geology: Geology is primarily Idaho Batholith granitics overlain by ash-influenced soils. The major landtype associations in the project area are frost-churned ridges (42%) and low relief rolling hills (38%). All proposed harvest units lie within these landtype associations. The major erosional processes are surface erosion and mass wasting. Most of the landtypes have low to moderate surface erosion and debris avalanche hazard, moderate parent material erosion and high to very high sediment delivery.

Frost-churned ridges occur on upper slopes, in the highest elevations. Slopes are generally less than 40%. The vegetation is dominated by Douglas-fir, grand fir, sub-alpine fir, and western redcedar cover types on primarily moist western redcedar and wet sub-alpine fir habitat type groups. Low relief rolling hills are gently rolling upland areas generally less than 30% slope. Because of the deep soils and gentle topography, these contain some of the most productive sites on the Forest. The vegetation is dominated by grand fir and Douglas-fir cover types on primarily moist western redcedar habitat type groups.

Landslide Hazard Factors: At least a dozen landslides have occurred in the project area, mostly during storm and flood events in1995 and 1996. About fifty-eight percent of the slides originated from roads. Most (77%) treatment areas have slopes less than 35% and low landslide potential. Five small areas totaling two acres in Units C, D and E are on slopes greater than 55%; however, these areas are not on parent material, aspect or elevations that cause concern for landslides.

Soil Productivity: Past natural and management activities have impacted the existing productivity of the soils in the project area. Existing detrimental soil conditions within the proposed harvest units range from 0 to 4%. Primary detrimental disturbance is compaction and displacement from non-system roads/skid trails. Soil disturbance monitoring for the project documented few instances of detrimental soil disturbance on areas not directly impacted by roads. Previous harvest in the project area occurred primarily with ground-based equipment from the 1960s to 1970s. Assuming soils in these previously harvested areas were subject to some degree of compaction, displacement and extensive vegetation removal; these observations indicate that recovery processes have occurred over the past 40-50 years in the project area. Recovery would likely continue if fundamental soil properties are maintained or enhanced during management activities.

Compaction, displacement and productivity: Surface soil loss through displacement and mixing with less productive substrata decreases soil productivity. This occurs during temporary road construction, excavation of skid trails and landings, and displacement of soils during ground based harvest. The loss of the Mazama ashcap layer, which exists over much of the project area, would reduce the water-holding capacity and increase the overall soil bulk density. These effects would decrease available soil moisture and tree root penetrability. Since volcanic ash is not replaced, the effects of erosional losses of the ashcap would be long-term. The Clearwater Forest Plan states that activities on ash cap soils will be conducted such that bulk densities on at least 85 percent of the activity area will remain at or below 0.90 grams/cubic centimeters. Because soil structure and fertility are difficult to quantify, surrogate soil parameters are often monitored. These parameters include soil disturbance, severely burned soil, ground cover, and above-ground organic matter (litter and woody debris) (FSH 2509.18)

Organic matter and productivity: The retention of coarse (> 3” diameter) woody material (CWM) is essential to maintaining soil organic matter, soil productivity and sustainable forest ecosystems (Graham et al. 1994). Regional guidance on organic matter retention recommends following guidelines such as those contained in Graham et al. (1994) if specific local guidelines are not available. Existing CWM in all proposed units are within the low end of the range recommended by Graham et al (1994) or Smith and Fischer (1997) for these habitat types. The predominant habitat types in the project area are subalpine fir/beargrass and several phases of grand fir/queencup beadlily. Graham et al (1994) recommends 7-13 tons per acre for grand fir/beargrass to provide sufficient nutrients and organic matter for long-term soil productivity, but did not assess the grand fir/queencup beadlily.

Fire ecology studies also report amounts of woody material in various size classes and provide guidance for CWM for habitat types of North Idaho not covered in Graham et al. (Smith and Fischer 1997) Fire Group Four includes the Dry, lower subalpine vegetation with 3 to 10 tons of Coarse Woody Material (CWM). Fire Group Seven includes the Moderate and Moist Grand Fir types with 1 to 10 tons of CWM

Environmental Consequences

Direct and Indirect Effects

The spatial scope for potential direct, indirect and cumulative effects is the individual treatment units and associated temporary roads. Because productivity effects are spatially static and productivity in one location does not influence productivity in another location, it is appropriate to spatially limit the geographic boundary to the activity area. (USDA, 2009). The temporal scope for direct, indirect and cumulative effects is several decades (20 to 50 years) because this is how long it takes for soils to recover depending on soil texture, depth of compaction, and loss of organic material (Powers et al. 2004, Froehlich et al. 1985). This analysis considers all activities from the expected implementation date of 2015 through 2065. Regeneration harvest and commercial thin harvest and temporary road construction are analyzed in detail as these activities can contribute to detrimental disturbance calculations, cause erosion and affect soil productivity.

Permanent road construction is not analyzed in detail because it takes land permanently out of productivity; therefore, it is removed from detrimental soil disturbance consideration. Road maintenance, reconditioning, reconstruction and road decommissioning, were not analyzed in detail because they are related to Forest system roads or have no detrimental ground-disturbing activities associated with them (FSH 2509.18). Precommercial thinning is not considered in detail because there are no ground disturbing activities associated with it. See the soils report in the project file for more information.

Estimates of increased detrimental soil disturbance from proposed activities are based on the following assumptions:

- Estimated detrimental soil impacts from proposed ground based skidding are eight to twelve percent (average 10 percent) of an activity area based on use of designated skid trails (Archer, 2008). Disturbance is generally limited to main skid trails and landings. Soil disturbance can be minimized by using existing skid trails and/or by designating the locations of new skid trails (Froehlich and McNabb 1983, Korb 2004).
- Estimated detrimental soil impacts from proposed skyline yarding are two percent of an activity area and disturbance is mostly concentrated at landings (Archer, 2008).
- Temporary roads are considered 100% detrimental disturbance with reduced soil productivity until vegetation, organic matter, and hydrologic function is restored. The dimensions of temporary road are equivalent to 3 acres of disturbed area for each mile of disturbed area for each mile of temporary road. Temporary roads within units on skid trails from prior harvest are not considered an increase in disturbance if used again during implementation.
- Slash treatment would be broadcast burn or jackpot burning of piles at landings. If piling within the unit occurs, piles would be placed along the trails to overlap disturbance effects. (Korb, 2004) Treatment of slash is already incorporated into the estimates discussed above.
- Mechanical site preparation would pile slash and create plantable spots about three feet in diameter to reduce vegetative competition from beargrass and huckleberry. If three foot diameter scalps are scattered across the unit for 600 trees per acre, about 9% of the unit could be affected. Small scattered areas are not considered detrimental. The depression created is unlikely to erode because of the strong vegetative cover between them.

- Tons per acre of woody material greater than three inches in diameter would be 7 to 13 tons per acre after site preparation. Existing wood on the ground would remain, and additional standing recruitment dead would make up the difference.
- Road construction assumes a right of way would average 33 foot average width. Two switchbacks would probably create a top of cut to toe of fill disturbed width of 100 feet. Road use would be limited to dry conditions. Removal of vegetation, compaction of ground, design and construction BMPs, and closure of the road to vehicles after use are assumed.

Table 3-14. Cumulative Effects on Detrimental Soil Disturbance for treatment areas.

Unit	Acres	Existing % DSD	Harvest Activity*	Harvest Method	Alternative B Cumulative % DSD All activity	Alternative C Cumulative % DSD All Activity
A	14	2	CT	Tractor	12	12
B	48	3	CT	Tractor	13	13
C	416	0	RG	Tractor 60% Skyline 40%	9	12
D	35	2	RG	Tractor 50% Skyline 50%	8	12
E	191	4	RG	Tractor 67% Skyline 33%	12	14

* CT = Commercial Thin; RG=Regeneration Harvest

1. Alternative A

No treatment activities are proposed in this alternative. This alternative would not alter the existing detrimental soil disturbance or existing soil productivity. No soil improvement activities would occur on existing skid trails and landings; soils would remain less productive. Recovery of soil productivity in areas currently detrimentally disturbed would occur over several decades. Alternative A would retain the same amount of coarse woody material, both standing and down.

No road decommissioning would occur that would directly improve soil conditions by decompacting soils and adding coarse woody material and other organic matter to the existing road surface. Undersized culverts would not be replaced, and would continue to provide inadequate drainage and continued risk of mass soil movements. Unstable roads would remain in place, increasing risk of erosion.

2. Alternatives B and C

Proposed harvest, road decommissioning and storage activities and soil restoration activities are the same for Alternatives B and C. They only differ in the amount and types of proposed road construction and methods of post-harvest site preparation.

Alternative B would construct 3.8 miles of temporary road and 2.1 miles of permanent road. Activity fuels would be broadcast burned. Alternative C would construct 5.2 miles of temporary road: broadcast burn activity fuels on skyline ground and mechanically treat activity fuels on tractor ground to better protect leave tree clumps. Under Alternative C, post-harvest mechanical treatments could cause additional detrimental soil disturbance.

Design criteria and site-specific mitigations would eliminate or minimize soil displacement and compaction and impacts to the forest floor and organic matter. Project design features and Best

Management Practices would help meet Forest guidelines and reduce the extent of disturbance and maintain soil productivity.

Landslide Hazard Risk Assessment: In all action alternatives, **t**he five small areas (2 acres) in Units C, D and E on slopes where sensitive soil characteristics have been identified would have 100% canopy retention to minimize potential for landslides. While the aspect, slope and parent material in Unit B could be conducive to landslides, tree retention levels in this commercial thin unit would be sufficient to avert concern for landslides.

About 3,000 feet of the 2 miles of proposed permanent road construction would occur on a high mass wasting hazard landtype. However, the proposed road location avoids wet areas and slopes over 40%. After harvest, this road would be put into storage as a permanent road and closed to traffic in Alternative B or treated as a temporary road under Alternative C and decommissioned after use.

Soil Productivity: Proposed activities in all activity areas should remain below 15%, given that existing trails would be used where possible, additional trails would be designed to keep total disturbance below 15%, and fuel treatments that use mechanical site preparation in Alternative C would use the same trails used for harvest. Also, skid trails would be scarified and recontoured after use to improve soil productivity. Available slash would be applied to the recontoured surface. Under Alternative C, site preparation would have additional machinery in the unit but overlap of harvest and post-harvest site preparation trails, or burn piles and trails would keep impacts to less than 15% areal disturbance. Under both action alternatives, broadcast burns of light severity on the steeper, skyline ground would not have adverse impacts on site productivity.

Under all action alternatives, existing downed wood and additional standing trees would be left in the units to allow for recruitment for future downed wood that would be beneficial for soil function. Leave tree retention guidelines would move the units toward higher amounts of coarse woody material. See Chapter 2 for a list of design features.

Cumulative Effects

The geographic boundary and time frame considered for cumulative effects on the soil resource from surface erosion and detrimental soil disturbance is the same as for direct and indirect effects described above. Past activities in the Middle Bugs project area include timber harvest since 1960 that affected 19% of the project area, and fire which affected about 50% of the project area. Ongoing and foreseeable activities consist of recreation and fire suppression. Motorized recreation and dispersed-camping activities may increase in the future, but the effects on soils would be limited to designated existing routes and existing dispersed-camping areas following implementation of the Clearwater National Forest Travel Plan. Fire suppression activities could increase soil detrimental disturbance, but the occurrence, extent, or intensity of suppression efforts cannot be estimated or predicted.

1. Alternative A

There are no cumulative effects related to the No Action alternative since cumulative effects can only arise from the incremental impact of an action when added to other past, present and reasonably foreseeable actions. Since there are no actions associated with this alternative, there are no cumulative effects.

2. Alternatives B and C

Soil Productivity*:* The cumulative effects of past and proposed activities are determined by adding the estimated disturbance from the project to past soil impacts. Potential DSD within each

treatment unit are estimated to be between 8 and 14% as shown in Table 3-14. Temporary roads constructed outside of the unit were added to the calculation of disturbed area. Impacts from mechanical site preparation in Alternative C were also included.

3. Landslide Hazard Risk Assessment

The landslide hazard from past, present, ongoing and proposed activities are expected to be negligible due to design features and BMP implementation. Harvest would avoid areas of slopes where sensitive soil characteristics have been identified. Decommissioning of temporary roads and storage of the permanent system road would remove fill material, and re-establish vegetation, so that after the first three years the vegetation would provide slope stability.

Loss of the volcanic ash cap through erosion or removal (excavated temporary roads and skid trails) is irretrievable. Remaining soil materials would eventually (minimum of several decades) develop, but may lack the water and nutrient holding properties of the Mazama ash cap.

Small, localized areas would have reduced soil productivity until vegetation becomes re-established and organic layers rebuild. These areas include temporary roads, skid trails, landings, and burned areas. Areas with compaction or that are severely burned could take decades to recover (Froehlich 1986). Soil improvement activities such as decompacting soils and adding organic matter (woody material) could jump start this process. Within regeneration harvest units, individual trees and clumps of trees would be retained for future woody material recruitment. In addition, at least 7-13 tons/acres of downed woody material would be left in each of the harvest units. These retention practices would maintain soil stability and productivity. This alternative would meet Regional soil standards for coarse woody material.

Recreation

Affected Environment

This analysis describes the existing recreation activities, settings and opportunities within the Middle Bugs project analysis area and describes the potential effects to recreation from the proposed vegetative treatments and watershed improvement.

Impacts to recreation were considered for the 5,540 acre Middle Bugs project area, located in the upper end of the Weitas Creek drainage on the North Fork Ranger District. The area is bounded by a portion of Roads 104 and 555 on the northwest; encompasses all of Roads 553, 556, 3100, 5153, 5159, and their respective spurs; is bounded by a portion of Road 103, just east of Beaver Dam Creek; and bounded to the southwest by approximately three miles of the Nee Me Poo Trail 40, between Beaver Dam Saddle and the headwaters of Hemlock Creek. Because the project does not propose changes that would greatly affect recreational access, this area is sufficient to assess direct, indirect and cumulative effects to the recreation resource.

Analysis Methodology

The following methods were used to assess current recreation use in and adjacent to the project area. The recreation specialist inventoried and evaluated dispersed campsites along Roads 103, 104, 555 and 556 during the summer and fall of 2011. Informal interviews were conducted with personnel familiar with the area including; the trail specialist, hydrologist, special uses administrator, archeologist and tribal liaison. Retrievable recreation visitor logs from the Beaver Dam Saddle and Mex Mountain snowmobile warming huts were reviewed to assess winter use levels (2003, 2004, 2007-2011). Field notes (2003 to 2011) from the Lolo Motorway field

rangers were used to assess summer and fall use patterns. Stakeholders familiar with the area including members from the local county snow grooming board and local outfitters provided input regarding use patterns. Road and trail access guides provided information regarding use restrictions within, and adjacent to the project area.

Resource Indicators

This analysis assessed potential impacts to recreational opportunities as measured by:

- Impact of vegetative treatments, watershed improvements, road work and haul traffic on seasonal modes of recreational access.
- Impact of road work on access to dispersed camping opportunities.

Current Conditions

Features, Developments & Land Designations: The Middle Bugs project area falls within a Roaded Natural classification on the Recreation Opportunity Spectrum. This spectrum describes settings that range from Primitive to Urban and is a tool used to help define standards for area management, directed by the Forest Service Manual (FSM 2311.1). Roaded Natural settings are described as being characterized by predominately natural environments with moderate evidence of humans. Human development in these settings usually harmonizes with the natural environment. Interactions between users are described as low to moderate, but evidence of visitors is prevalent. The Clearwater National Forest Plan describes Roaded Natural as, "A classification on the recreation opportunity spectrum where human practices are evident. Motorized vehicles are permitted on all or parts of the road system" (USDA Forest Service. 1987, p. VI-27).

The Middle Bugs project area is remote with steep terrain. Access is limited to rough, gravel road surfaces and three forest trails that connect to existing roadways. Recreationists are drawn to the vicinity because of the cultural and historic significance of the Nez Perce (Nee Me Poo) and the Lewis and Clark National Historic Trails, hunting opportunities, dispersed camping, nearby lookout rentals and groomed snowmobile opportunities. The primary recreation season runs from early July to October for regular motorized access and typically from October into March for snowmobile use.

Roads: The nearest towns to the Middle Bugs project area are the small towns of Pierce, Kooskia, and Kamiah, Idaho. The project area is accessed by Road 104, 103 and 500. Most visitors pass by the project area, travelling along its edges to access more popular dispersed campsites and historical locations outside the project area. These routes include following Lolo Trail Road 500 (the Lolo Motorway) along the National Historic Trail Corridor; travelling Road 555 to the Weitas Guard Station which lies approximately 12 miles to the northeast of the project area; travelling Road 500 to Rocky Ridge Lake dispersed campsite, accessed on Road 502, which lies 3.5 miles east of the project area; continuing further east to reach Weitas Lookout or other rental cabins beyond. Visitor encounters recorded on Road 500 between Beaver Dam Saddle and 12 Mile Saddle by field rangers between 2003 and 2010 noted between 400-2,000 visitor contacts from early July to mid-October each year (higher numbers occurred during the Lewis & Clark Bicentennial 2003-2005).

Trails: The following three trails connect to the project area:

Table 3-15. Trails and Trail Access Restrictions in the Middle Bugs Project Area

Trail #	Trail Name	Trail Location Relative to the Project Area	Current Access Restrictions	2012 Travel Plan Decision Access Restrictions
40	Nee Me Poo	Approximately 3 miles along SW project boundary	RYA* and bicycles	RYA and bicycles
100	Footrot Corrals	Trailhead on W side boundary, trail is outside project area	Undefined	RYA
112	Rocky Ridge	Approximately 1 mile crosses within the project area	RYA	RYA

*RYA - Restricted Yearlong to all motorized use

Within the project area, there are no developed campgrounds and only one vault toilet at Beaver Dam Saddle. Dispersed camping appears relatively light; with noticeable campsites along Road 103, 555, and at the Footrot Corrals trailhead. Existing gated roads limit motorized access within the project area. Hunting appears to draw the most recreationists who camp in the project area during the summer/fall season. There are two commercial outfitters who are licensed and permitted to provide hunting and fishing services in the Weitas Creek drainage. While both outfitters access their operating areas using Roads 103, 555, and 556, neither have assigned camps within the project area.

Aside from hunting, there is minimal non-motorized recreation activity occurring in the project area. The limited number of trails, bicycling restrictions on Trail 40, steep topography and remote location makes the area less popular for hiking, bicycling and horse riding than adjacent locations outside the project area.

All the roads in the project area are single lane gravel roads with pull outs, recommended for high clearance vehicles. Visitors may ride off highway vehicles (OHV's) to explore portions of the road and motorcyclists use the existing road systems in concert with trails outside the project area, to ride loops from Highway 12 over to the North Fork of the Clearwater.

A mobile warming hut for snowmobilers is located at Beaver Dam Saddle from mid-October to mid-July along the groomed snowmobile trail system which includes Roads 103, 104, 555 and 556. Available visitor use logs show a consistent range of use in the area.

Environmental Consequences

This section presents a summary of consequences relative to the recreation resource that may result from each alternative.

Direct and Indirect Effects

1. **Alternative A**

If no action is taken, the vegetative treatments and watershed improvement efforts would not occur within the project area and there would be no direct effects on the recreation resource. Existing roads and trails would retain current access and dispersed sites would remain accessible in their current conditions.

In the long term, deteriorating and failed culverts along active road systems, such as Road 103, may result in indirect effects to recreation due to potential road failures resulting in impassable road conditions and subsequent road closures.

2. Alternatives B and C

All vegetative treatments and watershed improvement activities proposed in Alternative B are identical to those included in Alternative C; the only exception being the amount of temporary, versus new road construction proposed to implement project goals. Alternative B proposes constructing 2.1 miles of new road and 3.9 miles of temporary road, while Alternative C proposes 5.2 miles of temporary road and no new permanent road construction. Since both alternatives propose restricting motorized, recreational access on all new roads (temporary and permanent) constructed for the project, any direct or indirect effects on recreation access would be common to both alternatives and are discussed in unison below.

There would be no direct impacts to dispersed site access within the project area. Regeneration treatments may delay access on Road 555 to the dispersed campsite at the Footrot corrals. No other dispersed sites would be impacted by project activities. Both Alternatives B and C would restrict recreational motorized access on all new road construction completed as part of this project. There would be no direct impacts to private hunters or outfitters in the area from the proposed actions. Access to hunting would not change, nor would hunting seasons be affected.

Effects to non-motorized and motorized recreation concerns are minimal and hinge on the alterations to travel routes proposed as part of the project, within the project area. Alternative B could provide 2.1 new miles of road available only to non-motorized recreational travel. Alternative C proposes no new road construction; there would be no change to non-motorized recreational travel opportunities.

Both Alternatives B and C propose decommissioning 3.01 miles of existing road. With the exception of 0.1 mile of Road 1610, these roads currently prohibit motorized recreational access and are largely overgrown and impassable. Road 1610 is a 0.2 mile segment that loops off of Road 103. Half of this segment would be decommissioned; half would be left to accommodate a pull out parking space and opportunity for dispersed camping.

While all the roads listed for decommissioning and storage allow bicycle use, most are overgrown and difficult to even traverse on foot. Given this current condition, there would be very little impact to existing non-motorized recreation access (hiking, bicycling and horse riding) from decommissioning and storage activities proposed under Alternatives B or C. Some segments of Roads 553 and 553A and Trail 112 overlap; storage procedures on these roads would not eliminate use of the trail.

The relatively high elevation of the project area requires that vegetative treatments and log or equipment hauling be completed before heavy snowfall accumulates, to avoid stranding heavy equipment in the mountains over winter. Design elements would require that roads groomed for snowmobiling would not be plowed for hauling during winter snowmobile season, eliminating any direct effects on winter recreation in the project area.

Of the 14.29 miles of road proposed for decommissioning and storage, 2.39 miles are currently open to snowmobiles. These miles are not currently part of the groomed system and snowmobile access would not noticeably differ as a result of proposed road decommissioning and storage treatments.

Cumulative Effects

The cumulative effects area for recreation analysis is the 5,540 acre project area. Because the project does not propose changes that would greatly affect recreational access, this area is sufficient to assess direct, indirect and cumulative effects to the recreation resource.

Past activities affecting recreation in the project area are linked to access provided by roads built in the 1900's for logging and development of fire lookouts. As access to the area became more available, recreational use including dispersed camping, hunting, berry picking and firewood gathering also became more frequent. All of these activities continue today along with OHV motorized use. Given available resources and maintained access routes, these uses are reasonably expected to persist into the foreseeable future.

Effects on recreation from the Middle Bugs proposed actions should be temporary and short term. Project activities should be completed over a five year period. Project activities may require visitors to use alternate access routes; however, design features would maintain recreational access to the area and existing recreational opportunities would be maintained.

Prescribed burning associated with the North Lochsa Face EIS could occur south and east of the Middle Bugs project area, starting near Rocky Ridge Point in the fall of 2012 and possibly impact recreational access through Road 500. During active burning, recreational access may be routed to Roads 103 and 104.

Impacts and changes to motorized access in the project area from the 2011 Clearwater National Forest Travel Plan are described in Appendix A.

Scenic Resources

Affected Environment

Overall, landtype associations within the Middle Bugs project area contain no distinctive features. Portions of the analysis area within the canyon bottoms have been classified as Class B (Typical) and have a low visual absorption capacity due to the steep canyon walls and superior viewing position of most area visitors. The Lewis and Clark Trail and Nee Mee Poo Trail lie within the Lolo Trail National Historic Landmark Corridor which is adjacent to the southern and eastern boundaries of the analysis area. A portion of the analysis area is visible from this corridor and has been classified as Type A due to the scenic attractiveness of the expansive sweeping vistas from the Lewis and Clark and Nee Me Poo trails.

The landscape is dominated by lodgepole pine with inclusions of some mountain hemlock, Douglas fir, western larch and grand fir and for the most part, appears as a continuous forest canopy. There are some natural opening created by rock outcrops and wet areas, but these are a minor portion of the viewshed. High levels of insect and disease are creating additional openings.

Historically, openings have been naturally created by wildfire throughout this region and can range from one to several hundred acres in size. Wildfire activity in the early 1900's affected the project area. Forest cover has since regenerated and for the most part appears as a continuous forest canopy. The rolling hills and frost churned ridges of the analysis area do not provide a great deal of visual variety, just extensive views of the largely undeveloped roadless areas to the north, east and west of the analysis area. The mixture of coniferous vegetation, shrubs and small trees contributes to the inherent scenic attractiveness of the project area, but do not contain any remarkable elements.

Analysis Methodology

The CFP (1987) used the Visual Management System terminology for adopted Visual Quality Objectives (VQO). VQO refers to the degree of acceptable alteration of the characteristic landscape. In 1995 the Forest Service developed the Scenery Management System which assigns Scenic Integrity Objectives (SIO). Scenic integrity is a continuum ranging over five levels of

integrity from Very High to Very Low. For this analysis, terminology from the new handbook is used along with the adopted VQOs. Table 3-16 below provides a cross-walk between the two systems and lists the designated travel corridor or sites, their sensitivity level, the variety class (distinctiveness of the landscape) and adopted VQOs listed in the Forest Plan.

Visual simulations were created in Google Earth to replicate the location and visual impact of harvest units in the landscape. They approximated the shape and visual impacts of proposed harvest activities. Visual screening of proposed activity by foreground vegetation was not considered in these views, but analyzed on the ground.

Resource Indicators

This analysis assessed potential impacts to scenic integrity as measured by Visual Quality Objectives (VQO) and Scenic Integrity Levels (SIL).

Current Conditions

E**xisting Scenic Integrity:** Past timber harvest and road construction are evident but do not dominate the seen area within the analysis area. Timber harvest occurred in the area from 1960 through the early 1990's. Areas harvested in the 1960's have re-vegetated and are only slightly visible while areas harvested in the early 1990s are still visible from several viewpoints along the Lolo Trail National Historic Landmark corridor. Depending on slope and aspect, openings created by timber harvesting in the area should no longer appear as openings within 35 to 40 years of harvest.

There are several natural openings within the analysis area that are created by rock outcrops or wet areas. There are several large inclusions of open area that stretch up from the canyon bottom. In several areas the insect and disease occurrences have reduced the coniferous canopy also.

Landscape Visibility and Scenic Integrity Standards: Several sensitive travel corridors and developed recreation sites identified in the Clearwater Forest Plan lay within the analysis area. Most visitors who view the area would travel on the Lolo Motorway (Road 500) that borders the analysis area on the south and east sides. There are views of the area from Road 500, Trails 25 and 40 (Lewis and Clark National Historic Trail and Nee Me Poo National Historic Trail), Hemlock Butte Lookout, and Weitas Butte Lookout.

The following table lists the designated travel corridor or sites, their sensitivity level, the variety class (distinctiveness of the landscape) and adopted scenic integrity objectives (VQOs) listed in the Forest Plan. Views from sites and travel corridors must meet or exceed the designated scenic quality objectives for those areas.

Table 3-16. Scenic Integrity Objectives

Site Name	Miles	Variety Class	Sensitivity Level	Foreground SIO	Middleground SIO	Background SIO
Road 500	21.9	B	2	High (VQO – Retention)	Low (VQO – Modification)	Low (VQO – Modification)
Trail 25 - Lewis and Clark	7.6	B	1	High (VQO – Retention)	Low (VQO – Modification)	Low (VQO – Modification)
Trail 40 - Nee Mee Poo	5.8	B	1	High (VQO – Retention)	Low (VQO – Modification)	Low (VQO – Modification)
Hemlock Butte Lookout		B	3	Low (VQO – Modification)	Low (VQO – Modification)	Low (VQO – Modification)
Weitas Butte Lookout		A	1	Moderate (VQO – Partial Retention)	Moderate (VQO – Partial Retention)	Low (VQO – Modification)

High scenic integrity requires that the valued landscape character "appears" intact. Deviations may be present but must repeat the form, line, color, texture, and pattern common to the landscape character so completely and at such scale that they are not evident.

Moderate scenic integrity refers to areas where the landscape character "appears slightly altered." Noticeable deviations must remain visually subordinate to the landscape character being viewed.

To meet low scenic integrity for middle ground views the valued landscape character can appear "moderately altered." Deviations may begin to dominate the valued landscape character being viewed but they borrow valued attributes such as size, shape, edge effect and pattern of natural openings, vegetative type changes outside the landscape being viewed. They should not only appear as valued character outside the landscape being viewed, but compatible or complimentary to the character within.

Environmental Consequences

Direct and Indirect Effects

1. **Alternative A - No Action**

There would be no change to the existing visual condition of the landscape. Over time, mountain pine beetle infested trees would continue to deteriorate and die, creating openings. Trees in previously harvested areas would continue to grow and openings would become less visually obvious.

2. **Alternative B**

All proposed regeneration harvest units lie within the middle ground viewing zone of the Lolo Trail National Historic Landmark Corridor. Proposed commercial thinning would occur within the background viewing zone. The Scenic Integrity Objective for both is Low (VQO of Modification). Proposed harvest units could be seen from viewpoints on Road 500, Trails 25 and 40 and Hemlock Butte Lookout, but would be screened from Weitas Butte Lookout. Vegetation adjacent to the roadway would screen proposed activities, reducing visibility. Vegetation in riparian areas and project design measures such as the grouping of leave trees in regeneration harvest areas and legacy tree retention would help harvested areas appear similar to the existing natural openings. Mid-slope (permanent and temporary) road construction would also be evident,

but the temporary roads would be decommissioned after use while the lineal pattern of the new permanent road across the slope would be broken up by the foreground screening vegetation. Proposed road decommissioning would improve the long-term visual character of the area by reducing the visual effects of the road template. There may be some short term adverse visual effects from ground disturbing activities required for road decommissioning but the duration should be less than one year given the highly productive soils. Road reconstruction and reconditioning would occur in the existing road prism and would have no effect to scenic integrity. Pre-commercial thinning would not effect on the scenic integrity of the area because after treatment there would still be a continuous canopy.

Alternative B would burn activity fuels generated by regeneration harvest to prepare the sites for planting of western white pine and western larch. Activity fuels would be broadcast burned, underburned, jackpot burned and/or landing pile burned.

The proposed management activities, while visually evident, should meet the Forest Plan Scenic Quality Objective of Low (VQO – Modification) in the middle ground viewing zone of the visual travel corridors and recreation sites found in or near the analysis area. Design features such as inclusion of riparian areas, grouping leave trees into clumps in critical viewing areas, naturalizing unit edges and protection of legacy trees, the harvest activities should appear similar to the existing natural openings. These activities would assure that scenic quality objectives for all harvest units would be met.

3. Alternative C

Alternative C includes all vegetation treatments and watershed improvement activities proposed in Alternative B. Alternative C would mechanically treat activity fuels on tractor ground to better protect leave tree clumps; it would also burn activity fuels on skyline ground. Mechanical fuel treatments would consist of excavator piling and burning, mulching, chipping, or mastication to reduce the surface fuels. Visual impacts from proposed harvest activities in Alternative C would be less than Alternative B due to the increased protection of leave trees.

Also, Alternative C would only construct temporary roads; no permanent roads. After use, these roads would be fully obliterated through full recontouring to original slopes and topography, decompaction, drainage stabilization, topsoil replacement, woody debris application, and revegetation. Visual impacts from temporary roads should be temporary. Under Alternative C, the visual impacts of all proposed management activities would be considerably less than proposed in Alternative B and the activities should exceed the Scenic Quality Objective of Low (VQO of Modification). Unit design measures to naturalize unit edges and retain legacy trees would assure that this alternative met the scenic quality objectives for all harvest units.

Cumulative Effects

The geographic boundary considered for cumulative effect to scenic integrity of the area is the western portion of the Lolo Trail Corridor because it encompasses the project area and the Lolo Trail area is generally a destination area for forest visitors. Viewing the landscape adjacent to the Lolo Trail Corridor becomes part of the experience visitors are seeking when they visit this area. It is part of the sense of place that visitors associate with this area.

Timber harvest generally appears as a modification in natural appearing landscape in the area for up to 40 years, depending on soils, aspect, and vegetative species composition. At the end of this time, the re-growth of vegetation develops the characteristics of a closed canopy, and the area no longer appears modified.

Past timber harvest in the area occurred between 1960 and 1999. Wildfire has also occurred across the analysis area in 1919 and 1936. Areas harvested before 1970 has re-vegetated and are no longer considered openings. Several harvest units adjacent the analysis area still appears as openings. The size and shape of the openings are small enough that they meet the Scenic Quality Objective of Low or emulate natural patterns found in the landscape to the point that they exceed the Forest Plan Scenic Quality Objectives.

Any proposed pre-commercial, commercial thinning and prescribed burning activities would not affect scenic integrity because canopy cover would be retained. Any proposed regeneration harvest that could create openings that could be visible from travel corridors in the analysis area would be designed to meet the Forest Plan scenic integrity objectives (Visual Quality Objectives – Appendix G Clearwater National Forest Plan) for travel corridors and use areas within this portion of the forest.

Vegetative patterns created should meet scenic integrity objectives within 5 years following harvest (all proposed activities would not dominate the existing landscape character and would meet the Scenic Quality Objective of Low), and re-vegetation to an unmodified condition would occur in 30 to 40 years. The vegetative patterns created would emulate natural processes prior to fire suppression and design features regarding leave tree retention would be implemented.

Roadless

The purpose of this analysis on the roadless resource is to disclose potential effects to roadless and wilderness attributes and determine if, or to what extent it might affect future consideration for wilderness recommendations. This analysis focuses on the potential effects of project activities on wilderness characteristics as defined in the Forest Service Handbook (FSH) 1909.12 (72.1). The 2008 Idaho Roadless Rule (36 CFR 294 subpart C) integrated local management concerns and the need to protect these areas in concert with the national objectives for protecting roadless area values and characteristics.

The following table shows the crosswalk between the wilderness attributes identified in Forest Service Handbook 1909.12 and the 1964 Wilderness Act; and the roadless area characteristics defined in the 2008 Idaho Roadless Rule.

Table 3-17. Crosswalk between Wilderness Attributes and Roadless Area Characteristics

Wilderness Attributes	Roadless Area Characteristics
Natural (Ecological systems are substantially free from the effects of modern civilization and generally appear to have been affected primarily by forces of nature).	High quality or undisturbed soil, water and air; Sources of public drinking water; Diversity of plant and animal communities; Habitat for threatened, endangered, proposed, candidate, and sensitive species and for those species dependent on large, undisturbed areas of land; Reference landscapes
Undeveloped (Degree to which the area is without permanent improvements or human habitation).	Natural appearing landscapes with high scenic quality
Outstanding Opportunities for Solitude or Primitive and Unconfined Recreation Solitude: Opportunity to experience isolation from the sights, sounds, and presence of others from the developments and evidence of humans Primitive and unconfined recreation: Opportunity to	Primitive, semi-primitive non-motorized and semi-primitive motorized classes of dispersed recreation

Wilderness Attributes	Roadless Area Characteristics
experience isolation from the evidence of humans, to feel a part of nature, to have a vastness of scale, and a degree of challenge and risk while using outdoor skills.	
Special Features and Values (Capability of the area to provide other values such as those with geologic, scientific, educational, scenic, historical, or cultural significance).	Traditional cultural properties and sacred sites; and Other locally identified unique characteristics
Manageability (The ability of the Forest Service to manage an area to meet size criteria and the elements of wilderness.)	No criteria

Affected Environment

The Middle Bugs project area is bounded to the west, north and east by the Bighorn-Weitas Roadless Area (B-WRA). The B-WRA is 254,800 acres in size. For a more complete description of the Roadless Area, see Roadless Area Conservation National Forest System Lands in Idaho, FEIS, Appendix C, Bighorn-Weitas #306 (USDA-Forest Service, August 2008).

The project area is bounded by a portion of Roads 104 and 555 on the northwest; encompasses all of Roads 553, 556, 3100, 5153, 5159, and their respective spurs; is bounded by a portion of Road 103, just east of Beaver Dam Creek; and bounded to the southwest by approximately three miles of the Nee Me Poo Trail 40, between Beaver Dam Saddle and the headwaters of Hemlock Creek. The project area is extensively roaded with approximately 35 miles of road of which 20 miles are open seasonally or yearlong to motorized traffic and 15 miles are closed yearlong to all motorized.

The CFP (1987) established Forest-wide multiple use goals, objectives, and management area requirements as well as management area prescriptions. The analysis of roadless lands, documented in Appendix C of the FEIS for the Plan, described each roadless area, the resources and values considered, the range of alternative land uses studied, and the effects of management under each alternative. As a result of the analysis some roadless areas were recommended for inclusion in the National Wilderness Preservation System and others were assigned various non-wilderness prescriptions. The B-WRA was assigned to MA A3, C1, C3, C4, C8S, and E1. The Middle Bugs project does not propose any activities in the B-WRA. Within the project area, the majority of the uninventoried lands contiguous to the B-WRA were assigned to MA C8S Big Game Summer Range. The primary goals for this MA are to manage to maintain high quality wildlife and fishery objectives while producing timber from the productive Forest land.

The purpose of this analysis is to evaluate the environmental consequences of the proposed action and alternatives on the wilderness characteristics in the B-WRA expanse described below.

Natural Integrity and Undeveloped Characteristics: In the B-WRA, with few exceptions, the natural integrity and appearance has not been altered. Timber harvest, road construction, and grazing have occurred in the area. Road 555 separates the Hemlock Creek drainage from the rest of the area. The Cook Mountain Reforestation area creates a major intrusion into the area. The Horseshoe Lake fire in 1961 and subsequent timber salvage activity in 8,000 acres of Gravey Creek is the only other major intrusion. Three short, low standard fire lookout roads penetrate the area from the Lolo Motorway (Road 500). There are hundreds of miles of low standard trails in the area.

Water quality ranges from good to high condition. The area provides habitat for Chinook summer salmon, steelhead, inland redband trout, westslope cutthroat and pacific lamprey habitat. No sources of public drinking water are present in the roadless area. Elk is the predominant big

game species; 92% of the area is key summer range. Canada lynx, wolverine, fisher, Coeur d'Alene salamander and western toad habitat, Regional 1 sensitive species occur in this roadless area.

Outstanding Opportunities for Solitude or Primitive and Unconfined Recreation: The size and shape of the area tends to promote solitude. The diverse topography and dense vegetation effectively isolates users effectively. The numerous trails disperse visitors. There are no lakes or single major attractions which tend to concentrate people. Outside viewing opportunities are limited, thereby minimizing visual disturbances from adjacent activities. Hiking, backpacking, primitive camping, photography, horseback riding, hunting and fishing are the key dispersed recreation. Commercial outfitters provide hunting and fishing services in the Weitas Creek drainage.

Special Features and Values: The Lolo Trail is one of the most important features (See Scenic Quality and Recreation sections above) in the roadless area. It was made into a road in the early 1930's. It remains as a very low standard route used today by hunters, Forest Service employees and others. Portions of a 400 acre Research Natural Area lie within the roadless area. Kelly Creek has a local and regional reputation for a quality fishery. Fishing for cutthroat trout is a major attraction.

Manageability: Except for the narrow Hemlock Creek area, the large size and rectangular shape of the roadless area contributes to the wildlife qualities. The area is large enough to be virtually unaffected by exterior sights and sounds.

Environmental Consequences

Direct and Indirect Effects – All Alternatives

Natural Integrity and Undeveloped Characteristics: No activities would occur within the B-WRA under any alternative. Project activities proposed outside and adjacent to these roadless areas would occur within areas that have been previously developed on National Forest System lands. As described above, the project area contains an extensive road system with general vehicular accessibility but with a relative degree of remoteness. There is a history of timber harvest, dispersed camping; and both motorized and non-motorized uses in the project area. Many of the roads identified in the project area were there as part of the existing condition for the 1987 Forest Plan. Within the Middle Bugs project area, under all alternatives, the watershed would remain in good to high condition. Proposed activities would have limited impacts to water quality, fisheries or wildlife habitat. There are no known occurrences of any sensitive plant species that would be affected by the proposed project. The amount of suitable habitat to be disturbed is miniscule compared to the amount available.

With the exception of unpredicted natural events such as wildlife or insect and disease infestations, the roadless area would remain in its current physical condition. The natural and undeveloped characteristics would remain the same. Because no activities would occur within the roadless area, the ability to find solitude would remain as it currently exists.

Outstanding Opportunities for Solitude or Primitive Unconfined Recreation: No project activities would occur in the roadless area under any alternative. Recreational opportunities and use of the project area is described in detail in the recreation section. Briefly, the majority of the use in this area is vehicular – cars, trucks, ATVs, UTVs, OHVs. Access is limited to rough, single lane, gravel roads by way of Roads 103, 104 and 500 and three forest trails that connect to existing roadways. There are no developed campgrounds and dispersed camping is relatively light. Most visitors pass by the project area, travelling along its edges to access more popular dispersed campsites and historical locations. Hunting appears to draw the most recreationists

who camp in the project area during the summer/fall season. Minimal non-motorized recreation occurs in the project area due to the steep terrain and remote location.

Under Alternative A there would be no effect to opportunities for solitude in the project area or the adjacent roadless area. Under all action alternatives, noise and distraction from proposed activities could be heard within the roadless area for a short distance and could reduce the feeling of solitude during the time of implementation. These effects would be temporary and limited in nature. Proposed road decommissioning and long term storage activities could increase opportunities for solitude in the long term.

Special Features and Values: The Middle Bugs project would not conduct any activities within the roadless area, the RNA or the National Historic Trail Corridor. Cultural resource inventories were conducted for the project area. No properties eligible or potentially eligible for listing in the National Register of Historic Places were found. Forest Plan Scenic Quality Objective for the area would be met under all alternatives.

Manageability: Project activities would not change any roadless area boundary, location or size or shape. Roaded access to the B-WRA already exists. The project area is currently roaded. Any existing wilderness attributes within the B-WRA would remain unchanged as a result of this project. The B-WRA would not be impacted by this project. The project area is immediately adjacent to this roadless area and roads have existed along the boundary since the 1987 Forest Plan went into effect.

Cumulative Effects

Cumulative effects to wilderness characteristics were considered for the combined project area and B-HRA totaling 260,600 acres because the project area boundary is immediately adjacent to the B-WRA on three sides. The time frame considered would be 30 years which the time necessary for proposed openings to revegetate, and negate any visual impacts. Present and foreseeable management actions considered are those that would impact roadless area characteristics. This would include timber harvest, prescribed burning, road construction or decommissioning and access changes.

Past management activities include timber harvest, prescribed burning, road and trail construction and grazing. Motorized access allowed dispersed camping, berry picking, hunting and firewood gathering to occur.

The only ongoing project in the cumulative effects area is the Weitas Fuels project. This project is conducting prescribed burning in the Weitas Creek drainage within the B-WRA. To date 15,709 acres have been treated; an additional 4,550 acres would be treated by 2013 to complete project activities. Burning would kill trees, create openings and reduce the green canopy that currently exists. This would appear natural given wildland fires are a major agent of change in this area and prescribed fire was designed to mimic wildland fire. These design features include unburned riparian buffers along streams, mosaic burn pattern, retention of duff layers, dominant low to moderate burn severity, and the timing of ignition of the units. All vertical and horizontal structure would be retained. None of the burned trees would be removed.

The Clearwater Forest Travel Plan designates roads, trails, and areas where motorized travel is permitted. A Motor Vehicle Use Map (MVUM) will be available to the public in late summer 2012. This plan affects motorized recreation across the Forest in a variety of ways, including limiting cross country travel, altering open access seasons and types of vehicles that are allowed on roads. Road and trail access will be managed per the 2005 Travel Guide until the Travel Plan decision is implemented with the exception of road and trail decisions made in this Middle Bugs project decision.

The Middle Bugs project activities when considered with the other past, present and ongoing activities described above, would not cumulatively impact wilderness characteristics. Because there are no direct or indirect effects, there can be no cumulative effects.

Economics

Affected Environment

The Middle Bugs project area is located within Clearwater and Idaho Counties, Idaho. The economic analysis area includes local towns and communities influenced by the timber sale activities. These towns include Orofino, Pierce, Weippe, Kamiah, Kooskia, Grangeville and Lewiston, Idaho. The influence is based on their geographic location to the watershed, economic dependence on it, and use of it dating to settlement more than 100 years ago. The Clearwater National Forest has provided wood to local mills since the 1930s. The Forest's output, along with BLM timber outputs, accounted for half the total timber harvested in Clearwater County in the mid-1990s. Most of it was processed in mills located in or near the towns mentioned previously.

This project would be harvested with tractor and skyline systems. Proposed harvest would require up to 5.2 miles of temporary road construction, depending on the alternative. Alternative B also proposes approximately 2.1 miles of permanent road construction. The appraised sawmill is 31 miles away at Weippe, Idaho. The local sawmill delivered log prices are currently rising compared to 2011, but are not as high as 2007.

Employment and income effects attributable to Forest Service timber management are derived from the harvesting and processing of timber. Timber harvest and processing requires the employment of loggers, truck drivers, mill workers and a variety of workers in logistical support (road grader operators, back hoe operators etc.).

The logging contractors, wood processing plants, county road departments and public schools must purchase materials and labor to perform their functions. These purchases produce indirect effects. Induced effects are the result of spending by workers directly employed in the timber industry and by workers that are in part supported by dollars generated by the timber industry, such as grocery and equipment stores. This chain of purchases travels through the local community until the timber dollars leave the local market area and becomes part of the national economy.

Analysis Methodology

The Forest Service Micro IMPLAN model was used to derive the indirect and induced economic effects. Direct economic effects were derived from mill surveys conducted by the Bureau of Business and Economic Research at the University of Montana. The response coefficients found in the table were developed for the 1997 CNF Timber Sale Program Information Reporting System (TSPIRS). TSPIRS is a reporting system developed jointly with the General Accounting Office (GAO) and the Forest Service, which has been reviewed and approved by Congress.

The coefficients from the Forest Service Micro IMPLAN model to derive the indirect and induced economic effects are:

Harvest Related Jobs Generated	13.5 per 1.0 MCCF
Harvest Income to Communities	$383,406 per 1.0 MCCF
Federal Income Tax Generated	$57,511 per 1.0 MCCF
Total Gross Receipts	$95,968 per 1.0 MCCF

The Region One gate 1 and 2 spreadsheet and Quicksilver model with Nez Perce Clearwater National Forest area factors were used to determine sale feasibility and appraised value. The Quicksilver model uses recent transactional evidence based on local timber sales to determine sale value. The timber stand data base and extensive field reviews were used to determine timber volume and species composition; these are the two primary factors determining gross value of a timber sale. Net value depends on costs for logging system, haul distance, slash disposal, planting, and cost of mitigation activities. The cost estimates for this sale are based on recent similar sales in the vicinity.

Resource Indicators

Resource indicators are the number of harvest related jobs generated, Appraised Value and Present Net Value.

Current Conditions

The towns of Orofino, Weippe, Pierce, and Lewiston all show high to very high historic employment in the wood products manufacturing industry.

As of October 2011, Clearwater County had an unemployment rate of 15.5 percent; this is the second highest in Idaho. Idaho County is at 11.3 percent. The Idaho State average unemployment is 8.8 percent and the national average is 9.0 percent.

Counties dependent on federal timber receipts to help fund schools and highways find that this source of funding is drying up, so they have relied more heavily on taxes to bolster their income. However, this distribution process has been revised under the Secure Rural School and Community Self-Determination Act of 2000 (P.L.106-393). This revision allows counties to select “full payment” of the high three years of National Forest Receipts, rather than rely on yearly timber sales or National Forest funds. The 25 percent fund will still provide funds to counties, but other funds will be included to make up the “full payment”.

Environmental Consequences

Direct and Indirect Effects

1. **Comparison of Alternatives A, B and C**

Timber Harvest Jobs and Income: Alternative A would not generate any timber harvest jobs, community income, income tax or receipts. Alternatives B and C would generate the same amount of jobs and income, because even though they have other economic variations, they ultimately have the same amount of timber output, which is what the model is based on.

Table 3-18. Timber Harvest Jobs and Income

Alternative	Volume (CCF)	Volume (MBF)	Jobs Sustained	Community Harvest Income	Federal Income Tax	Total Gross Receipts
A	0	0	0	0	0	0
B and C	20,600	9,600	278	$7,898,000	$1,185,000	$1,977,000

Predicted Stumpage and Present Net Value: Each alternative produces a different level of benefits and costs associated with the timber harvest, road work, fuel treatment, reforestation, mitigation measures (skid trail decompaction), and other related timber harvest activities. This part of the economic analysis focuses on the relative differences in these benefits and costs between alternatives by displaying Predicted Bid Rates and Present Net Value (PNV). The

Predicted Bid Rate is the amount based on recent bidding that the Clearwater National Forest anticipates the timber would sell for. The PNV is the anticipated selling value minus the costs to implement the sale. An alternative with a positive PNV has stumpage values exceeding costs; an alternative with a negative PNV has costs in excess of stumpage values and may require supplemental funding to complete all activities.

Information provided by the economic models is used as a tool to understand the relative differences between alternatives rather than to predict actual values for each alternative.

Costs associated with road decommissioning and storage, culvert replacement (except as needed for hauling on Road 555), and precommercial thinning are not included in the stumpage equation. A limited amount of this type of activity for sediment reduction may be funded under the Knutson-Vandenburg Act (KV) which derives funds from timber stumpage revenues above base rates from the harvesting of timber within the immediate vicinity of a watershed restoration site. Stewardship retained receipts from other projects may also be a funding source; however, this watershed would likely not rate as a high priority when compared with other watersheds across the Forest, which would also be competing for these funds. Considering this project for stewardship sale authority, which could fund some of these activities directly from timber stumpage, has not been considered realistic either, because of the low timber value species. This could change if the stumpage values rise by the sell date.

Alternative A does not generate any values or have any costs associated with the NEPA decision; therefore, the PNV is zero. This alternative would not offset NEPA analysis preparation costs of $174,000. Bark beetle activity would continue to spread throughout the proposed treatment area, decreasing economic timber values. Should a large (100+ acre) wildfire start as a result of the fuel buildup from the anticipated tree mortality, fire suppression costs exceeding $300,000 should be expected (for comparison, the 350 acre Granite fire of 2011, which occur in the same habitat with the increased mortality, cost $2.2 million).

Alternatives B and C would generate enough stumpage value to cover all sale costs, including reforestation. They would also capture the timber value before it deteriorates due to bark beetle infestations. An item that contributes to the sale's efficiency is that the harvest units are large in size and focused in a localized area, which reduces mobilization costs. Both alternatives would generate enough funds to cover the implementation costs. This would not include NEPA analysis preparation costs of $174,000 because these pre-decisional costs are not an outcome of the NEPA decision). Alternatives B and C propose the same harvest activities. The only differences are:

Alternative B proposes permanent road construction which entails a higher cost design versus Alternative C which proposes a slightly narrower width, steeper grade, temporary road.

Alternative B would prescribe burn harvested areas to remove slash and prepare sites for planting versus Alternative C which would employ purchaser mechanical site preparation methods. Under Alternative B, required overhead costs and additional leave tree protection measures necessary to meet visual objectives are more expensive than the burning and purchaser mechanical site preparation methods proposed in Alternative C.

The following table displays the predicted stumpage and present net value for each alternative. Alternative B proposes permanent road construction and prescribed burning for site preparation, which requires extensive additional leave tree protection; this would result in a PNV of $29,000 less than Alternative C.

Table 3-19. Predicted Stumpage and Present Net Value

Alt	Volume (CCF)	Volume (MBF)	Appraised Total 1/	Reforestation Costs	Implementation Costs 2/	Present Net Value	Stewardship Costs 3/
A	0	0	0	0	0	0	0
B	20,600	9,600	$716,000	$600,000	$66,000	$50,000	$265,000
C	20,600	9,600	$740,000	$600,000	$61,000	$79,000	$265,000

1/ Appraised value predicted high bid includes site preparation costs, skid trail decompaction and road costs associated with the harvest.

2/ Implementation costs include presale, engineering and administration costs. NEPA costs, which total about $174,000, are not included.

3/ Stewardship item costs include road decommissioning and storage, culvert replacement and pre-commercial thinning.

Table 3-20. Non-timber sale or Stewardship Project Costs by Alternative

Project Activity	**Project Costs by Alternative Alternatives B and C**
Road Decommissioning	30,000
Intermittent Road Storage or Term Service	90,500
Culvert Replacement high Priority	46,240
Culvert Replacement moderate Priority	37,760
Precommercial Thinning	60,500
Total Stewardship Projects	265,000

Cumulative Effects

Geographic Boundary. The geographic boundary considered for economic cumulative effects are Clearwater, Idaho, Lewis, Nez Perce Counties in Idaho.

Time Frame. The time frame considered is 8 years after estimated project implementation in 2013 as this is the expected life of the project, including post-harvest reforestation, site preparation and road decommissioning.

Past, Proposed and Foreseeable Future Actions. Economic impacts for timber harvest and sawmilling lumber are shown in the previous section. These are described as direct and indirect effects, but they are also cumulative impacts due to the additional jobs, taxes, and income they provide. The table in the previous section displays these values. When considering impacts of additional jobs and income created, this sale contributes towards the Forest's 5-year timber sale plan. The 5-year timber sale plan has averaged 25 MMBF per year and is projected to stay at that level for the next 3 to 5 years. Sold or foreseeable local sales affecting the same communities and contributing to the long term timber flow to these communities include the Middle Black Sale (sold 2005), Gezel Sale (sold 2007), Lower Orogrande project (NEPA not completed), Preacher Dewey Sale (proposed to sell in 2012), Lochsa Thin (proposed to sell in 2013) and Lolo Insect and Disease (NEPA not completed, proposed to sell in 2017). The Forest road decommission program also plans some projects in the North Fork Clearwater River, Orofino Creek, Lolo Creek, and Eldorado Creek drainages which would contribute to local jobs and income.

Prescribed burning is planned in association with some of the timber sale projects discussed above and would be completed with Forest Service workforce; therefore, it would not have a cumulative effect on the local communities.

There may be a need for additional forestry workers if additional forest activities are implemented within these counties by the State of Idaho or private industries.

1. **Alternative A.**

This alternative does not propose any timber harvest or road decommissioning; therefore, it would not contribute cumulatively to the local community jobs and income. It would maintain current unmanaged use and related income. It potentially could contribute toward future firefighting costs as the insect infested trees die and create excessive fuel loadings susceptible to wildfire ignitions.

2. **Alternatives B and C**

Both alternatives would create the same amount of jobs and income. When added to the Forest 5-year timber sale plan, these alternatives would not generate enough jobs or income from timber harvest or road work and Precommercial thinning activities to change community employment averages as calculated for the past three years.

Irreversible and Irretrievable Commitment of Resources : There is no known or suspected irreversible and irretrievable commitment of resources. From an economic standpoint, harvest and utilization of the merchantable timber at this time is the lowest risk to loss of economic value. Fire, insects, disease, and other natural events could reduce the existing value of the trees in the analysis area.

Tribal Treaty Rights

Affected Environment

The Middle Bugs analysis area lies within the 1855 treaty rights boundary and 'northern homeland' of the Nez Perce Tribe. The area is important to the Nez Perce Tribe as a traditional place for gathering, hunting, fishing, camping, and religious activity. It is important to the Nez Perce people who value access to their traditional land use areas.

Analysis Methodology

Historical, cultural, and traditional properties in the project area are regulated by a number of federal laws and regulations, including the National Historic Preservation Act, 26 CFR 800 – protection of Historical and Cultural properties, the American Indian Religious Freedom Act, the Archaeological Resource Protection Act, and the Native American Graves Protection and Repatriation Act.

Clearwater Forest Plan direction is to protect Indian tribal rights as retained in treaties and other agreements, and to protect religion ceremonial sites and hunting and fishing rights. Other agency plans direct the Forest Service to work closely with area Indian tribes to achieve mutual goals and objectives, and to insure that "trust responsibilities" of Indian treaties are honored.

Resource Indicators

This section assesses the potential impacts of project activities on tribal fishing, hunting and gathering.

Environmental Consequences

The Nez Perce Tribe reserves the exclusive right of taking fish at all usual and accustomed places together with the privilege of hunting, gathering roots and berries. The following estimates the effects of proposed treatments on these tribal activities:

Direct and Indirect Effects

1. **Alternative A**

Fishing, Hunting and Gathering Activities: Current recovery trends would continue in the area's streams. However, increased risk of sediment delivery to streams from undersized and deteriorating culverts would continue. The risk of wildfire would continue to increase which could have an impact on water quality and fish habitat.

There would be minimal impact to Tribal hunting. Elk summer habitat effectiveness would remain at 82% within MA C8S. Hunting opportunities for tribal members should continue at current levels.

2. **Alternatives B and C**

Proposed activities are not likely to affect the ability of Nez Perce Tribal members to exercise their right to fish within and near the analysis area. Effects upon fish habitat are expected to be minimal, not likely to affect fish populations. This is due to INFISH buffer implementation and the fact the project would produce no measurable increase in sediment. Also, road decommissioning, storage and culvert replacement activities would benefit fish habitat.

Elk habitat effectiveness in the Beaver Dam Elk Habitat Unit, where most of the proposed regeneration harvest activity is located, would increase slightly because of road decommissioning and storage activities and improvements in the hiding cover to forage ratio. Vegetation treatments would provide more big game forage. Overall, the area would continue to provide adequate hiding cover. Overall, hunting opportunities for tribal members would not change under the action alternatives.

Overall, impacts on Tribal gathering activities should be minimal and potentially beneficial.

Cumulative Effects

Geographic Boundary: The cumulative effects boundary consists of the project area, since the effects of proposed actions would be negligible outside of this area.

Time Frame: Twenty years after project implementation because effects from proposed activities would no longer be apparent as openings revegetate.

Past, Present, and Foreseeable Future Actions: Past actions include completed timber sale activities and wildfires. There are no other ongoing or foreseeable actions in the project area that could possibly have an effect on fishing, hunting, or gathering activities. In the event of any future projects, consultation with the Tribe would be initiated with each sale proposal, and design or mitigation measures would be implemented to minimize or eliminate any adverse effects.

1. **All Alternatives**

There are no cumulative effects related to any alternative since cumulative effects can only arise from the incremental impacts of an action when added to other past, present, and reasonably foreseeable future actions. There are no other present or foreseeable actions associated with any alternative.

Chapter IV. Other Required Analysis

This is not a major Federal action. It will have limited context and intensity (40 CFR 1508.27), individually or cumulatively, to the biological, physical, social or economic components of the human environment. It will have no adverse effect upon public health or safety, consumers, civil rights, minority groups and women, prime farm land, rangeland and forestland, roadless areas, or to old growth forest options.

Effects of Alternatives on Prime Farm land, Rangeland, and Forest land

All alternatives are in keeping with the Secretary of Agriculture memorandum, 1827 for prime land. The project area does not contain any prime farm lands or range lands. "Prime" forest land does not apply to lands within the National Forest system. With both alternatives, National Forest lands would be managed with sensitivity to the effects on adjacent lands.

Energy Requirements of Alternatives

There are no unusual energy requirements for implementing any alternative. With relation to national and global petroleum reserves, the energy consumption associated with the individual alternatives, as well as the differences between alternatives, is inconsequential.

Effects of Alternatives on Minorities and Women

There are no unusual differences among the effects of any alternative on American Indians, women, other minorities, or the civil rights of any American citizen.

Environmental Justice

In regard to Environmental Justice Order 12898, the health and environmental effects of the proposed activities would not disproportionately impact minority and low-income populations. There would be no effect from the proposed activities on the treaty rights of the Nez Perce Tribe and local communities. The project economic analysis did not reveal any disproportionately high and adverse impacts to minority populations and low-income populations.

Invasive Species (E.O. 13112)

Executive order 13112 on Invasive Species directs that Federal Agencies should not authorize any activities that would increase the spread of invasive species. This project includes design features to limit the spread of invasive species.

List of Preparers

ID Team Members:

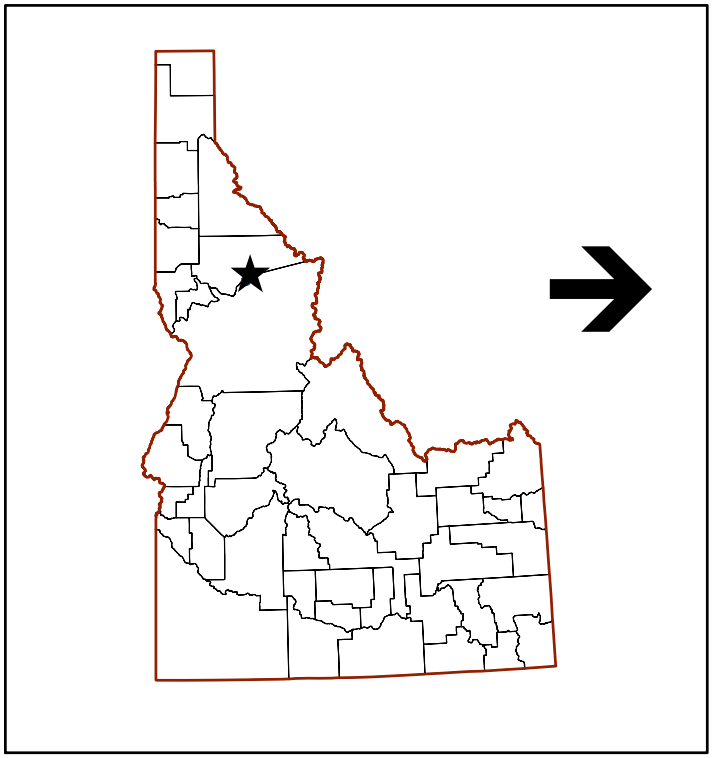
Rick Brazell	Forest Supervisor	Decision Maker
Kathy Rodriguez	North Fork District Ranger	Line Officer
Tammy Harding	NEPA Specialist	IDT Leader
Tam White	Timber Management Officer	Economics
Marcus Chin	Silviculturist	Vegetation
Meg Foltz	Soil Scientist	Soils
Andre Snyder	Hydrologist	Water Quality
Dan Kenney	Fisheries Biologist	Fisheries and Wildlife
Diana Jones	Landscape Architect	Scenic Quality
Robbin Johnson	Archeologist	Cultural Resources
Kearstin Edwards	Recreation Specialist	Recreation
Amy Larson	Fuels Specialist	Fuels
Sue Elias	GIS	GIS
Mike Hayes	Botany/Invasive Plants	Sensitive Plants

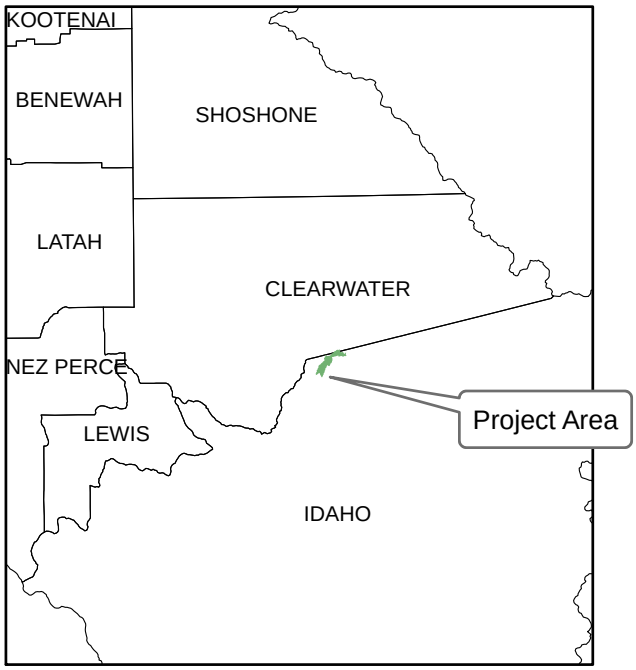
Appendices

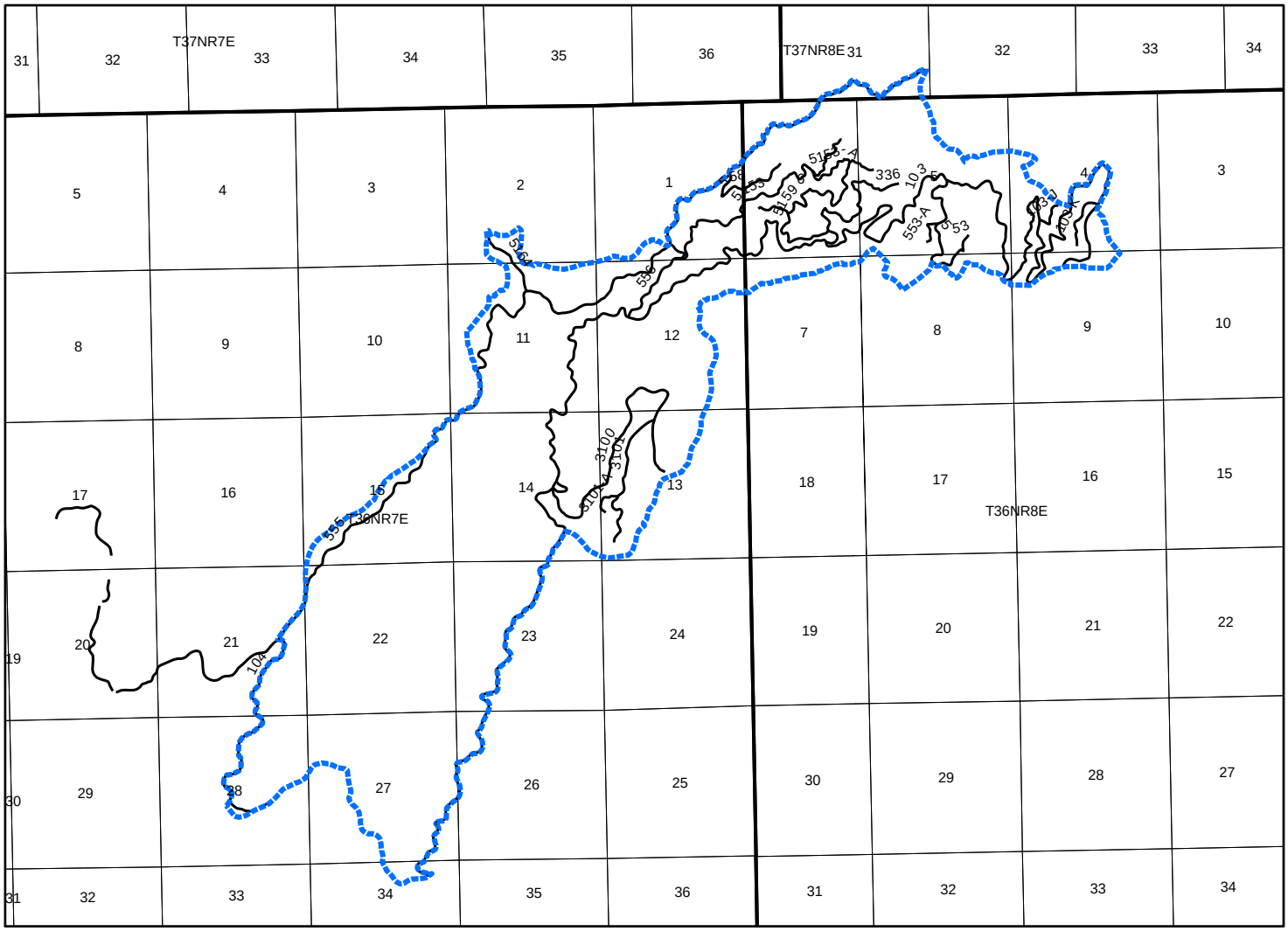
Appendix A – Maps and Treatment Descriptions

A-1 Vicinity Map
A-2 Alternative B Treatment Map
A-3 Alternative C Treatment Map
A-4 Management Area Map
A-5 Watershed Boundaries Map
A-6 Old Growth Map
A-7 Soils Mitigations Map

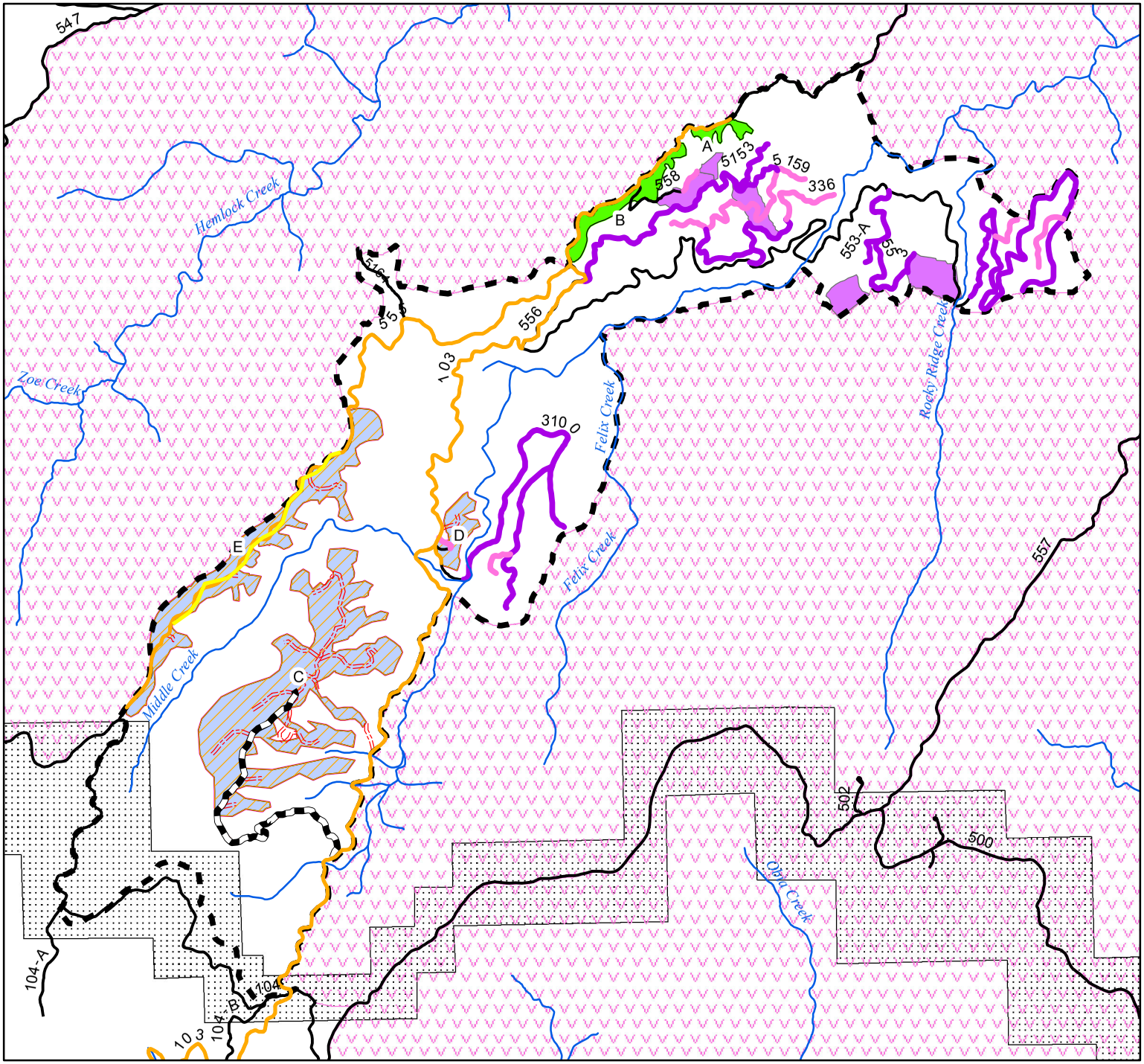
Middle Bugs Project Vicinity Map







Middle Bugs Project Alternative B



N

- Road Reconstruction
- Road Reconditioning
- Streams
- Road Decommissioning
- Roads To Be Placed Into Long Term Storage
- Study Area Boundary
- Permanent Road Construction
- Temporary Road Construction
- Post Harvest Prescribed Burn
- Precommercial Thin
- Regeneration Harvest
- Commercial Thin
- Bighorn Weitas Roadless Area
- Neemeepoo Trail Corridor

Miles

0 0.25 0.5 1 1.5 2

Date: 8/21/2012

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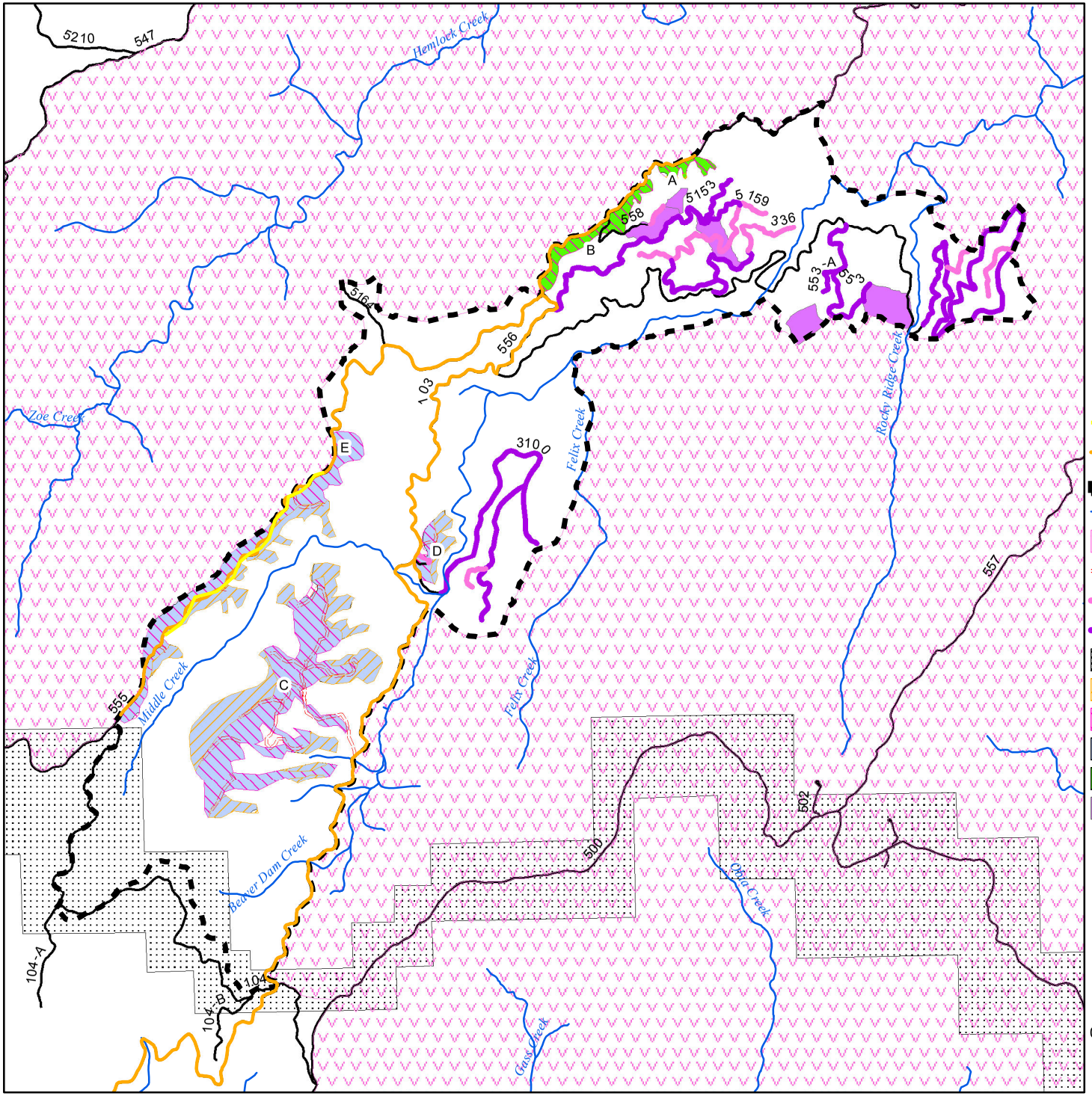
Middle Bugs Project
Alternative C
No Permanent Road Construction



N

- Road Reconstruction
- Road Reconditioning
- Study Area Boundary
- Streams
- Bighorn Weitas Roadless Area
- Temporary Road Construction
- Road Decommissioning
- Roads To Be Placed Into Long Term Storage
- Neemeepoo Trail Corridor
- Post Harvest Prescribed Burn
- Post Harvest Excavator Piling
- Regeneration Harvest
- Commercial Thin
- Precommercial Thinning

Miles
0 1 2

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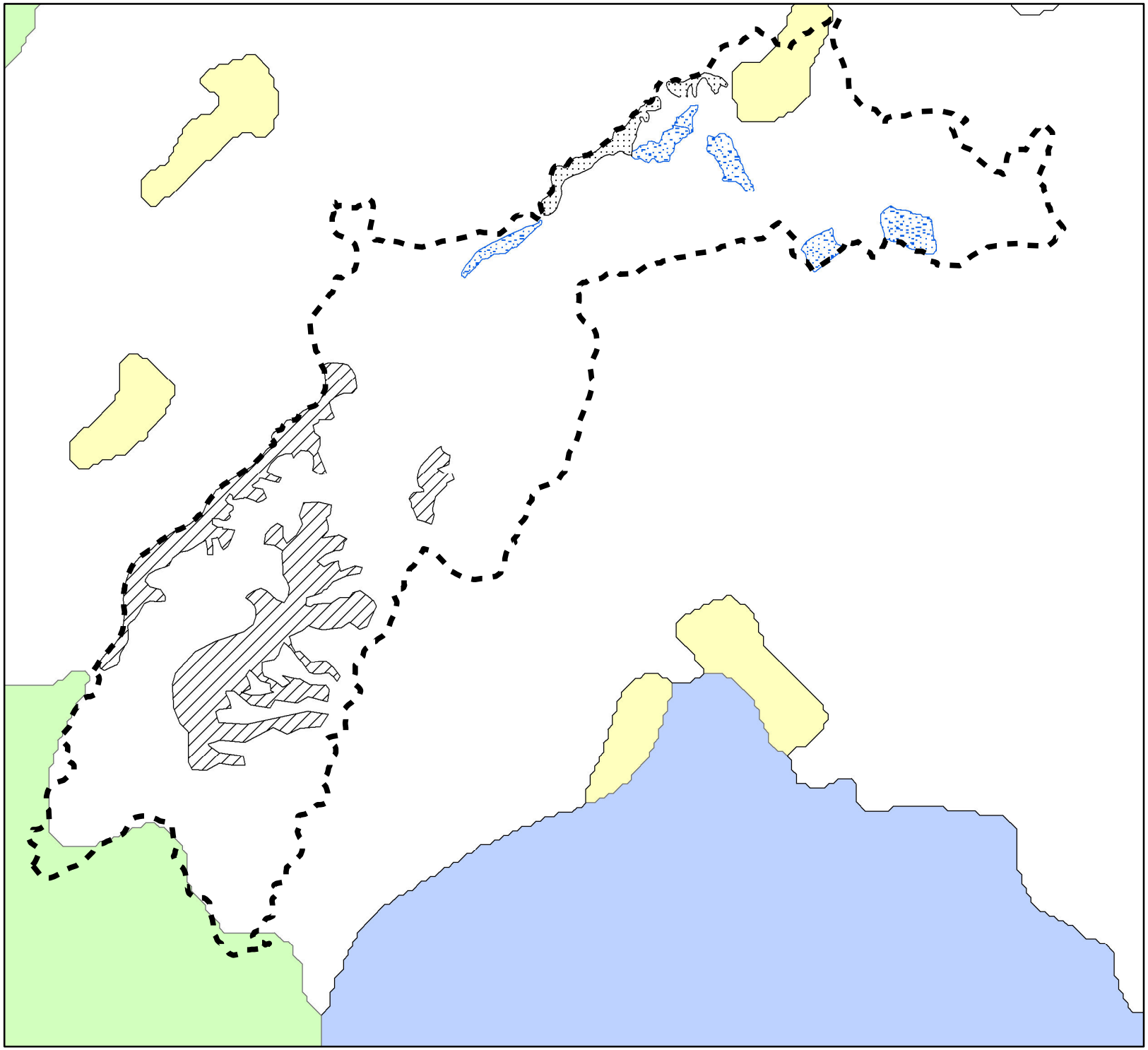
Date: 8/21/2012

Map A-4

Middle Bugs Management Areas



N

Study Area Boundary
Big Game Summer Range /Timber Management (C8S)
Key Fishery Habitat (C6)
Timber Management (E1)
Unsuitable (US)
Commercial Thin
Regeneration
Precommercial Thin

Miles
0 0.5 1

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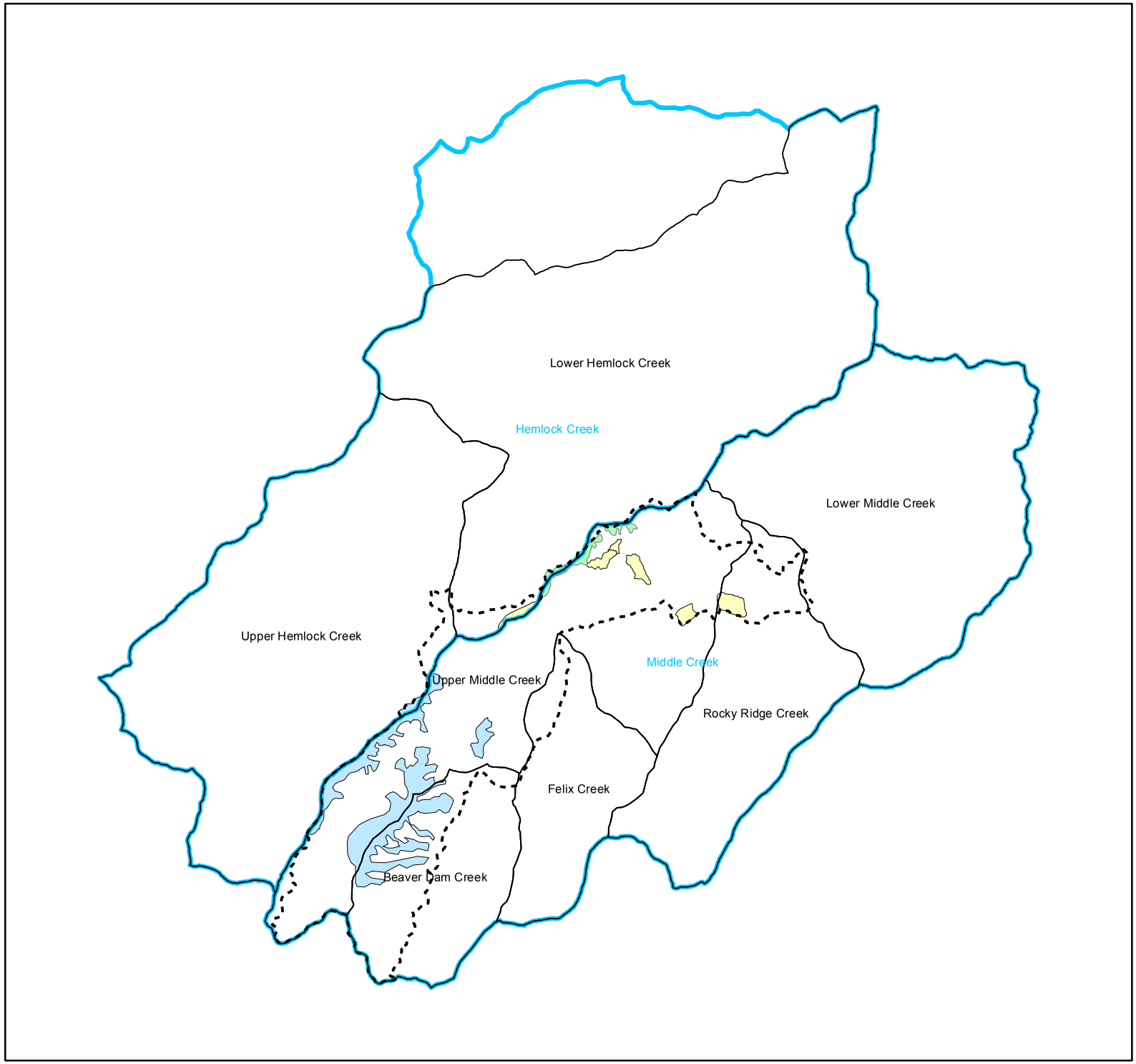
Date: 8/21/2012

Map A-5

Middle Bugs Project Watershed Boundaries



N

- Study Area Boundary
- Precommercial Thin
- Regeneration Harvest
- Commercial Thin
- HUC 6 Boundaries
- Huc 7 Boundaries

Miles
0 1.5 3

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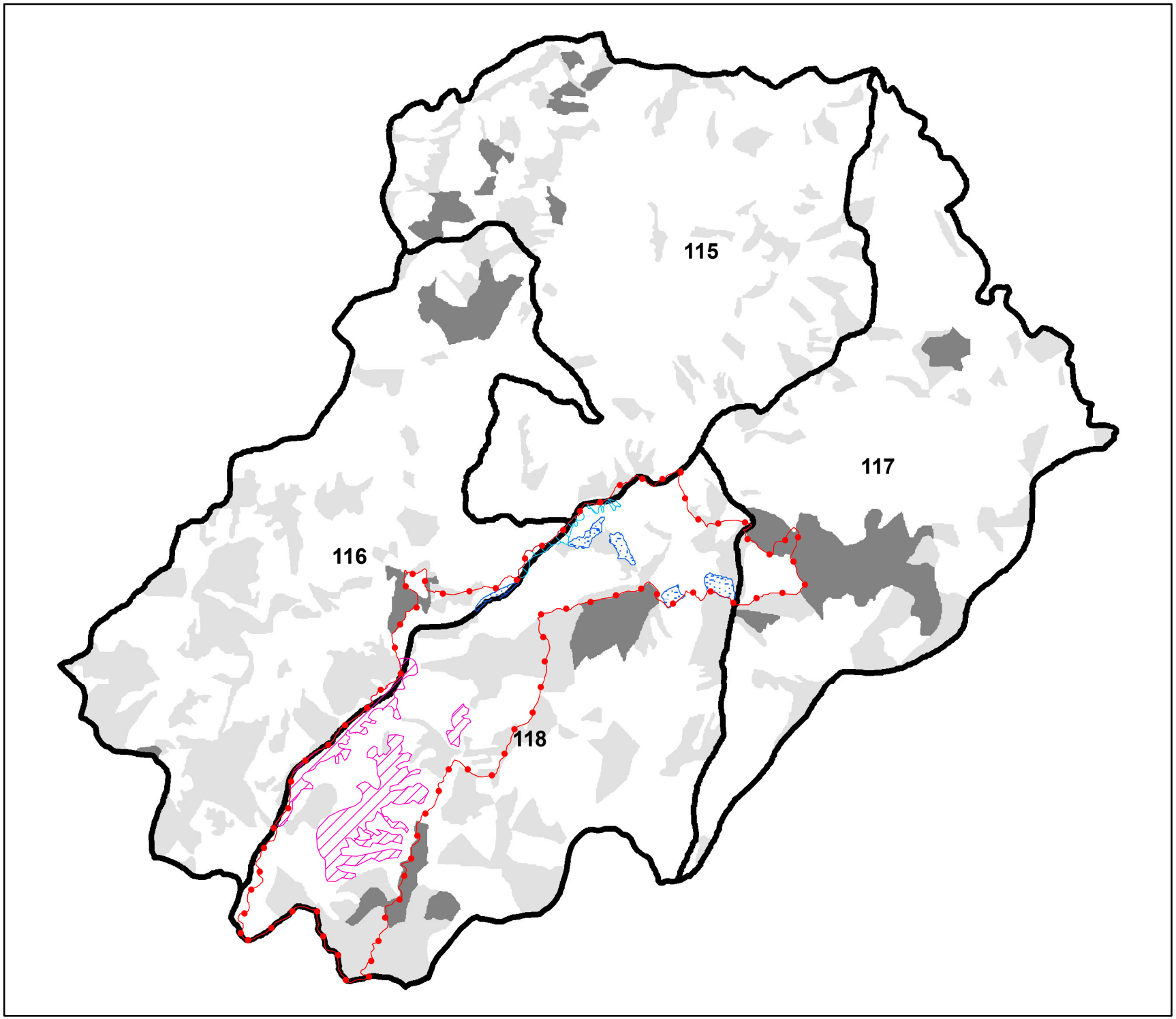
Date: 8/21/2012

Middle Bugs Old Growth



N

Middle Bugs Study Area
Regeneration Harvest
Commercial Thin
PreCommercial Thinning
Old Growth Units
Oldgrowth
Mature(130-150yrs)

Miles
0 0.5 1 2

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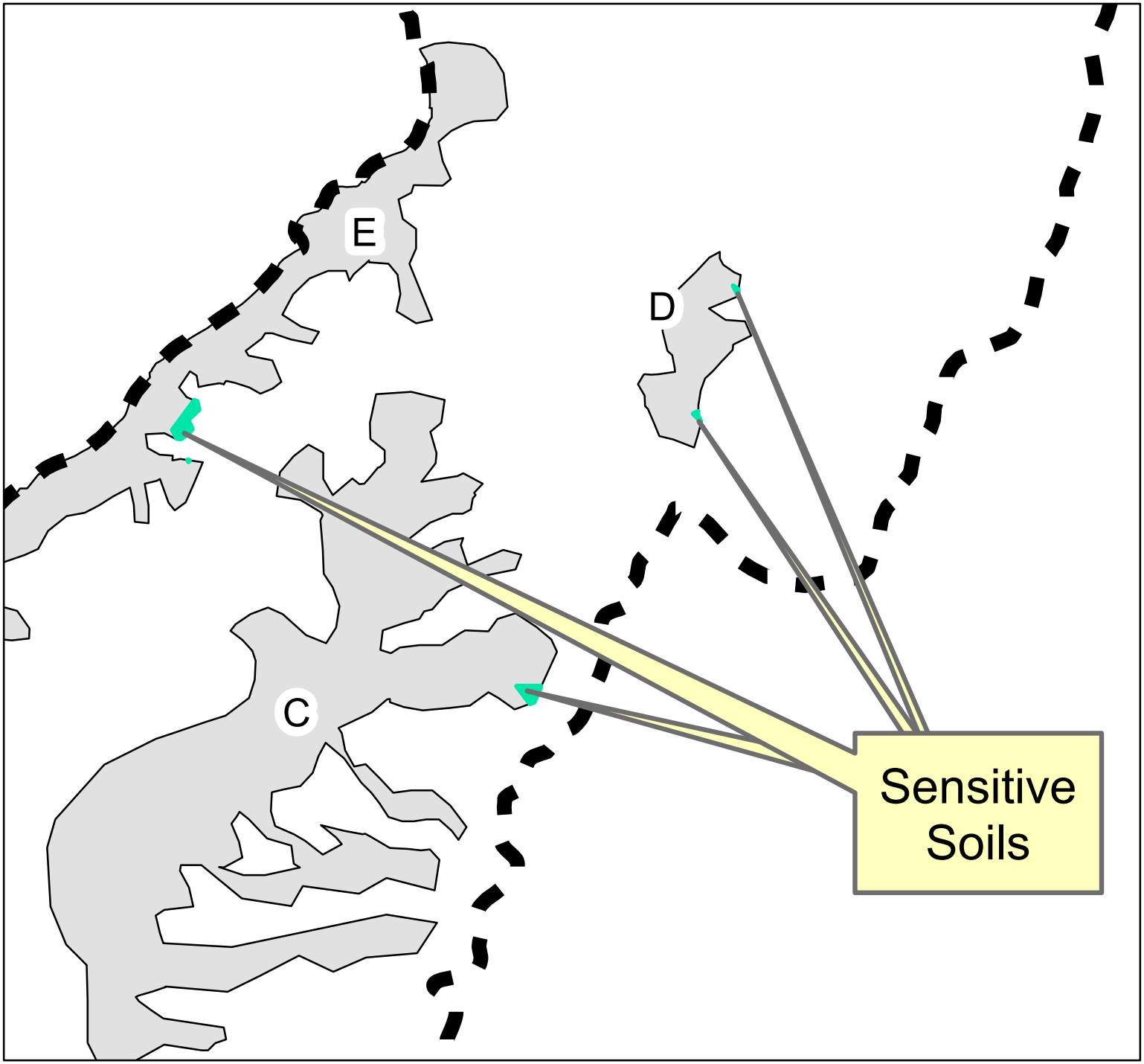
Date: 8/21/2012

Middle Bugs Sensitive Soils Requiring Mitigation



N

Study Area Boundary
Sensitive Soils
Harvest Units

Miles
0 0.05 0.1 0.2 0.3 0.4

Date: 8/22/2012

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Detailed Descriptions of Proposed Activities

Table A-1. Treatment Summary

Activity	Alternative A No Action	Alternative B Proposed Action	Alternative C Temporary Roads Only Scenery Protections
Regeneration Harvest (acres)	0	642	642
Commercial Thin (acres)	0	63	63
Logging System	0	464 acres tractor 241 acres skyline ground	
Site Preparation	0	Prescribed burn	Prescribed burn on skyline ground and excavator site-prepare tractor ground
Road Construction (miles)	0	2.1	0
Road Reconstruction (miles)	0	1	1
Road Reconditioning (miles)	0	23	23
Temporary Road (miles)	0	3.9	5.2
Pre-commercial Thin (acres)	0	114	
Road Long-Term Storage (miles)	0	11.3	
Road Decommissioning (miles)	0	3.01	
Watershed Improvements	0	Culvert replacement on 555 and 103 roads 42 culverts	

Vegetation Treatments by Unit

Table A-2. Alternative B

Unit	Harvest Prescription	Acres	Logging Systems		Prescribed Burning		Temporary Road Miles	Permanent Road Miles
			Skyline	Tractor	Skyline	Tractor		
A	Commercial Thin	14	1	14	0	0	0	0
B	Commercial thin	48	0	48	0	0	0	0
C	Regeneration	416	162	256	162	256	3.4	2.1
D	Regeneration	35	18	18	18	18	0.1	0
E	Regeneration	192	64	130	64	130	0.3	0

Table A-3. Alternative C

Unit	Harvest Prescription	Acres	Logging Systems		Prescribed Burning		Temporary Road Miles	Permanent Road Miles
			Skyline	Tractor	Skyline	Tractor		
A	Commercial Thin	14	1	14	0	0	0	0
B	Commercial thin	48	0	48	0	0	0	0
C	Regeneration	416	162	256	162	0	4.8	0
D	Regeneration	35	18	18	18	0	0.1	0
E	Regeneration	192	64	130	64	0	0.3	0

Watershed Improvements

Table A-4. Culvert Replacement List

Road	Mile Post	Priority	Comments
103	3.7	high	adequate size at 24", but poor condition and function
103	4.19	high	existing 24" in poor condition, slumpy areas at inlet; outlet buried in fill buttress; 24" is sized for Q100, but would pass debris better at larger size
103	4.35	high	existing 18" undersized and poor condition and function; replace with 24"
103	4.69	high	existing 24" adequate size in poor condition and function; replace with 24" minimum
103	5.14	high	existing 24" adequate size but poor condition; replace with 24"
103	5.89	high	existing 18" in poor condition and function: replace with 24"
103	6.6	high	existing 18" in poor condition and function; could not find outlet; replace with at least 18"(dry ditch relief)
103	6.81	high	existing 18" in poor condition and function; could not find outlet; replace with at least 18" (trickle flow)
103	6.82	high	existing 18" in poor condition and function; replace with 24"
103	9.27	high	existing 18" undersized in poor condition; replace with 24"
103	9.3	high	existing 18" in poor condition and function; replace with 24"
103	9.8	high	existing 18" in poor condition and function, failed 2010; replace with 24"
103	10.08	high	existing 18" in poor condition and function; replace with 24"
103	10.1	high	existing 18" in poor condition and function; replace with 24"
103	10.2	high	existing 18" in poor condition and function; replace with 24"
103	4.45	high	existing 24" undersized and in poor condition and function; replace with 36"
103	4.65	high	existing 24" slightly undersized and in poor condition and function; needs >27"
103	6.2	high	existing 24" is undersized and in poor condition and function, outlet totally buried; replace with 36"
103	7.6	high	existing 36" slightly undersized ; poor condition and function; replace, >40" recommended but 36" will handle 100yr flow at 1.0 HW/D
103	8.6	high	existing 24" slightly undersized and in poor condition and function; needs >27";
555	2	high	existing 12" in fair condition and function; trickle flow; replace with >=18"
103	1.52	high	existing 36" slightly undersized but sufficient capacity at HW/D=1.0 ; fair inlet condition, outlet smashed but functional; 27% of basin in unit C; replace with >40" recommended
103	1.52	mod	existing 18" undersized in fair condition and function; replace with 24"
103	1.8	mod	good condition but slightly undersized at existing 36"; Q100 = 40", but size sufficient at full 1.0 HW/D; 32% of basin in unit C; possible fish barrier
103	2.05	mod	existing 24" slightly undersized but 24" sufficient at HW/D =1.0; fair condition and function; 25% of basin in unit C boundary; replace with >26" recommended
103	2.72	mod	existing 18"in fair condition and function; very low flow; replace with >24"
103	4.25	mod	existing 18" in fair condition and function at inlet; outlet buried in fill; very low flow; find outlet or replace
103	4.91	mod	existing 18" in poor condition and function; dry ditch relief; replace with >=18"
103	5.04	mod	existing 18" in poor condition and function; dry ditch relief; replace with >=18"
103	5.24	mod	existing 18" in poor condition and fair function; replace with 24"
103	5.4	mod	existing 18" in fair condition and poor function; replace with 24"

Road	Mile Post	Priority	Comments
103	5.45	mod	existing 18" in poor condition and fair function; dry ditch relief; replace with ≥18"
103	5.66	mod	existing 18" in fair condition and poor function; replace with 24"
103	5.8	mod	existing 18"in fair condition and function; replace with >24"
103	6.3	mod	existing 18"in poor condition and fair function; inlet smashed, can be repaired
103	6.45	mod	existing 18"in fair condition and function; very low flow; replace with ≥18"
103	6.68	mod	existing 18"in fair condition and function; very low flow; replace with ≥18"
103	6.71	mod	existing 18"in poor condition and fair function; perennial stream; replace with 24"
103	6.72	mod	existing 24"in fair condition and good function; perennial stream; replace with 24"
103	7.2	mod	existing 18" in poor condition and function; dry ditch relief; replace with ≥18"
103	9.47	mod	existing 18" in fair condition and function; replace with ≥18"
555*	0.61	mod	existing 12" in fair condition and function; trickle flow; replace with ≥18"

*This culvert would be replaced with the timber sale to facilitate safe log haul.

Table A-5. Proposed Road Decommissioning and Long-Term Storage

Road #	Treatment	Miles Treated	Priority	Current Motorized Restriction	2012 Travel Plan Motorized Restrictions	Current Bicycle Restriction	Current Snowmobile Restrictions	2012 Travel Plan Snowmobile Restrictions
103-J	Decommission	0.23	mod	Yearlong	Yearlong RYA	None	10/1-12/1	5/16-11/15
103-K	Decommission	0.40	mod	Yearlong	Yearlong RYA	None	10/1-12/1	5/16-11/15
1610	Decommission	0.10	low	None	None OYA	None	None	5/16-11/15
3101-A	Decommission	0.22	low	Yearlong	Yearlong RYA	None	10/1-12/1	5/16-11/15
336	Decommission	0.53	high	Yearlong	Yearlong RYA	None	10/1-12/1	5/16-11/15
5159	Decommission	1.14	high	Yearlong	Yearlong RYA	None	10/1-12/1	5/16-11/15
5159-A	Decommission	0.23	unknown	Yearlong	Yearlong RYA	None	10/1-12/1	5/16-11/15
558	Decommission	0.14	unknown	Yearlong	Yearlong RYA	None	10/1-12/1	5/16-11/15
103	Long-Term Storage	3.42	high	Yearlong	Yearlong RYA	None	10/1-12/1	5/16-11/15
3100	Long-Term Storage	0.58	mod	Yearlong	Yearlong RYA	None	10/1-12/1	5/16-11/15
3100	Long-Term Storage	1.28	high	Yearlong	Yearlong RYA	None	10/1-12/1	5/16-11/15
3101	Long-Term Storage	0.11	mod	Yearlong	Yearlong RYA	None	10/1-12/1	5/16-11/15
3101	Long-Term Storage	0.07	mod	Yearlong	Yearlong RYA	None	10/1-12/1	5/16-11/15
3101	Long-Term Storage	0.85	mod	Yearlong	Yearlong RYA	None	10/1-12/1	5/16-11/15
336	Long-Term Storage	0.55	high	Yearlong	Yearlong RYA	None	10/1-12/1	5/16-11/15
5153	Long-Term Storage	1.89	high	Yearlong	Yearlong RYA	None	None	5/16-11/15
5153-A	Long-Term Storage	0.40	high	Yearlong	Yearlong RYA	None	None	5/16-11/15
5159	Long-Term Storage	0.73	low	Yearlong	Yearlong RYA	None	10/1-12/1	5/16-11/15
553	Long-Term Storage	0.05	high	Yearlong	Yearlong RYA	None	10/1-12/1	5/16-11/15
553	Long-Term Storage	1.14	high	Yearlong	Yearlong RYA	None	10/1-12/1	5/16-11/15
553-A	Long-Term Storage	0.22	high	Yearlong	Yearlong RYA	None	10/1-12/1	5/16-11/15
Total Miles of Decommissioning:			**3.01**	**Total miles in Long Term Storage:**			**11.28**	

Decommissioning method is full-obliteration, full recontour to original ground contour on entire road
Long-term Storage method for all roads is partial recontour (approx. 20%) of road prism and full recontour at stream crossings and unstable areas
Priorities based on 2011 field assessments, except 5159
High Priority = frequent existing problems with drainage/culvert function and condition, road stability, chronic sedimentation, with moderate-high potential for sediment delivery to streams; often roads are close to streams with frequent stream crossings
Moderate Priority = some existing concerns with drainage/culvert function and condition, road stability, chronic sedimentation, with low-moderate potential for sediment delivery to streams; often roads are in upper hill slope positions away from streams with few stream crossings
Low Priority = limited to no problems with drainage/culvert function and condition, road stability, chronic sedimentation, with low potential for sediment delivery to streams; often roads are in upper hill slope positions away from streams with few to no stream crossings
RYA= Restricted Yearlong All **OYA=Open Yearlong All**

Table A-6. Clearwater National Forest Threatened, Endangered, Sensitive and Management Indicator Species

Species	Status	Occurrence	Comments
Grizzly bear	Threatened MIS	Unlikely	"No Effect" Grizzly bear is not on the current CNF list from the USFWS. Not expected to occur in the project area due to a lack of habitat, and suitable habitat is not altered.
Canada lynx	Threatened	Habitat present	Not likely to adversely affect. See Chapter 3 of this document for detailed analysis.
Bald eagle	Sensitive MIS	No	The bald eagle was removed from the list of threatened species on July 9, 2007 (USFWS 2007c). The bald eagle continues to be protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. It should now be addressed as a sensitive species for a minimum of five years; however, it has not yet been formally added to the Northern Region Sensitive Species List. Bald eagles use larger fish-bearing streams, rivers, and lakes for foraging, nests nearby. For this project, there would be "No impact" to bald eagles because no preferred habitats are present, there are no documented sightings and no known or suspected nest sites in the project area. There is some chance for foraging in Weitas Creek (4 miles northeast of the project area) but because no harvest would occur in RHCAs, this species would not be affected.
Gray wolf	Sensitive MIS	Yes	Gray wolf may occur in suitable habitats. While the project "May impact individuals or habitat", proposed activities would pose little risk of effects to individual wolves due to their high mobility and large territories. See Chapter 3 of this document for detailed analysis.
Western toad	Sensitive	Yes	Activities "May impact individuals or habitat" as suitable habitat occurs throughout the project area, particularly in riparian areas. See Chapter 3 of this document for detailed analysis.
Elk	MIS	Yes	Habitat use appears moderate to high in the area. See Chapter 3 of this document for detailed analysis.

Species	Status	Occurrence	Comments
Moose	MIS	Yes	Moose habitat consists of a mosaic of second-growth forests, openings, lakes, and wetlands. In the project area, some patches of moderate quality habitat are found along drainages and meadows. Habitat effectiveness is compromised because of the open road density and less-than-desired security in the Beaver Dam EAU. Moose are expected to be present to common because of the presence of suitable habitats, despite the habitat effectiveness. See Chapter 3 of this document for detailed analysis.
White-tailed deer	MIS	Yes	Relatively recent timber harvest and meadows provide a relatively low density of forage, although cover is abundant in the project area. Habitat effectiveness is compromised because of the open road density and less-than-desired security in the Beaver Dam EAU. Deer typically move to lower elevation winter ranges. White-tailed deer population densities are relatively low. See Chapter 3 of this document for detailed analysis.
Pileated woodpecker	MIS	Yes	Signs of foraging activity observed in the project area in 2011. Abundant suitable nesting and foraging habitat. See Chapter 3 of this document for detailed analysis.
Northern Goshawk	MIS	Yes	The Northern Goshawk was removed from the Northern Region Sensitive Species List on July 17, 2007 because data collection and analysis by the Region indicated that there is not a significant current or predicted downward trend in population numbers or density, nor is there a downward trend in habitat capability that would reduce distribution of the species. Within the project area, modeled habitat is beginning to display attributes of suitable nesting habitats, but these habitats are common and well-distributed in the analysis area. Suitable habitats are abundant across the Forest. See Chapter 3 of this document for detailed analysis.
Pine marten	MIS	Yes	Recent surveys document presence the project area. Suitable habitats available. See Chapter 3 of this document for detailed analysis.
Belted kingfisher	MIS	Possible	This species is dependent upon riparian habitat (FP EIS, Vol. III-22). Marginally habitats are available along some streams, such as Middle Creek, but these habitats are protected by INFISH buffers and BMPs. Suitable habitats would not be affected by project activities. Generally, other streams in the area are too small to support the fish populations needed to provide for local resident kingfisher or a relatively open canopy cover necessary for flight. Populations are expected to be low to non-existent because of the marginal quality of habitats.
Black backed woodpecker	Sensitive	Yes	Project activities “May Impact Individuals or Habitat” because habitats are common and widespread. See Chapter 3 of this document for detailed analysis.
Flammulated owl	Sensitive	Yes	Project activities “May Impact Individuals or Habitat”. Specie prefers drier, ponderosa pine habitats not present in the project area. See Chapter 3 of this document for detailed analysis.

Species	Status	Occurrence	Comments
Harlequin Duck	Sensitive	Possible	These diving ducks winter along the Pacific coast and migrate inland to nest along forested, mountain streams (Cassier and Groves, 1991). They prefer forested mountain streams with a gradient less than 3%, shrub cover greater than 50% and minimal human disturbance. Streams in the project area are on the small end of suitable habitat. It is highly unlikely that ducks occur in the project area and project activities would have "No Impact" to this species.
Pygmy Nuthatch	Sensitive	No	This species typically inhabits mid to late seral ponderosa pine where they forage. The availability of ponderosa pine snags (dead trees or tops) are believed essential for the long-term availability of pygmy nuthatch habitat. At 3,500 to 5,900 feet elevation, the project area provides minimal ponderosa pine habitats; therefore, project activities would not impact this species.
Fisher	Sensitive	Yes	Project activities "May Impact Individuals or Habitat" but would have limited impacts due to the amount and type of treatment in suitable habitats. See Chapter 3 of this document for detailed analysis.
Wolverine	Sensitive	Yes	Project activities "May Impact Individuals or Habitat", Since there is no denning habitat in the project area, use is transient. See Chapter 3 of this document for detailed analysis.
Fringed Myotis	Sensitive	Yes	Project activities "May Impact Individuals or Habitat" because of potential snag reduction in areas of suitable habitat. See Chapter 3 of this document for detailed analysis.
Coeur d'Alene Salamander	Sensitive	Yes	Salamanders are found at spring seeps, waterfall spray zones, and banks of small cascading creeks associated with disjunct coastal biota, below 5,000 feet elevation. Project activities "May Impact Individuals or Habitat" because project culvert removal and replacement activities would occur in riparian areas and possibly potential suitable habitat. All other proposed activities would occur outside of RHCAs, so they would not impact this species.
Ringneck snake	Sensitive	No	This species requires dry forest and shrub habitats; open hillsides with rocks or other debris. There would be "No Impact" because suitable habitat is limited and proposed activities would not affect available habitat.
Townsends big-eared bat	Sensitive	No	Townsend's big-eared bats are found in dry coniferous forest where cave or cave-like structures for hibernacula and maternity roost sites exist. They are often found in abandoned mines and buildings. There would be "No Impact" to this species because there are no suitable habitats, known potential roosting sites or documented sightings in the project area.
Yellow-billed Cuckoo	Candidate	No	This species requires low-elevation, dense deciduous riparian forests (usually cottonwood). There are no preferred habitats, documented sightings or known or suspected nest sites in the project area for this species; therefore, there would be "No Impact" to this species from project activities. (Laymon, S. A. 1998. Yellow-billed Cuckoo (Coccycus americanus). In The Riparian Bird Conservation Plan:a strategy for reversing the decline of riparian-associated birds in California. California Partners in Flight. http://www.prbo.org/calpif/htmldocs/riparian_v-2.html)

Species	Status	Occurrence	Comments
American Peregrine Falcon	Sensitive	No	This species uses many types of habitat, although not typically in heavy timber, but typically nests on cliffs or other rock faces. There would be "No Impact" to this species as falcon are not known to occur on the CNF and little or no suitable nesting habitat exists in the project area.
Common loon	Sensitive	No	Loon nest and feed in lakes. There would be "No Impact" to this species as they are not known to occur on the CNF (USFS 2011) and no habitat is likely present in the project area.
Mountain Quail	Sensitive	No	Habitat is typically warm/dry shrub. There would be "No Impact" to this species as they are not known to occur on the CNF and no habitat is likely present in the project area.
Black Swift	Sensitive	No	This neotropical migratory bird nests in moist cliff environments, typically near or behind waterfalls or in shallow caves. There would be "No Impact" to this species as they are not known to occur on the CNF (USFS 2011) and no habitat is likely present in the project area.
White headed woodpecker	Sensitive	No	This species prefers open canopy mature to old growth ponderosa pine forests. There would be "No Impact" to this species as they are not known to occur on the CNF (USFS 2011) and no habitat is likely present in the project area.
Big Horn sheep	Sensitive	No	These sheep are found in a variety of open habitats, but not typically in heavy timber common to the project area. There would be "No Impact" to this species as sheep are not known to occur on the CNF (USFS 2011) and no habitat is likely present in the project area.
Northern bog lemming	Sensitive	No	These rodents typically occur in sphagnum bogs or fens. There would be "No Impact" to this species as lemming are not known to occur on the CNF (USFS 2011) and no habitat is likely present in the project area.

Appendix B - Federal Consistency Checklist

1. **Have you identified which land management activities (by nonpoint source category), regulated by the Idaho Water Quality Standards are within the project area?**

Yes. Regeneration harvest, pre-commercial and commercial thinning, temporary and permanent road construction, road reconstruction, road reconditioning, road decommissioning and storage, culvert replacement.

2. **Have you identified the state approved BMP's for each nonpoint source activity?**

Yes. See the Appendix C of this document containing BMPs list.

3. **For nonpoint source categories not having approved BMP's, have you identified practices that demonstrate a knowledgeable and reasonable effort to minimize resulting water quality impacts?**

Yes. See Appendix to watershed specialist report--project design measures of this document.

4. **Have you provided a monitoring plan which, when implemented, will provide adequate information to determine the effectiveness of the approved or specialized BMP's in protecting the beneficial uses of water?**

Yes, the Clearwater National Forest hydrologist conducts annual BMP audits of projects on the forest.

5. **Have you provided a process (including feedback from water quality monitoring) for modifying the approved or specialized BMP's in order to protect beneficial uses of water?**

Yes, See the Appendix C of this document containing BMPs list.

6. **Have you identified the appropriate beneficial uses of water for the water bodies in the project area?**

Beneficial uses and water quality criteria and standards are identified in the State of Idaho Water Quality Standards and Wastewater Treatment Requirements (IDAPA 58.01.02). Middle Creek has designated beneficial uses of cold water aquatic life, salmonid spawning and secondary contact recreation.

7. **Have you determined if a Water Quality Limited Segment has been designated within the project area?**

Idaho Department of Environmental Quality (IDEQ) prepared a Subbasin Assessment to determine the current status of pollutants and support of beneficial uses in the Upper North Fork Clearwater River (IDEQ 2003). The TMDL was approved by EPA in January 2003. Idaho DEQ reviewed sediment conditions in Middle Creek in 2003 and determined that Middle Creek meets the Idaho water quality standards for sediment. The 2010 IDEQ Integrated Report states Middle Creek currently does not meet the Idaho water quality standards numeric water temperature criteria for salmonid spawning(IDEQ 2010b), and the EPA-approved TMDL for temperature for Middle Creek and its tributaries remains in place. The Forest continues to implement Forest Plan and INFISH strategies to protect or attain canopy closure over waterbodies to reduce, minimize or eliminate solar heating in Middle Creek. The actions proposed in the Middle Bugs project require full implementation of INFISH practices and buffers, and would not increase stream temperatures.

8. **Have you determined if an Outstanding Resource Water (ORW) has been designated in the project area?**

There are no Outstanding Resource Waters within the project area.

9. **Have you identified the water quality standards and criteria applicable to protecting the "appropriate beneficial uses"?**

Yes, The standards (http://adm.idaho.gov/adminrules/rules/idapa58/0102.pdf.) that apply to the project area streams are:

- Sediment: "Sediment shall not exceed quantities ...which impair beneficial uses." (IDAPA 16.01.02200,08.).
- Turbidity: The turbidity standard allows for an increase over background of no more than 25 nephelometric turbidity units (ntu's) for a period of 10 days, and no more than 50 ntu's, instantaneous, over background (IDAPA 16.01.02250, 02.c.iv.).
- Cold Water Biota: Water temperatures of 22 degrees C. or less with a maximum daily average not greater than 19 degrees C. (IDAPA 16.01.02250,02.c.ii.).
- Salmonid Spawning. Water temperatures of 13 degrees C or less with a maximum daily average no greater than 9 degrees C. (IDAPA 16.01.02250.02.f.ii.)
- Secondary contact recreation. Waters designated for recreation are not to contain E.coli bacteria… in concentrations exceeding a … mean of 126 E. coli organisms per 100 ml (IDAPA 16.01.02251.01.a)

10. **Does pre-project planning and design include an analysis of water quality resulting from implementation of the proposed activity sufficient to predict exceedence of water quality criteria for the appropriate beneficial use(s), or in the absence of such criteria, sufficient to predict the potential for beneficial use impairment?**

Yes. The watershed specialist report contains a detailed effects analysis that used a range of data sources (field surveys and observations, reports, literature) to estimate effects of proposed activities. Equivalent Clearcut Area (ECA) calculations, GIS generated reports and the WEPP:Road model (version 2010.100; Elliot et. al. 1999) were used to compare the predicted effects of the alternatives on water quality and quantity. Throughout the analyses, results were used in project design and mitigation development to minimize impacts on watershed resources and assure that standards would be met.

Appendix C – BMPS

The Forest Service is required by law to comply with water quality standards developed under authority of the Clean Water Act. Both the Environmental Protection Agency and the State of Idaho are responsible for enforcement of these standards. The use of BMPs is also required in the Memorandum of Understanding between the Forest Service and the State of Idaho as part of our responsibility as the Designated Water Quality Management Agency on National Forest System lands.

Idaho water quality standards regulate non-point source pollution from timber management and road construction activities through application of Best Management Practices (BMPs). The BMPs were developed under authority of the Clean Water Act to ensure that Idaho waters do not contain pollutants in concentrations that adversely affect water quality or impair a designated use. State-recognized BMPs that will be used during project design and implementation are contained in these documents:

a. Rules and Regulations Pertaining to the Idaho Forest Practices Act, (IFPA), as adopted by the Idaho Land Board (April 2000); and

b. Rules and Regulations and Minimum Standards for Stream Channel Alterations, as adopted by the Idaho Water Resources Board under authority of the Idaho Stream Channel Protection Act (ISCPA).

Many of the rules and regulations for stream channel alterations are contained, in slightly different form, in a Memorandum of Understanding (MOU) between the Idaho Department of Water Resources and Forest Service Regions One and Four dated January 2008.

Executive Order 13112 relates to Invasive Species and prevents the introduction of invasive species and provides for their control. Each federal agency is to identify actions that may affect the status of invasive species and prevent the introduction of the invasive species. Regional direction (FSM2080) discusses prevention and control measures for various forest activities.

The Practices described herein are tiered to the practices in FSH 2509.22. They were developed as part of the NEPA process, with interdisciplinary involvement, and meet State and Forest water quality objectives. The purpose of this appendix document is to: 1) establish the connection between the Soil and Water Conservation Practices (SWCP) employed by the Forest Service and BMP's identified in Idaho Water Quality Standards (IDAHO APA 16.01.2300.05); and 2) identify how the SWCP, Standard Specifications for the Construction of Roads, Timber Sale Contract provisions and Stewardship Contract provisions meet or exceed the Rules and Regulations Pertaining to the Idaho Forest Practices Act, Title 38, Chapter 13, Idaho Code (BMP's). The relevant portions of the Rules and Regulations developed under the Idaho Stream Protection Act are also covered.

Soil and Water Conservation Practices (BMPs)

11 WATERSHED MANAGEMENT
W11.05 Wetlands Analysis and Evaluation
W11.07 Oil and Hazardous Substance Spill Contingency Planning
W11.09 Management by Closure to Use
W11.11 Petroleum Storage and Deliver Facilities and Management

13 VEGETATION MANIPULATION
G13.02 Slope Limitations for Tractor Operation

G13.03 Tractor Operation Excluded from Wetlands, Bogs, and Wet Meadows
E13.04 Revegetation of Surface Disturbed Areas
E13.06 Soil Moisture Limitations for Tractor Operation

14 TIMBER
A14.02 Timber Harvest Unit Design
A14.03 Use of Sale Area Maps for Designating Soil and Water Protection Needs
A14.06 Riparian Area Designation
A14.07 Determining Tractor Loggable Ground
E14.08 Tractor Skidding Design
E14.09 Suspended Log Yarding in Timber Harvesting
A14.10 Log Landing Location and Design
E14.11 Log Landing Erosion Prevention and Control
E14.12 Erosion Prevention and Control Measures During Timber Sale Operations
E14.14 Revegetation of Areas Disturbed by Harvest Activities
E14.15 Erosion Control on Skid Trails
E14.16 Meadow Protection During Timber Harvesting
S14.17 Streamcourse Protection (Implementation and Enforcement)
E14.18 Erosion Control Structure Maintenance
A14.19 Acceptance of Timber Sale Erosion Control Measures Before Sale Closure
A14.22 Modification of the Timber Sale Contract

15 ROADS AND TRAILS
A15.02 General Guidelines for Road Location/Design
E15.03 Road and Trail Erosion Control
E15.04 Timing of Construction Activities
E15.05 Slope Stabilization and Prevention of Mass Failures
E15.06 Mitigation of Surface Erosion and Stabilization of Slopes
E15.07 Control of Permanent Road Drainage
E15.09 Timely Erosion Control Measures on Incomplete Road and Streamcrossing Projects
E15.10 Control of Road Construction Excavation & Sidecast Material
S15.11 Servicing and Refueling of Equipment
S15.12 Control of Construction In Riparian Areas
S15.13 Controlling In-Channel Excavation
S15.14 Diversion of Flows Around Construction Sites
S15.15 Stream Crossings on Temporary Roads
S15.16 Bridge and Culvert Installation (Disposition of Surplus Material and Protection of Fisheries)
S15.17 Regulation of Borrow Pits, Gravel Sources and Quarries
S15.19 Streambank Protection
E15.21 Maintenance of roads
E15.22 Road Surface Treatment to Prevent Loss of Materials
G15.24 Snow Removal Controls
E15.25 Obliteration of Temporary Roads

18 FUELS MANAGEMENT
E18.02 Formulation of Fire Prescriptions
E18.03 Protection of Soil and Water from Prescribed Burning Effects

***CLASSES OF SWCP (BMP)**
A = Administrative **G** = Ground Disturbance Reduction
E = Erosion Reduction **W** = Water Quality Protection
S = Stream Channel Protection/Stream Sediment Reduction

Format of the BMPs

Each Soil and Water Conservation Practice (SWCP) is described as follows:

Title: Includes the sequential number of the SWCP and a brief title

Objective: Describes the SWCP objective(s) and the desired results for protecting water quality.

Compliance: Provides a qualitative assessment of how the implementation of the specific measures will meet Forest Practices Act Rules and Regulations pertaining to water quality.

Implementation: This section identifies: (1) the range of site-specific water quality protection measures to be implemented and (2) how the practices are expected to be applied.

Effectiveness: Provides a qualitative assessment of expected effectiveness that the applied measure will have on preventing or reducing impacts on water quality. The SWCP effectiveness rating is based on literature & research, administrative studies, and professional experience. The SWCP is rated either High, Moderate, or Low based on the following criteria:

a. Literature/Research

b. Administrative studies

For those SWCPs that have a corresponding Forest Practices Act Rule, information on effectiveness was generated from the Clearwater Forest BMP audits in 1999-2004. A rating of "high" was assigned where the measure(s) kept sediment from reaching the stream in 100 percent of the sites checked. A rating of "moderate" was assigned where the measure(s) kept sediment from reaching the stream in 90 - 99percent of the sites checked. A rating of "low" was assigned where the measure(s) kept sediment from reaching the streams in less than 90percent of the sites checked.

c. Experience (judgment of an expert by education and/or experience)

d. Fact (obvious by logical response)

Items Common to all Soil and Water Conservation Practices

Responsibility for Implementation: The District Ranger is responsible for insuring the factors identified in the following SWCPs are incorporated into: Timber Sale Contracts through the inclusion of proper B and/or C provisions; or Public Works Contracts through the inclusion of specific contract clauses.

The Contracting Officer, through his/her official representative (Sale administrator and/or Engineering Representatives for timber sale and stewardship contracts; and Contracting Officers Representative for public works contracts) is responsible for insuring that the provisions are properly administered on the ground.

Monitoring: Ten percent of all timber sales are monitored by the Forest Hydrologist on an annual basis for implementation and effectiveness of BMP's.

ABBREVIATIONS

TSC = Timber Sale Contract FPA = Idaho Forest Practices Act
TSA = Timber Sale Administrator COR = Contracting Officer Representative
PWC = Public Works Contract SAM = Sale Area Map
WQLS = Water Quality Limited Segment SC = Stewardship Contract
RHCA= Riparian Habitat Conservation Area
SPS = Standard Project Specifications

Middle Bugs BMPs

PRACTICE 11.05 - Wetlands Analysis and Evaluation
PRACTICE 13.03 - Tractor Operation Excluded from Wetlands, Bogs, and Wet Meadows
PRACTICE 14.16 - Meadow Protection During Timber Harvesting
OBJECTIVE: To maintain wetland functions and avoid adverse soil and water resource impacts associated with the destruction or modification of wetlands, bogs and wet meadows.
COMPLIANCE: FPA Rule - 030.08.c
IMPLEMENTATION: This is covered by the TSC Provision B6.61 (Meadow Protection) and SC G.6.1 and K-G.6.2#, which is a standard provision in all contracts. When it is necessary to identify these areas on the SAM, direction to do so and protective requirements will be incorporated into C6.62 (Wetlands Protection). Vehicular or skidding equipment shall not be used on meadows except where roads, landings, and tractor roads are approved. In all cases, soil and vegetation will be protected from disturbance which would cause adverse affects on water quality, quantity and aquatic habitat. Unless otherwise agreed, trees felled into meadows shall be removed by end-lining, and resulting logging slash shall also be removed. Damage to meadows, streamcourses, and Riparian Areas caused by unauthorized Purchaser's operations shall be repaired by the Purchaser in a timely manner to restore and prevent further damage. This project would utilize INFISH buffers, which require a 150 foot no-harvest buffer around the perimeter of wetlands greater than one acre in size and a 100 foot buffer around the perimeter of wetlands smaller than one acre in size.
EFFECTIVENESS: High

PRACTICE 11.07 - Oil and Hazardous Substance Spill Contingency Planning
PRACTICE 11.11 - Petroleum Storage and Delivery Facilities & Management
PRACTICE 15.11 - Servicing and Refueling of Equipment
OBJECTIVE: To prevent contamination of waters from accidental spills of fuels, lubricants, bitumens, raw sewage, wash water, and other harmful materials by prior planning and development of Spill Prevention Control and Countermeasure Plans.
COMPLIANCE: FPA Rule - 060.02.a, b, c and 060.04.a
IMPLEMENTATION: TSC provision B6.341 and SC G.3.4.1 hold the purchaser responsible for taking appropriate preventive measures to insure that any spill of oil or oil products does not enter any stream or other waters of the United States. If the total oil or oil products storage exceeds 1320 gallons in containers of 55 gallons or greater, Purchaser shall prepare a Spill Prevention Control and Countermeasures plan. Such plan shall meet applicable EPA requirements (40 CFR 112), including certification by a registered professional engineer.
In the event any leakage or spillage enters any stream, water course or area of open water, the operator will immediately (in TSC B6.342 or SC G.3.4.1) notify the National Response Center and CO who will be required to follow the actions to be taken in case of hazardous spill, as outlined in the Forest Hazardous Substance Spill Contingency Plan.
EFFECTIVENESS: Moderate. A plan insures foresight, but cannot eliminate the risk of materials being spilled and escaping into waters.

PRACTICE 11.09- Management by Closure to Use
OBJECTIVE: To exclude activities that could result in damages to facilities or degradation of soil and water resources.
COMPLIANCE: FPA Rule - None
IMPLEMENTATION: All temporary roads and short-term specified roads will be obliterated following use.
EFFECTIVENESS: High

PRACTICE 13.02 - Slope Limitations for Tractor Operation
OBJECTIVE: To reduce gully & sheet erosion and associated sediment production by restricting tractor operation to slopes where corrective measures for proper drainage are easily installed and effective.
COMPLIANCE: FPA Rule - 030.03.a, b

IMPLEMENTATION: Tractor or wheel skidding shall not be conducted on sustained slopes exceeding 35 percent gradient. Cut-to-length operations, which operate on a bed of slash, would not be conducted on sustained slopes exceeding 45percent.
EFFECTIVENESS: High

PRACTICE 13.04 - Revegetation of Surface Disturbed Areas
PRACTICE 14.14 - Revegetation of Areas Disturbed by Harvest Activities
OBJECTIVE: To protect soil productivity and water quality by minimizing soil erosion.
COMPLIANCE: FPA Rules - 030.04.c and 030.05.a, b.
IMPLEMENTATION: All temporary roads in the sale area will be seeded after construction and after final use, as identified in TSC B6.6 and C6.601. Exposed soil on landings and skid trails will be seeded and fertilized after use. Seed mixes (specific to the district) and fertilizer specifications will be incorporated into TSC provision C6.601# or SC K-G.6.0.1#(Erosion Control Seeding). TSC provision C6.633# and SC K-G.6.3.3# (Temporary Road, Skid Trail/Skid Road and Landing) will identify that scarification/ripping of compacted landings, tractor skid roads in regeneration harvest units, and closed roads will be a minimum of 6 inches, not to exceed 2 feet.
Areas of new construction and exposed soil would be seeded and fertilized. If problem revegetation areas are discovered following construction then additional revegetation methods such as matting, top soil replacement or other effective processes would be employed through contract modifications.
EFFECTIVENESS: High

PRACTICE 14.18 - Erosion Control Structure Maintenance
PRACTICE 15.04 - Timing of Construction Activities
PRACTICE 15.09 - Timely Erosion Control Measures on Incomplete Road and Stream-Crossing Projects
OBJECTIVE: To insure that constructed erosion control structures are stabilized and working effectively. To minimize erosion by conducting operations during minimal runoff periods. To minimize erosion of and sedimentation from disturbed ground on incomplete projects.
COMPLIANCE: FPA rules - 040.03. d, g; 030.05.a
IMPLEMENTATION: During the period of the Timber Sale Contract, the Purchaser shall provide maintenance of soil erosion control structures constructed by the Purchaser until they become stabilized, but not for more than one year after their construction. After 1 year, erosion control work needed is accomplished through Watershed Improvement practices (SWCP 11.03).
The Forest Service may agree to perform such structure maintenance under B4.225 (Cooperative Deposits), if requested by the Purchaser, subject to agreement on rates. If the Purchaser fails to do seasonal maintenance work, the Forest Service may assume the responsibility and charge the Purchaser accordingly.
Detailed erosion control measures are developed by an interdisciplinary team during the environmental analysis and are incorporated into the contract specifications. Compliance with plans, specifications, and the operating plan is assured by the Contracting Officer and/or Engineering Representative.
Protective measures must be applied to all areas of disturbed, erosion-prone, unprotected ground that is not to be further disturbed in the present year. When conditions permit operations outside the Normal Operating Season, erosion control measures must be kept current with ground disturbance, to the extent that the affected area can be rapidly closed, if the weather conditions deteriorate. Areas must not be abandoned for the winter with remedial measures incomplete.
Project location and mitigative measures are developed in the NEPA process using an interdisciplinary approach. Compliance with environmental analysis controls and requirements, contract specifications, and operating plans are assured by the Contracting Officer or Engineering Representative.
REFERENCES: Timber Sale Contract Provisions B6.6, B6.66, and B4.225; FSH 2409.15, Timber Sale Administration Handbook.
FAR 52.236-15; Timber Sale Contract Provisions C6.3, C6.36, and B6.31; SWCP 15.03; see references in "Best Management Practice" Definition (05--2 and 3).
FSM 7721; Standard Specification 206; Timber Sale Contract Provisions B6.31, B6.6, C6.6; FAR 52.213-3, 52.236-15, and 4G-52.235-107; SWCP 15.03 and 15.04; see reference in "Best Management Practice" Definition (05--2 and 3).
EFFECTIVENESS: High

PRACTICE 13.06 - Soil Moisture Limitations for Tractor Operation

OBJECTIVE: To minimize soil compaction, puddling, rutting, and gullying with resultant sediment production and loss of soil productivity.
COMPLIANCE: FPA Rule - 030.03.a, b.
IMPLEMENTATION: Following TSC provision B6.6, equipment shall not be operated when ground conditions are such that excessive damage will result.
EFFECTIVENESS: Moderate. The measure will be highly effective in preventing impacts under sustained adverse weather, but may not catch sudden downpours which have short-term impacts on water quality.

PRACTICE 14.02 - Timber Harvest Unit Design
PRACTICE 14.08 - Tractor Skidding Design
PRACTICE 14.10 - Log Landing Location and Design
OBJECTIVE: To insure that timber harvest unit design will secure favorable conditions of water flow, maintain water quality and soil productivity by locating/designing landings and skidding patterns to best fit the terrain and avoid soil erosion.
COMPLIANCE: FPA Rules - 030.03.a, b, c, d; 030.04.a, b,
IMPLEMENTATION: TSC provision B6.311 (Plan of Operation) should specify how Purchaser intends to meet erosion control requirements.
TSC provision B6.422 (Landings and Skid Trails) and SC provisions G.4.2 and K-G.4# requires that the location of all skid trails and landings must be agreed upon before construction. Specific items that will be addressed during sale-layout and pre-work with the operator will include the following:
Skid Roads (for tractors) and Forwarder Roads:
a) Design and locate skid roads, forwarder roads, and skidding operations to minimize soil disturbance.
b) Locate skid roads and forwarder roads to avoid concentrating runoff and provide breaks in grade and waterbars.
c) Locate skid roads and forwarder roads and landings away from natural drainage systems, and divert runoff to stable areas.
Landings: Landings, log decks, and burn piles will not be located within RHCAs.
REFERENCES: Timber Sale Contract Provision B6.422, B6.424, and C6.6; FSM 2524 and 2451; FSH 2409.18, Sale Preparation Handbook and FSH 2409.15, Timber Sale Administration handbook; see references in "Best Management Practice' Definition (05--2 and 3); in R-4, R-4 Technical Guide - Erosion Prevention and Control on Timber Sale Areas, May 1981
EFFECTIVENESS: High

PRACTICE 14.03 - Use of Sale Area Maps for Designating Soil & Water Protection Needs
OBJECTIVE: To delineate the location of protection areas and special treatment areas, to insure their recognition, proper consideration, and protection on the ground.
COMPLIANCE: No related FPA rule.
IMPLEMENTATION: The SAM will identify the location of stream courses to be protected, wetland and riparian areas to be protected, harvest unit boundaries, specified roads, roads were log hauling is prohibited or restricted, structural improvements, areas for different skidding and yarding methods, sources of rock for road work, riprapping, water sources available for Purchasers use, and other features required by Division "C" contract provisions.
These features will be reviewed on the ground by the Purchaser and the Sale Administrator prior to harvesting. A Watershed Specialist (Forest or District) will ensure that the above features have been designated on the Sale Area Map during contract development. This will be coordinated with the District Timber Management Staff.
REFERENCES: Timber Sale Contract Provisions B1.1, B6.5, B6.6, C6.51 (R-1); FSM 2431.1 - .3 and 2471; FSH 25409.15, Timber Sale Administration Handbook and FSH 2409.18, Sale Preparation Handbook.
EFFECTIVENESS: High. Identifying the locations of water and wetlands prior to activity is paramount in preventing impacts to water quality.

PRACTICE 15.05 - Slope Stabilization and Prevention of Mass Failures
OBJECTIVE: To identify and protect unstable areas and avoid triggering mass movements of the soil mantle and resultant erosion and sedimentation.

COMPLIANCE: FPA Rule – 030.03.a,b and 030.04.c
IMPLEMENTATION:
1) Avoid road locations or timber harvesting on or adjacent to active landslides, slump blocks and other mass wasting processes.
2) To prevent landslides, fill material used in landing construction shall be free of loose stumps and excessive accumulations of slash. On slopes where sidecasting is necessary, landings shall be stabilized by use of seeding, compaction, riprapping, benching, mulching, or other suitable means.
3) If road construction is necessitated in an area of moderate instability, the embankment should be layer placed or as recommended by a geotechnical engineer.
4) On unstable landtypes with sideslopes of 50 percent to 60 percent gradient, at least 40 percent crown closure will be maintained. On sideslopes 60 percent or greater, at least 50 percent crown closure will be maintained. Maintaining the residual canopy closure within the treated stands on unstable landtypes will minimize the risk of mass wasting by providing rooting strength/cohesion, buttressing and soil arching action, and reducing piezometric levels (saturated subsurface zone) in the slope.
EFFECTIVENESS: Avoidance is the most effective measure on high-risk landforms. Risk assessment based on experience is essential. Effectiveness is expected to be moderate.

PRACTICE 14.06 - Riparian Area Designation and Protection
PRACTICE 15.12 - Control of Construction in Riparian Areas
OBJECTIVE: To minimize the adverse effects on Riparian Areas with prescriptions that manage nearby logging and related land disturbance activities.
COMPLIANCE: FPA Rules - 030.07.b, c, d, e.i, e.ii, e.iii, e.iv, e.v, e.vi, e.vii, e.viii and 030.06.a, b, c
IMPLEMENTATION: Streamcourses will be identified on the Sale Area Map. All streams will have PACFISH buffers. The following RHCA buffers will be applied:
1) Intermittent streams will have a 100 foot buffer.
2) Perennial non-fish bearing streams will have a 150 foot buffer.
3) Perennial fish bearing streams will have a 300 foot buffer.
4) Wetlands under one acre will have a 100 foot buffer. Wetlands 1 acre and larger will require a 150 foot buffer.
Where existing roads are located in the RHCA and a forwarder or skid trail traverses a portion of the RHCA located above the road in order to access the road: 1) trail locations shall be agreed upon in advance of use; 2) such trails shall be limited to the minimum amount necessary; 3) ground disturbance will be minimized through use of slash mats and; 4) straw bales and/or filter cloth will be placed in road ditch transitions to prevent sediment delivery to streams.
EFFECTIVENESS: Moderate (030.07.b, c, d, e.i, e.iii, e.iv, e.v, e.vi, e.vii, e.viii and 030.06.a, b, c = 100percent, 030.07.e.ii = 67percent)

PRACTICE 14.07 - Determining Tractor Loggable Ground
PRACTICE 14.08 - Tractor Skidding Design
OBJECTIVE: To minimize erosion and sedimentation and protect soil productivity by designing skidding patterns to best fit the terrain.
COMPLIANCE: FPA Rules - 030.03.a, b, c, d; 030.04.a, b
IMPLEMENTATION:
1) Use of constructed skid roads and forwarder roads will be avoided.
2) The location of tractor skid roads and forwarder roads shall be approved by the Sale Administrator.
3) Tractor piling operations shall not be allowed on sustained slopes over 35 percent.
EFFECTIVENESS: High

PRACTICE 14.09 - Suspended Log Yarding in Timber Harvesting
OBJECTIVE: To protect the soil from excessive disturbance and accelerated erosion and to maintain the integrity of the Riparian Area and other sensitive watershed areas.
COMPLIANCE: FPA Rules - 030.03.d and 030.07.d
IMPLEMENTATION: Skyline yarding (partial or full suspension) will be used on all areas identified for such logging on the Sale Area Map. As noted in TSC provision B1.1, item (n), areas requiring special yarding, as identified in TSC provision B6.42 (Skidding and Yarding) and SC G.4.2, will be identified on

the Sale Area Map. These requirements will be included in TSC C6.4 and SC K-G.4#(Conduct of Logging).
EFFECTIVENESS: High

PRACTICE 14.11 - Log Landing Erosion Prevention and Control
PRACTICE 14.12 - Erosion Prevention and Control Measures During Timber Sale-Operations
PRACTICE 14.15 - Erosion Control on Skid Trails
OBJECTIVE: To protect water quality by minimizing erosion and subsequent sedimentation derived from log landings and skid trails.
COMPLIANCE: FPA Rules - 030.05.a, b and 030.04.c
IMPLEMENTATION: The following criteria will be used in controlling erosion and restoring landings and skid trails so as to minimize erosion:
General:
1) TSC provision B6.6 and SC provision G.6 require the purchaser to conduct operations in a reasonable fashion to minimize erosion. This is a standard provision in the TSC and SC. Additionally, specific erosion requirements will be spelled out in TSC Provisions such as B6.422, B6.64, C6.601 and SC Provisions such as G.6.4, K-G.6, K-G.6.3.2#, K-G.6.6.1and K-G.6.3.3#.
2) Skid trails, forwarder trails, and landings will be seeded as necessary with a mix specified in C6.601 or K-G.6.6.1.
Landings:
1) Landings will be located outside of RHCAs -except in cut-to-length units where the existing road access is currently located within an RHCA.
2) During construction, landings will have design filter windrows constructed at the toe of the fill slope to mitigate sediment delivery to the streams until timber harvesting begins.
3) During period of use, landings will be maintained in such a manner that debris and sediment are not delivered to any streams.
4) Landings will drain in a direction and manner that will minimize erosion and will preclude sediment delivery to any stream.
5) Standard TSC provision B6.64 (Landings) or SC Provision G.4.2.2 require that after landings have served the Purchaser's purpose, the Purchaser shall ditch or slope them to permit the water to drain or spread.
Skid trails and Forwarder Trails:
1) Stabilize skid trails, forwarder trails, and fire trails whenever they are subject to erosion, by water-barring, cross draining, outsloping and spreading slash on the trails to reduce erosion. This work shall be kept current to prevent erosion prior to fall and spring runoff.
2) If skid trails are compacted, after use, they will be ripped (in regeneration harvest units).
3) Skid trails and forwarder trails will be planted with trees concurrently with unit planting to revegetate the disturbed area (in regeneration harvest units).
EFFECTIVENESS: High

PRACTICE 14.16 - Meadow Protection During Timber Harvesting
OBJECTIVES: To avoid damage to the ground cover, soil, and water in meadows.
COMPLIANCE: 030.08.c
IMPLEMENTATION: Vehicular or skidding equipment shall not be used on meadows except where roads, landings, and tractor roads are approved. In all cases, soil and vegetation will be protected from disturbance which would cause adverse affects on water quality, quantity and aquatic habitat. The TSC provision B6.61 (Meadow Protection) or SC provision G.6.1is a standard provision in all contracts. Unless otherwise agreed, trees felled into meadows shall be removed by end-lining, and resulting logging slash shall also be removed. Damage to meadows, streamcourses, and riparian areas caused by unauthorized Purchaser's operations shall be repaired by the Purchaser in a timely manner to restore and prevent further damage.
EFFECTIVENESS: High

PRACTICE 14.17 - Stream Channel Protection (Implementation and Enforcement)
PRACTICE 15.19 - Streambank Protection

OBJECTIVE: To protect stream beds and streamside vegetation, during and after forest practice operations and road construction, by (1) maintaining unobstructed passage of stormflows; and (2) reducing sediment and other pollutants from entering streams.
COMPLIANCE: FPA Rules - 030.06.a, b, c; 030.07.b, c, d, e.i, e.ii
IMPLEMENTATION: To reduce sediment and channel bank degradation at sites disturbed by construction of stream crossing or roadway fill, it may be necessary to incorporate "armoring" in the design of a structure to allow the water course to stabilize after construction. Riprap, gabion structures, and other measures are commonly used to armor stream banks and drainage ways from the erosive forces of flowing water. These measures must be sized and installed in such a way that they effectively resist erosive water velocities. Stone used for riprap should be free from weakly structured rock, soil, organic material and materials of insufficient size, all of which are not resistant to stream flow and would only serve as sediment sources. Outlets for drainage facilities in erodible soils commonly require rip-rapping for energy dissipation (FSH 7709.56B, and Std. FS Spec. 619).
The intent of the regulations and clauses is to protect the integrity of stream channels, and minimize adverse impacts to the channel and downstream resources and beneficial uses. To list all of the regulations that would be implemented to protect and restrict channel alterations, would require a small book. The following items, however, highlight some of the principal provisions incorporated into the TSC that will govern channel protection in the sale area.
1) Care shall be taken to cause only the minimum necessary disturbance to the natural appearance of the area. Streambank vegetation shall be protected except where its removal is absolutely necessary for completion of the work [TSC Provisions B6.5, B6.6 and C6.4# or SC provision G.5 and G.6].
a) All streambanks will be avoided by design.
b) Logs shall be fully suspended when skyline yarding across a stream.
2) If the channel is damaged during construction, it will be restored as nearly as possible to its original configuration without causing additional damage to the channel.
3) Purchaser shall repair all damage to a streamcourse if the Purchaser is negligent in their operations, including damage to banks and channel, to an acceptable condition as agreed to by the certified Sale Administrator and Purchaser's representative.
4) All project debris shall be removed from streamcourse, in an agreed manner that will cause the least disturbance. (TSC B6.5 or SC G.5 Streamcourse Protection). Specifically:
a) Whenever possible trees shall be felled, bucked, and limbed in such a manner that the tree or any part thereof will fall away from any Class I streams. Slash that enters Class I streams as a result of harvesting operations shall be continuously removed, as will other debris that enters Class I streams whenever there is a potential for stream blockage or if the stream has the ability for transporting such debris. Material removed shall be placed five feet slope distance above the ordinary high water mark.
i) Material to be removed will be all logging debris that is less than six inches in diameter and less than six feet long.
b) Slash and other debris that enters Class II streams whenever there is a potential for stream blockage or if the stream has the ability for transporting the debris shall be removed immediately following skidding and placed above the ordinary high water mark.
i) Material to be removed will be all logging debris that is less than six inches in diameter and less than six feet long.
5. Fill-transition rip-rapping at stream crossings.
6. Slash filter windrows will be placed in draws and contributing areas of perennial streams.
EFFECTIVENESS: Moderate (030.06.a, b, c = 100percent, 030.07.b, c, d, e.i = 100percent, 030.07.e.ii = 67percent)

PRACTICE 14.19 - Acceptance of Timber Sale Erosion Control Measures Before Sale Closure
OBJECTIVE: To assure the adequacy of required erosion control work on timber sales.
COMPLIANCE: No directly related FPA rule.
IMPLEMENTATION AND RESPONSIBILITY: TSC provision B6.36 and SC provision G.3.6 require that upon the Purchaser's written request and assurance that work has been completed the Forest Service shall perform an inspection. One area the Purchaser might request acceptance for are specific requirements such as logging, slash disposal, erosion control, or snag felling. In evaluating acceptance the following definition will be used by the Forest Service: "Acceptable" erosion control means only minor deviation

from established standards, provided no major or lasting impact is caused to soil and water resources. Certified TSAs will not accept as complete erosion control, measures which fail to meet this criteria.
EFFECTIVENESS: High - because correction of erosion control measures can be affected immediately after the evaluation.

PRACTICE 14.22 - Modification of the Timber Sale Contract
OBJECTIVE: To modify the Timber Sale Contract if new circumstances or conditions indicate that the timber sale will cause irreversible damage to soil, water, or watershed values.
COMPLIANCE: No directly related FPA rule.
IMPLEMENTATION: Over time, the Forest Service adopts new policies and direction that amend how we address timber harvest operations. An example is the change in direction to leave some large organic debris in stream channels instead of removing it all. In cases such as this, modifications to the TSC would occur under provision B2.37 (Minor Changes) or SC i.3.3.
If evidence indicates that unacceptable impacts would occur to soil and water resources if the sale was harvested as planned, the Forest Service Representative will request the Contracting Officer to gain Regional Forester advice and approval to proceed with a resource environmental modification, mutual cancellation, or unilateral cancellation of the Timber Sale Contract as allowed by TSC Provision B8.3 or SC i.3.3. If the decision is for a resource environmental modification, once the action is approved by the Regional Forester, the appropriate Line Officer will assign an interdisciplinary team to make recommendations of implementation.
EFFECTIVENESS: Low to moderate. Interrupting a sale to update practices assumes impacts have already occurred to some extent.

PRACTICE 15.02 - General Guidelines for the Location and Design of Roads and Trails
OBJECTIVE: To locate and design roads and trails with minimal soil and water resource impact while considering all design criteria.
COMPLIANCE: No related FPA Rule.
IMPLEMENTATION:
1) Reconstruction and construction of roads will have a scheduled plan reviewed prior to contract administration so that appropriate modifications can be made before the contract package is completed.
2) Roads will be located high on the slope to minimize sediment delivery to streams.
3) New road construction will not cross any perennial streams.
EFFECTIVENESS: Moderate. A plan insures foresight, but excellent administration is still required to be highly effective.

PRACTICE 15.03 - Road and Trail Erosion Control Plan
OBJECTIVE: To prevent, limit, and mitigate erosion, sedimentation, and resulting water quality degradation prior to the initiation of construction and maintenance activities through effective contract administration during construction and timely implementation of erosion control practices.
COMPLIANCE: FPA – 040.04.a,b, c.
IMPLEMENTATION: Prior to the start of construction, the Contractor shall submit a schedule for proposed erosion control work as required in the Standard Specifications. The schedule shall include all erosion control items identified in the specifications. The schedule shall consider erosion control work necessary for all phases of the project. The Purchaser's construction schedule and plan of operation will be reviewed in conjunction with the erosion control plan to insure their compatibility before any schedules are approved. No work will be permitted on the project until all schedules have been approved by the Contracting Officer.
To maximize effectiveness, erosion control measures must be in place and functional prior to seasonal precipitation or runoff.
REFERENCES: FSM 7721, 7722, and 7723; Timber Sale Contract Provisions B6.31, B6.5, B6.6, and C6.3; see references in "Best Management Practice" Definition (05--2 and 3); In R-4: R-4 Technical Guide - Erosion prevention and Control on Timber Sale Areas, May 1981; Cook, M.J. and J.G. King. 1983. Construction Cost and Erosion Control Effectiveness of Filter Windrows on Fill Slopes. USDA Forest Service Research Note, INT-335; SWCP Handbook 10.40 Feedback mechanism; FSH 7709.56b, Drainage Structures Handbook.

EFFECTIVENESS: Moderate. A plan insures foresight, but excellent administration is still required to be highly effective.

PRACTICE 15.06 - Mitigation of Surface Erosion and Stabilization of Slopes
OBJECTIVE: To minimize soil erosion from road cutslopes, fillslopes, and travelway.
COMPLIANCE: FPA Rule - 040.03.c and 040.04.a, b, and c
IMPLEMENTATION: Areas requiring mitigation of surface erosion will occur during the life of the timber sale contract. When these are found, the following provisions will be implemented.
1) Where surface erosion is occurring because of inadequate vegetative cover, additional seeding and re-fertilization will occur using recommended seed and fertilizer mixes. Timber Sale Contract provision C6.601 and SC provision K-G.6.0.1# cover re-seeding of cut slopes if bared by the purchaser's maintenance operation. If the purchaser has done his required seeding, or bare spots are not caused by the purchaser, revise the KV Plan to cover costs.
2) Where ditches are carrying erosion products into stream channels, straw bale and erosion cloth ditch blocks will be installed to "short-circuit" the delivery. Seeding of the eroding surfaces, and seeding of the stored sediment in the ditch will also be accomplished. If problem areas are known before contract award, add C5.31# or K-F.3.1.4# to require cross ditching on segments of road.
3) Particular attention will be given to areas where straw bale/erosion cloth structures either fail or the opportunity for success is doubtful. Additional relief drainage may be installed to drain the ditches out onto suitable ground, to at least preclude delivery of erosion products to the stream. Other solutions may involve replacing ditch blocks, adding riprap and eliminating source of sediment. If problem areas are known before contract award, add C5.31# or K=F.3.1.4# to require cross ditching on segments of road.
4) Slumping of cutslopes will require a combination of both mechanical and vegetative controls. If/when this problem is found, a solution will be determined in consultation with Engineers and the Soil Scientist. If surface erosion problem areas were unknown before the sale was awarded or are part of a recurrent slide area, corrective measures will be beyond the scope of Purchaser's responsibility. Repair and/or improvement will be handled under modification in the contract under C8.3 or through a KV Plan Revision.
EFFECTIVENESS: Low (040.03.c = 100percent, 040.04.b = 67percent)

PRACTICE 15.07 - Control of Permanent Road Drainage
OBJECTIVE: To minimize the erosive effects of concentrated water and the degradation of water quality by proper design and construction of road drainage systems and drainage control structures.
COMPLIANCE: FPA Rule – 040.03.a and 040.04.c.i, c.ii, c.iii.
IMPLEMENTATION: The following items will be included in the timber sale contract provisions or road contract special project specifications.
1) Drainage ways shall be cleared of all debris generated during construction and/or maintenance which potentially interferes with drainage or water quality, TSC C5.31, SC K-F.3.1# and Standard Road Specifications
2) Install sediment basins in ditches.
3) Road portions over 6percent grade will be insloped, under 6percent will be outsloped.
4) During and following operations on out-sloped roads, out-slope drainage shall be retained and berms shall be removed on the outside edge except those intentionally constructed for protection of road grade fills (TSC C5.31 or SC K-F.3.1#).
5) Cross drains and relief culverts shall be constructed to minimize erosion of embankments. The time between road construction and installation of erosion control devices shall be minimized. Drainage structures or cross drains shall be installed on uncompleted roads which are subject to erosion prior to fall or spring runoff. Relief culverts shall be installed with a minimum grade of 1 percent (Standard Road Specifications).
6) Relief culverts and rolling dips will be provided at frequent intervals, based upon soil erodibility and road grade.
EFFECTIVENESS: High (040.03.hi, hii, h.iii = 100percent; 040.04.c.i, c.ii, c.iii, c.iv = 100percent)

PRACTICE 15.10 - Control of Road Construction Excavation and Sidecast Material
OBJECTIVE: To reduce sedimentation from unconsolidated, excavated, and sidecast material caused by road construction, reconstruction or maintenance.

COMPLIANCE: FPA Rule - 040.03.d
IMPLEMENTATION: Normal erosion control such as seeding should be supplemented with special mitigation measures where exposed material (excavation, embankment, borrow pits, waste piles, etc.) is potentially erodible, and where sediment would enter streams. Jute netting, filter cloth, mulching slash windrows, sediment ponds, and hay bale dams will be used when such measures are determined necessary for local conditions.
EFFECTIVENESS: High (040.03.d = 100percent)

PRACTICE 15.13 - Controlling In-Channel Excavation
OBJECTIVE: To minimize downstream sedimentation by insuring that all in-channel excavations are carefully planned.
COMPLIANCE: SCA Rule 9,1(a) - Meets
IMPLEMENTATION: Location and method of stream crossings will be designed and agreed to prior to construction. The following items highlight some of the principal provisions incorporated into the TSC and SC that will govern channel protection:
1) Construction equipment may cross, operate in, or operate near streamcourses only where so agreed to and designated by the Forest Service prior to construction (TSC B6.5 or SC G.5). Crossing of perennial stream channels will be done in compliance with the specifications in the Stream Channel Alteration Act Rules and Regulations and included in the project specifications.
2) No construction equipment shall be operated below the existing water surface except that fording the stream at one location only will be permitted, and work below the water level that is necessary for culvert bedding or footing installations will be permitted to the extent that it does not create unnecessary turbidity or stream channel disturbance [SCA Rule 9,1(a) and Standard Road Specifications-Special Project Specification 204.04].
3) Wheeled or track laying equipment shall not be permitted to operate within 5 feet slope distance of the apparent high water mark of Class II streams and 75 feet of Class I streams. (C6.6 Erosion Prevention and Control or G.5).
4) Construction of any hydraulic structures in stream channels will be in compliance with the Rules and Regulations pertaining to the Stream Channel Protection Act, Title 42, Chapter 38, Idaho Code).
EFFECTIVENESS: High

PRACTICE 15.14 - Diversion of Flows Around Construction Sites
See also Practice 15.13
OBJECTIVE: To restore the natural course of any stream as soon as practical if the stream is diverted as a result of timber management activities.
COMPLIANCE: SCA Rule - Meets
IMPLEMENTATION: Flow in stream courses may only be diverted if the Forest Service deems it necessary for the contractor to do the job. Such a diverted flow shall be restored to the natural stream course as soon as practicable and in any event, within the period stated in Stream Channel Alteration Act Rules and Regulations. Stream channels impacted by construction activity will be restored to their natural grade, condition, and alignment. (Std. FS Spec. 206,206A).
1) On perennial Class I and II streams dewatering shall be accomplished prior to excavation for culvert installation.
2) Filter cloth, erosion control blankets, plastic, straw bales, and rip-rap can be used to keep live water from contacting new fill during culvert installations.
3) When dewatering of stream crossings is required, a non-erodible conduit, flex pipe or geotextile fabric will be used. Diversion dams above the crossing shall be hand constructed. Sediment traps shall be constructed below the stream crossing.
EFFECTIVENESS: High

PRACTICE 15.15 - Stream Crossings on Temporary Roads
See also Practice 15.13
OBJECTIVE: To keep temporary roads from unduly damaging streams, disturbing channels, or obstructing fish passage.
COMPLIANCE: 030.07.b.

IMPLEMENTATION: Temporary roads will be located high on the slope to minimize sediment delivery to any streams. Culverts, temporary bridges, low water crossings, or fords will be required on temporary roads at all locations where it is necessary to cross streamcourses. Such facilities shall be designed and installed to provide unobstructed stream flow and fish passage, and to minimize damage to streamcourses. The number of crossings shall be kept to the minimum needed for access. Channel crossings should generally be as perpendicular to streamcourses as possible. Streambank excavation shall be kept to the minimum needed for use of the crossings.
Crossing facilities shall be removed when the facility has served its purpose and is no longer needed. Fills associated with these facilities shall also be removed. For contracted projects, compliance with specifications and operating plans is assured by the Contracting Officer, certified Sale Administrator, or Engineering Representative.
REFERENCES: Timber Sale Contract Provisions B6.5, B6.62, B6.65, C6.3, C6.51, C6.52, C6.6, and C6.753; FSH 2409.15, Timber Sale Administration Handbook, FSM 2505.1 and 7721; FAR 4G-52.236-107; SWCP 11.04, 11.05, 14.03 14.06, 14.17, 15.12, 15.13, and 15.14; see reference in "Best Management Practice" Definition (05--2 and 3)
EFFECTIVENESS: High. Stream crossings will be avoided where possible.

PRACTICE: 15.16 - Bridge and Culvert Installation (Disposition of Surplus Material and Protection of Fisheries)
OBJECTIVE: To minimize sedimentation and turbidity resulting from excavation for in-channel structures.
EXPLANATION: Excavation in or near streamcourse is a common requirement for the installation of bridges, culverts, and other streamside structures such as weirs, check dams, riprapping, or fish passage structures. Surplus material should not obstruct the streamcourse including the floodplain nor the efficiency of the associated structure. Preventive measures include:
a. Diverting stream flow around project sites during construction in order to minimize erosion and downstream sedimentation.
b. Easily erodible material shall not be deposited into live streams.
c. Any material stockpiled on floodplains shall be removed before rising waters reach the stockpiled material.
d. During excavation in or near the streamcourse, it may be necessary to use suitable coffer dams, caissions, cribs or sheet piling. This will usually be the case where groundwater is contributing a significant amount of water to the immediate excavation area. If any of the aforementioned devices are used, they will be practically watertight and no excavation will be immediately outside of them. If water from subsurface strata is not significant, pumping may be used, provided the sediment from the pumped water can be disposed of where it will not re-enter the stream during high flows.
e. Water pumped from foundation excavation shall not be discharged directly into live streams, but shall be pumped into settling ponds.
f. When needed, bypass roads should be located to have the minimal disturbance on the streamcourse.
g. The construction activity in or adjacent to the stream will be limited to specific times to protect beneficial water uses (such as fisheries).
IMPLEMENTATION: Forest Service supervisors are responsible for insuring that In-Service projects meet the design standards. For contracted projects, compliance with contract specifications and operating plans is assured by the Contracting Officer or Engineering Representative.
REFERENCES: FAR 52.213-3, 52.236-15, and 4G-52.235-107; Standard Specifications 206 and 206A; Timber Sale Contract Provision C6.5; FSM 2505.1; see reference in "Best Management Practice" Definition (05--2 and 3).
EFFECTIVENESS: High

PRACTICE: 15.17 - Regulation of Borrow Pits, Gravel Sources and Quarries
OBJECTIVES: To minimize sediment production from borrow pits, gravel sources, and quarries, and limit channel disturbance in those gravel sources suitable for development in floodplains.
EXPLANATION: Borrow pits, gravel sources, and quarries are often susceptible to erosion due to steep side slopes, lack of vegetation, and/or their proximity to water courses. Whenever possible, the top soil should be removed and stockpiled for use as surface dressing during the reclamation phases, prior to excavation of the site.

Drainage design for the excavation should consider temporary erosion control measures during the life of the material source and permanent drainage control measures after the site has been rehabilitated. When excavation of the site has been completed on all or part of the area, and the site will not be used again, the sides will be sloped, graded, or scaled and the general pit are smoothed and stabilized. Oversized material, if planned for future use as riprap or derrick rock, should be stockpiled. If not, it should be scattered or buried. Finer material, if available, should be spread over the bottom of the pit prior to spreading stockpiled or imported topsoil. Seeding, mulching, and/or planting should be carried out. If the site will be used again, the above requirements will be limited to those essential to resource protection between uses. Access roads to the site should also have temporary or permanent drainage design for erosion control depending on the life of the pit or the roads should be ripped, drained, blocked to traffic, and seeded, mulched, and/or planted unless other uses are planned.

Borrow pits and gravel sources located in floodplains require special attention. Material deposited in floodplains or along channel sections during storm runoff often provide excellent and inexpensive sand and gravel. Because of easy access, these deposits are often in demand. With careful planning and design, these deposits can be removed with minimal impact on water resources. Under some circumstances, sand and/or gravel removal may alter stream flow characteristics and consequently affect stream channel stability and create a new sediment source. Excavation of these deposits within stream channels should be limited to those above the waterline which is normal for the period of the excavation. If the borrow area is subject to periodic flooding, leveling, shaping, or other special drainage features shall be provided. Excavation in flood plains should not take place below the water table unless sediment basins are built to contain or catch the resulting sediment. Sediment basins should not be subject to washouts. If excess sediment accumulates in basins, it should be excavated to clean the basin and the sediment removed to an approved site.

Wash water or waste from concrete batching or aggregate operations shall not be allowed to enter streams prior to treatment by filtration, flocculations, settling and/or other means. The potential pollution of adjacent water resources by blasting agent in quarry operations shall be addressed in the pit operation plan.

IMPLEMENTATION: Project feasibility, location, suitability, and the limits for disturbance and sediment production will be identified through the NEPA process using an interdisciplinary approach. Detailed mitigative measures are developed by the design engineer using criteria from the environmental analysis and through consultation with technical resource staffs when needed. Development of borrow pits or gravel sources in the floodplain will be coordinated with State and local agencies.

Special-use permits issued for borrow pits, gravel sources, and quarries will include the above requirements and District Rangers or their representatives are responsible for insuring compliance. Forest Service supervisors are responsible for implementing In-Service projects to design standards. For contracted projects, compliance with management requirements, specifications, and operating plans is assured by the Contracting Officer or Engineering Representative.

REFERENCES: FSM 2511, 2502.1, 7706.11, 7706.12, 7721; FSH 7709.11, Transportation Engineering Handbook, and FSH 7709.56, Road Preconstrcution Handbook; FAR 52.236-09; Standard Specifications 203, 210, 611, 624, 625, 626, and 629; Timber Sale Contract Provision B6.31, B6.6, B6.62, B6.65, and B6.66, C5.2, C5.23, C5.4, C6.36, C6.52, C6.6, C6.601, C6.622; Water Pollution Control Act, 33 USC 466; NEPA; Montana Water Quality Act and Hardrock Atc; Idaho Dredge and Placer Mining Act, Title 47, Ch. 13; SWCP 11.04, 11.05, 15.03; see reference in "Best Management Practice" Definition (05--2 and 3).

PRACTICE 15.21 - Maintenance of Roads

OBJECTIVE: To conduct regular preventive maintenance operations to avoid deterioration of the roadway surface and minimize disturbance and damage to water quality, and fish habitat.

COMPLIANCE: FPA Rule - 040.04.a, b, c.i, c.ii, c.iii, c.iv, d.i, d.ii, e.i, e.ii, e.iii, fi, fii, fiii.

IMPLEMENTATION: For roads in active timber sale areas standard TSC provision B5.3 (Road Maintenance) or SC provision F.3 requires the Purchaser to perform or pay for road maintenance work commensurate with the Purchaser's use. Purchaser's maintenance responsibility shall cover the before, during, and after operation period during any year when operations and road use are performed under the terms of the timber sale contract (C5.31 - Road Maintenance) or Stewardship Contract (K-F.3.1#). Purchaser shall perform road maintenance work, commensurate with purchaser's use, on roads controlled by Forest Service and used by purchaser in connection with this sale except for those roads and/or maintenance activities which are identified for required deposits in C4.219. All maintenance work shall be done concurrently, as necessary, in accordance with T-specifications set forth herein or attached hereto, except for agreed adjustments (TSC C5.31 or SC K-F.3.1#).

1) Sidecast all debris or slide material associated with road maintenance in a manner to prevent their entry into streams (TSC C5.31, SC K-F.3.1# and Standard Road Specification-Special Project Specification T108).
2) Repair and stabilize slumps, slides, and other erosion features causing stream sedimentation (TSC C5.31, SC K-F.3.1# and Special Project Specification T108).
3) Active Roads. An active road is a forest road being used for hauling forest products, rock and other road-building materials. The following maintenance shall be conducted on such roads.
a) Culverts and ditches shall be kept functional.
b) During and upon completion of seasonal operations, the road surface shall be crowned, out-sloped, in-sloped or cross ditched, and berms removed from the outside edge except those intentionally constructed for protection of fills.
c) The road surface shall be maintained as necessary to minimize erosion of the subgrade and to provide proper drainage.
d) If road oil or other surface stabilizing materials are used, apply them in such a manner as to prevent their entry into streams (TSC C5.314 and C6.341, SC K-F.3.1#).
4) Inactive Roads. An inactive road is a forest road no longer used for commercial hauling but maintained for access (e.g., for fire control, forest management activities, recreational use, and occasional or incidental use for minor forest products harvesting). The following maintenance shall be conducted on inactive roads.
a) Following termination of active use, ditches and culverts shall be cleared and the road surface shall be crowned, out-sloped or in-sloped, cross ditched or otherwise left in a condition to minimize erosion. Drainage structures will be maintained thereafter as needed.
b) The roads may be permanently or seasonally blocked to vehicular traffic.
c) Roads will be seeded and fertilized.
5) Abandoned Roads. An abandoned road is not intended to be used again. No subsequent maintenance of an abandoned road is required after the following procedures are completed:
a) The road is left in a condition suitable to control erosion by out-sloping, cross ditched, seeding, or other suitable methods.
b) Ditches are cleaned.
c) The road is blocked to vehicular traffic.
d) The department may require the removal of bridges and culverts except where the owner elects to maintain the drainage structures as needed.
6) For roads not in an active timber sale area road maintenance must still occur at sufficient frequency to protect the investment in the road as well prevent deterioration of the drainage structure function. This will be accomplished by scheduling periodic inspection and maintenance, including cleaning dips and cross drains, repairing ditches, marking culvert inlets to aid in location, and cleaning debris from ditches and culvert inlets to provide full function during peak runoff events (FSH 7709.15).
REFERENCES: FSM 7730.2, 7732, and 7735; FSH 2409.15, Timber Sale Administration Handbook and FSH 7709.15, Transportation System Maintenance Handbook; Timber Sale Contract provision C5.4; SWP 11.09; see references in "Best management Practice" Definition (05--2 and 3).
EFFECTIVENESS: High (040.04.a = 94percent; 040.04.b, c.i, c.ii, c.iii, c.iv, d.i, d.ii = 100percent).

PRACTICE 15.22 - Road Surface Treatment to Prevent Loss of Materials
OBJECTIVE: To minimize the erosion of road surface materials and consequently reduce the likelihood of sediment production.
COMPLIANCE: No associated FPA Rule.
IMPLEMENTATION: On timber sale roads, the Purchaser shall undertake measures to prevent excessive loss of road material if the need for such action has been identified. Road surface treatments may include: watering, applying magnesium chloride, sealing, aggregate surfacing, chip-sealing, or paving.
EFFECTIVENESS: Moderate. Stabilization of road surface and ditch lines over 6 percent with competent rock (rock that does not rapidly disintegrate) is often over 90 percent effective (Burroughs, et.al., 1983a, 1983b, 1984, 1985; Burroughs and King, 1989).

PRACTICE 15.24 - Snow Removal Controls
OBJECTIVE: To minimize the impact of snow melt on road surfaces and embankments and to reduce the probability of sediment production resulting from snow removal operations.
COMPLIANCE: FPA Rule - 040.05.a,b.

IMPLEMENTATION:
1) During snow removal operations, banks shall not be undercut, nor shall gravel or other selected surfacing material be bladed off the roadway surface. Ditches and culverts shall be kept functional during and following roadway use. If the road surface is damaged, the Purchaser shall replace lost surface material with similar quality material and repair structures damaged in blading operations.
TC5.316# or SC K-F.3.1.6#.
2) Snow berms shall not be left on the road surface or shall be placed to avoid channelization or concentration of melt water on the road or erosive slopes. Berms left on the shoulder of the road shall be removed and/or drainage holes opened at the end of winter operations and before spring breakup. Drainage holes shall be spaced as required to obtain satisfactory surface drainage without discharge on erodible fills. On insloped roads, drainage holes shall also be provided on the ditch side, but care taken to ensure that culverts and culvert inlets are not damaged.
REFERENCES: Timber Sale Contract provisions C5.46; Standard Specifiation 203.09; see references in "Best Management Practice" Definition (05--2 and 3).
EFFECTIVENESS: Moderate

PRACTICE 15.25 - Obliteration of Temporary Roads
OBJECTIVE: To reduce sediment generated from temporary roads by obliterating them at the completion of their intended use.
COMPLIANCE: FPA Rule - 040.04.di, dii.
IMPLEMENTATION: For timber sales, temporary road closure, stabilization and removal of temporary structures are accomplished by the Timber Purchaser. Compliance with plans and the Timber Sale Contract is assured by the certified Sale Administrator. Forest Service supervisors are responsible for insuring that other temporary roads developed by the Forest Service met design standards and management requirements. Effective obliteration is generally achieved through a combination of the following measures: (TSC B6.63, B6.62, B6.5, C6.6, and C6.601, C6.632 and SC G.6.3, and K-F.6.3.2).
1) Road effectively drained and blocked.
2) Temporary culverts and bridges removed and any modified channel slopes stabilized and revegetated.
3) Road returned to resource production through revegetation (grass, browse or trees).
4) Sideslopes reshaped and stabilized.
EFFECTIVENESS: High

PRACTICE 18.02 - Formulation of Fire Prescriptions
OBJECTIVE: To provide for soil and water resource protection while achieving the management objective through the use of prescribed fire.
COMPLIANCE: No Related FPA Rule.
IMPLEMENTATION: The prescription elements are defined by the interdisciplinary team during the environmental analysis. Field investigations are conducted to identify site specific conditions which may affect the prescription. Both the optimum and tolerable limits for soil and water resource needs should be established. Prescription elements will include such factors as fire weather, slope aspect, soil moisture and fuel moisture which influence the fire intensity. These elements have a direct effect on whether or not a litter layer remains after burning and whether or not a water repellent layer is formed. The amount of remaining litter significantly affects erosion rates, water quality and runoff volumes.
EFFECTIVENESS: Moderate. A plan insures foresight, but excellent implementation is still required for high effectiveness.

PRACTICE 18.03 - Protection of Soil and Water from Prescribed Burning
OBJECTIVE: To maintain soil productivity, minimize erosion, and prevent ash, sediment, nutrients, and debris from entering surface water.
COMPLIANCE: No Related FPA Rule.
IMPLEMENTATION: Forest Service and/or other crews are used to prepare the units for burning. This includes cross ditching firelines and reducing fuel concentrations. The interdisciplinary team identifies Riparian Areas and soils with water repellant tendencies as part of the environmental analysis. Some of the techniques used to prevent soil erosion and water quality degradation are: (1) construct water bars in fire lines; (2) reduce fuel loadings in drainage channels; (3) maintain the integrity of the Riparian Area; (4) avoid intense fires, which may promote water repellency, nutrient leaching, and erosion; (5) retain or plan

for sufficient ground cover to prevent erosion of the burned sites and (6) removal of all debris added to stream channels as a result of prescribed burning, unless debris is prescribed to improve fisheries habitat.
EFFECTIVENESS: Moderate. A plan insures foresight, but excellent implementation is still required for high effectiveness.

Noxious Weed Prevention Measures (FSM 2080)

MEASURE 1.a. Remove the seed source
OBJECTIVE: To remove the seed source that could be picked up by passing vehicles and limit seed transport in new and reconstruction areas.
IMPLEMENTATION: Remove all mud, dirt and plant parts from all off road equipment before moving into project areas. TSC C6.351# requires washing of machinery to be used in the project area.

MEASURE 1.a.3 Re-establish vegetation
OBJECTIVE: Re-establish vegetation on bare ground due to construction and reconstruction activity to minimize weed spread.
IMPLEMENTATION: Revegetate all disturbed soil, except the travel way on surfaced roads, in a manner that optimizes plant establishment for that specific site. Use native material where appropriate and available. Use a seed mix that includes fast, early season species to provide quick, dense revegetation. Use local seeding guidelines. TSC C6.601 specifies seed mix and application rates.

MEASURE 1.a.4. Minimize the movement of … weed species
OBJECTIVE: Minimize the movement of existing and new weed species caused by moving infested gravel and fill material. TSC C6.351# requires washing of off road machinery to be used in the project area.

MEASURE 6.1. Timber
OBJECTIVE: Ensure that weed prevention is considered in all pre-harvest timber projects.
IMPLEMENTATION: Remove all mud, dirt and plant parts from all off road equipment before moving into project area. TSC C6.351# requires washing of machinery to be used in the project area.

MEASURE 6.2. Minimize creation of sites suitable for weed establishment.
IMPLEMENTATION: Revegetate bare soil in a manner that optimizes plant establishment for that specific site. Use native material where appropriate and available. Use a seed mix that includes fast, early season species to provide quick, dense revegetation. Use local seeding guidelines.

Appendix D – Cumulative Impacts

Past, present and reasonably foreseeable future actions were considered for each resource to determine the cumulative effects associated with implementing the Middle Bugs project. The spatial extent of the cumulative effects analysis area and the activities considered varies for each resource analyzed. A description of the areas used to determine cumulative effects and the rationale for their boundaries are included in Chapter Three under each resource discussion. Existing conditions are the result of past and current activities in the analysis area. Past management activities and their potential effects as well as current practices are briefly described below.

Summary of the Effects of Past, Ongoing and Proposed Activities

Timber Harvest: Harvest has occurred on approximately 2,500 acres within the Middle Creek and Hemlock Creek drainages from the mid 1960's to 2000; most of it was regeneration harvest and occurred before 1995. Overall, less than 6% of the Middle Creek and Hemlock Creek drainages have been harvested. Management through the 1980's emphasized low cost harvest methods in order to provide low-cost wood products. Logging practices were less regulated and more impactive than current practices. Harvest unites were placed where access was easiest and volumes were high. In some cases, this occurred within riparian areas, adjacent to streams. The removal of the largest, oldest trees also reduced hiding cover, foraging, nesting and rearing habitats for some wildlife species. Activities reduced habitat available to riparian hand upland species including early seral habitats, which provided some foraging opportunities, but reduced the amount of mature forest habitat available for denning. Traditional regeneration harvesting simplified habitats by removing habitat elements such as snags and legacy trees.

Cheap, labor intensive logging methods, such as short distance jammer systems, and tractor logging were favored, resulting in soil erosion, compaction, and sediment input into streams. Streams were sometimes used as a method to transport logs from the harvest site, causing impacts to both aquatic and riparian habitat. Much of the timber harvest was conducted using clearcut methods. These activities caused a reduction of riparian habitats, increased ECA and some soil erosion in tractor logged areas. This caused a loss of stream shading resulting in increases in water temperatures, reduced fish usage in warm areas. There was bank destabilization in some locations due to the removal of streamside vegetation, with potential increases in stream sediment at these locations.

Currently, protection of mature and old growth forest habitats, along with the use of INFISH buffers since 1995 minimize the effects to sensitive species and their habitats. Because of INFISH buffer retention, there is no change to stream shading or temperature. There is minimal to no effect on sediment due to well vegetated buffers. All current (instream) and future (riparian) wood is retained. Adherence to downed woody debris and snag requirements retains adequate amounts of large woody debris and snags for travel, resting, hiding cover, prey habitat, hunting and denning. Current habitat prescriptions retain trees to address issues such as wildlife habitat, watershed conditions, visual quality, soil productivity and forest health. The prescriptions include retention of snags for cavity nesters, retention of standing live and dead down wood for soil nutrition and wildlife habitat, and maintaining sediment filtering vegetation near riparian areas.

Improved logging systems reduce the threat of environmental harm. The use of best management practices and forest plan standards and guidelines also helps to reduce impacts associated with logging. Monitoring during and after the sale provides valuable feedback for future sales.

Road Construction: Road construction in the Middle Creek and Hemlock Creek drainages dates from 1968; 37 miles of system road currently exist in these watersheds. The majority of the roads were built in the 1960's to provide access for timber harvest. They were sometimes constructed through riparian areas, floodplains, and adjacent hillsides to provide efficient access for harvest. No roads have been constructed in the project area since 1999. Most of the current road work in the area consists of routine maintenance and repairs. Road construction resulted in a reduction of riparian habitat and increase of sediment to streams. Roads caused loss of stream shading due to tree removal resulting in increased water temperature and sediment in stream channels, blocked fish passage and reduced fish habitat. In some cases, riparian habitat and road cut and fills have re-vegetated resulting in minimal soil erosion. Permanent loss of trees and future wood still exists where roads remain in riparian areas. Roads fracture wildlife habitat and cause disturbance to individuals. Motorized access reduced big game security.

Forest Service Best Management Practices are used during all road construction/reconstruction activities on the Forest. Special road construction and surfacing techniques are used to prevent or control surface erosion and thus sediment delivery into streams. Aggregate surfacing is increasingly used as a direct result of research studies showing reductions in sediment potential of 80 to 90 percent from the travelway. Highly erosive or unstable slopes are avoided. Slash filter windrows below the toe of constructed fills are a very effective sediment mitigation technique (Burroughs and King, 1989) utilized wherever appropriate. Overall sediment mitigation levels of up to 80% for road development are currently achieved.

Road crossings (culverts) are located at more stable sites and are designed to mimic the stream itself, rather than just move water quickly through the site. Roads are located well away from streams and riparian areas wherever practicable; and the numbers of crossings are minimized.

In the past, when a road was no longer needed it was simply abandoned. Many of these abandoned roads continued to erode or experience fill failures due to a lack of maintenance. In many cases, they developed into chronic sediment sources for local streams. Current decommissioning practices restore unneeded roads to a "hydrologically neutral" condition. This involves the removal and recontouring of all stream crossings and wet areas. Recontouring hillslopes also occurs where deemed necessary to provide for slope stability. Woody material and duff from the surrounding area are placed on the decommissioned surface to provide nutrients to the soil and erosion control.

Standardized travel management prescriptions keep motorized vehicles off unsurfaced roads during wet seasons, reducing sediment delivery.

Wildfire: The Middle Bugs project area is located within the 139,736 acre Weitas Creek watershed which includes the Middle Creek and Hemlock Creek watersheds. Forest records from 1910 to 1931 show that fires burned 123,833 acres (all but 15,963 acres) of the Weitas drainage. Wildfires since 1910 have burned 68% of the Middle Creek watershed area. The fires of 1919 burned most of the areas in the Upper Middle Creek and Beaver Dam Creek where proposed harvest and road construction activities are concentrated, initiating most of the lodgepole pine stands in the area. These large scale fires removed much of the tree canopy in the watersheds.

Since 1919, fire suppression efforts have limited fire starts to 20, with less than 25 acres affected. Some fires caused loss of stream shading resulting in increased water temperatures and sediment in stream channel and reduced fish habitat. Wildfires also increased instream wood levels. Large intense fires can damage soils.

With fire suppression and succession, the density of snags may have increased, but the size of the snags have decreased, which may not be beneficial to many wildlife species that depend on large diameter snags and logs.

Mountain pine beetle activity in lodgepole pine in the project area is changing wildlife habitats at the landscape scale.

Prescribed Fire: Fire suppression has occurred in the Middle Creek watershed for several decades. Broadcast burning of activity fuels following timber harvest has been the most common form of prescribed burning. Within the Middle Creek drainage and/or larger Weitas Creek watershed, prescribed burning associated with the North Lochsa Face NEPA decision and the Weitas Fuels Project on the east side of the Weitas Creek watershed has been implemented since 2005. Prescribed burning activities follow INFISH guidelines; they restrict ignition in riparian areas, but allow fires to back into these areas.

Recreation: Past activities affecting recreation in the project area are linked to access provided by roads built in the 1900's for logging and development of fire lookouts. As access to the area became more available, recreational use including dispersed camping, hunting, berry picking and firewood gathering also became more frequent. All of these activities continue today along with motorized touring by OHV's and these uses are reasonably expected to persist into the foreseeable future, given available resources and maintained access routes. Recreational trails and dispersed campsites are located in the watersheds with recreational use occuring throughout the summer months and through the fall hunting seasons. A number of dispersed campsites are located along the road system. The road system is used by full-size vehicles and OHVs. Several system OHV routes exist.

Grazing: Livestock grazing began in the Middle Creek and Hemlock Creek watersheds in 1919 after the large wildfires, peaked in 1930s and dropped off in the 1950s. It mostly consisted of sheep with some cows and horses. Livestock use was concentrated in meadows and riparian areas and reduced the quality of these habitats for fish and wildlife. There have not been allotments in the Middle Creek or Hemlock Creek watersheds since 1970. Any past impacts have dispersed and are no longer evident.

Aquatic Restoration: Recently, various aquatic restoration projects have been completed to improve aquatic organism passage, accommodate 100 year flow events and curb chronic sediment delivery. This includes culvert removal and replacement, road outsloping, installation of drivable dips or drainage outlets. Aquatic passage improvement projects have occurred where Road 103 crosses Middle Creek and Rocky Ridge Creek.

Past timber harvest (1965-1999), wildfire (1910-2008) and road construction (1965-1999) in the Hemlock and Middle Creek watersheds are summarized below.

Table D-1. Past Activities

6th Code Watershed	Watershed (Acres)	Past Harvest Acres		Fire Activity (Acres)	Miles of Road
		Regen.	Interm.		
Middle Creek	17,537	1043	215	11,947	36.6
Hemlock Creek[1]	21,412	1091	160	19,267	47.9
7th Code Watersheds					
Upper Middle Creek	4,976	763	80	1,455	22.6
Lower Middle Creek	5,530	0	0	4,599	1.7
Beaver Dam Creek	2,117	9	0	1,432	3.8
Felix Creek	1,835	45	0	1,555	1.4
Rocky Ridge Creek	3,080	215	35	1,857	7.1
Upper Hemlock Creek	7,715	64	1	7,451	7.4
Lower Hemlock Creek	9,908	60	483	8,273	16.3

*Detailed harvest information is located in the project file.

Proposed and Foreseeable Projects

The impacts of past activities are described above and in each resource section in Chapter 3. Middle Bugs is the only proposed project within the 5,540 acre project area, there are no ongoing projects. All proposed projects considered for cumulative effects by various resources are described below.

French Larch: This project tentatively proposes commercial thin and regeneration harvest in 2017. Activities would occur in T37N, R7 and 8E. Portions of this project area lay in Lynx Analysis Unit 38 – west of the project area. Portions of the French Larch project area also lay in Hemlock Creek and OGAUs 115 and 116. A NFMA analysis has not been completed, the specific activities, the amount or where they would occur are not known, the project has not yet been scoped and all proposed actions have not been identified; therefore, a detailed discussion of potential effects is not possible. Not enough information is available about the type, location or extent of potential proposed activities to include them in the analysis.

Lolo Insect and Disease: This project is still in the NFMA stage and the specific activities, the amount or where they would occur are not known. The project has not yet been scoped and all proposed actions have not been identified; therefore, a detailed discussion of potential effects is not possible. Not enough information is available about the type, location or extent of potential proposed activities to include them in the analysis. The project is scheduled to be scoped in 2013. The 80,000 acre project area lies in the Lolo Creek watershed in T34, 35, 36N; R6 and 7E. Tentatively, this project would propose vegetative landscape scale restoration. It would treat stands between 80 and 120 years old showing signs of root disease and bark beetle. Analysis is scheduled to be completed in 2015. Portions of the project area lay within **Lynx Unit 38, OGAU 104 and Camp and Yoosa Elk Analysis Units**. It is proposed to sell in 2016 and 2017 as multiple sales.

Lochsa Thin: NEPA has been completed for this project; the decision was signed May 5, 2011. Activities have not yet started. The 79,000 acre project area is in Townships 33N, 34N, 35N, and 36N and Ranges 6E and 7E, Boise Meridian in Idaho County, Idaho. Project activities will occur on the Lochsa District, within the Eldorado Creek, Musselshell Creek, Middle Lolo Creek, and Upper Lolo Creek subwatersheds. The project will be split into multiple projects scheduled to sell from 2014 and 2015. Unit 5 is a precommercial thin unit that lies within OGAU 104. Unit 6 proposes precommercial thin within the **Yoosa EAU and OGAU 104**. All other harvest activities are outside the cumulative effects areas considered for each resource for Middle Bugs.

Ongoing Activities

Weitas Fuels: The Weitas Fuels project is the only ongoing project considered for cumulative effects. NEPA was completed for this prescribed burning project in July, 2004. The project area is located within Townships 36N, 37N, and 38N, Ranges 8E and 9E and encompasses the entire 140,000 acre Weitas Creek drainage. A small portion of this project area lays in **OGAU 107** and **Middle Creek** (1,250 acres) **and Middle Creek Elk Analysis Unit**. From 2005 through 2011, burning was completed on 15,709 acres. This project will burn 4,550 acres in 2013 which will complete project activities. Sediment delivery to streams and increases in water yield are expected to be minor and negligible due to the design features and mitigation measures implemented within the prescribed burn activities (unburned riparian buffers along streams, mosaic burn pattern, retention of duff layers, dominant low to moderate burn severity, and the timing of ignition of the units (USDA 2003).

Clearwater National Forest Travel Plan: The Clearwater National Forest Travel Plan designates roads, trails, and areas where motorized travel is permitted. A Motor Vehicle Use Map (MVUM) will be available to the public in late summer 2012. This plan affects motorized

recreation across the Forest in a variety of ways, including limiting cross country travel, altering open access seasons and types of vehicles that are allowed on roads.

The CNF Travel Plan designates roads proposed for decommissioning or long term storage under the Middle Bugs project as restricted yearlong to all except for Road 1610 (.2 miles).

The CNF Travel Plan changes snowmobile restrictions on all roads to 5/16 to 11/15. Of the 14.29 miles of road proposed for decommissioning and storage, 2.39 miles are currently open to snowmobiles. These miles are not currently part of the groomed system and snowmobile access would not noticeably differ as a result of proposed road decommissioning and storage treatments.

The CNF Travel Plan will implement seasonal restrictions on some trails within MA C8S protect wildlife habitat.

The CNF Travel Plan maintains the current yearlong motorized and bicycle restrictions on Trail 40 and will implement yearlong motorized restrictions for all motorized vehicles on Trail 100.

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