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Environmental Assessment

Anaconda Job Corp Wildland Urban Interface Fuels Hazard Abatement

Pintler Ranger District
Beaverhead-Deerlodge National Forest

Entrance to the Anaconda Job Corps Center and Administrative Site

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Introduction

In 2007 this project was reviewed in accordance with FSH 1909.15, and was determined to fall under Section 31.2(10): "Hazardous fuels reduction activities using prescribed fire, not to exceed 4,500 acres, and mechanical methods for crushing, piling, thinning, pruning, cutting, chipping, mulching, and mowing, not to exceed 1,000 acres." A Draft Decision Memo was released for public comment on June 25, 2007. Before a Decision Memo was signed for this project, the Ninth Circuit Court ruling in *Sierra Club v. Bosworth* on December 5, 2007, invalidated the use of Category 10 as described in FSH 1905.15 31.2.

Because of the invalidation of the CE, the Beaverhead-Deerlodge National Forest has taken the Proposed Action, public involvement, and environmental effects analysis used to support the Categorical Exclusion and developed this Environmental Assessment.

An increase in tree mortality in and around the project area has caused a change in existing condition. Because of the increased tree mortality, the Forest Service is proposing to remove dead and dying trees in order to meet the purpose and need for the project.

Background/Existing Condition

The Anaconda Job Corps Wildland Urban Interface Fuels Hazard Abatement Project is proposed in response to elements of the National Fire Plan and the President's Healthy Forest Initiative which address hazardous fuels reduction and reduced risk from wildfire to people and property.

The Healthy Forests Restoration Act (HFRA), passed in December of 2003, provides improved statutory processes for hazardous fuel reduction projects on certain types of at-risk National Forest System (NFS) and Bureau of Land Management (BLM) lands. It also provides other authorities and direction to help reduce hazardous fuel and restore healthy forest and rangeland conditions on lands of all ownerships. The Anaconda Job Corp Wildland Urban Interface Fuels Hazard Abatement Project qualifies as an HFRA project, see Table 1**Error! Reference source not found.**.

Table 1: The Healthy Forests Restoration Act of 2003

HFRA Requirement	Project Compliance
Hazardous Fuels Reduction	The Purpose and Need for this project is hazardous fuels reduction to increase safety for firefighters, students and employees of the center, and the public
10 Year Comprehensive Strategy	The project is in line with the 10 Year comprehensive Strategy
Wildland Urban Interface (WUI)	The entire project area is within the WUI boundary of an at risk community as defined in the HFRA and the Anaconda-Deer Lodge County CWPP
Authorized Hazardous Fuels Reduction Project	The project treatments fit the definition of an authorized project
Outside Designated Wilderness	The proposed project is not located in designated wilderness
Collaboration	Collaboration efforts include: Public Scoping Local Community and the Anaconda Job Corp Center have been actively engaged Project Consultation meeting 5/20/08 with the Shoshone-Bannock Tribes of the Fort Hall Reservation Project Consultation meeting 5/20/08 with the Confederated Salish and Kootenai Tribes of the Flathead Reservation On three separate occasions (6/26/07, 1/15/08, and 6/17/08) Pintler District Ranger Charlene Bucha Gentry met with the Anaconda-Deer Lodge County Commissioners. These were

HFRA Requirement	Project Compliance
	public meetings, with advance notice, where the proposed project was discussed
Public Meeting with Advanced Notice	A public meeting was held during the Anaconda-Deer Lodge County Commissioners meeting on November 18, 2008 at 7:00 p.m. Pintler District Ranger Charlene Bucha Gentry gave a project briefing and answered questions from the public. Advanced notice of this meeting was sent to local media.

The Beaverhead-Deerlodge National Forest is working in conjunction with the Anaconda Job Corps Center and following the Anaconda-Deer Lodge County Community Wildfire Protection Plan (CWPP). The CWPP was produced in 2005 as a collaborative effort.

The CWPP identifies the Job Corps Center as a High Priority Protection Zone, Moderate to High risk for Ignition Probability and Moderate to High for Fire Risk/Wild Urban Interface Impact. The CWPP also identified the Anaconda Job Corps Center as an important structure within the WUI and of high value to Anaconda-Deer Lodge County and the State of Montana.

Table 2: CWPP Ratings for the Anaconda Job Corps Project Area

CWPP Category	CWPP Rating for Project Area
Priority Protection Zone	High Priority (CWPP, p. 29)
Ignition Probability	Moderate to High Risk (CWPP, Figure 7)
Fire Risk/Wild Urban Interface Impact	Moderate to High Risk (CWPP, Figure 9)
Values at Risk	Human Life, Important WUI Structures and of High Value to the County, Forest Resources (CWPP, p. 13-14)
Subdivision Risk	Extreme Fire Risk (CWPP, p. 32)
Egress/Ingress	Critical Egress/Ingress Route (CWPP, p. 16)

The Anaconda Job Corp Center is an administrative site within the Beaverhead-Deerlodge National Forest, and was built in the early 1960's on a former Forest Service campground site on a bench above Foster Creek. Forest Road #195 (Foster Creek Road) is the only access into and out of the center. The Anaconda Job Corp Center has an approximate population of 240 students living in 4 dormitories on the center with 70 additional staff members who live or work on site. The remaining facility consists of 31 additional structures. There are also approximately 5 private residences along road Foster Creek Road above and below the Job Corps Center. The CWPP includes a county subdivision risk assessment and reports the Foster/Barker Creek subdivision at Extreme Fire Risk, the highest risk/priority rating.

Vegetation

Even-aged stands of lodgepole pine (currently impacted by the mountain pine beetle epidemic) and Douglas-fir dominate the landscape throughout the Foster Creek drainage, west of Anaconda, Montana. These stands became established following large-scale clearcutting to provide fuel for mining and smelting operations in Anaconda and Butte in the early 1900's. The project area spans elevation ranges from 6200 feet at Foster Creek to 7400 feet at the upper elevations of proposed Unit 10. Gentle, flatter slopes consist of lodgepole pine with minor components of Douglas-fir and aspen, while the drier, west-facing, steeper slopes hold a mixed forest of lodgepole pine, Douglas-fir, aspen, limber pine and juniper with intermingled grass meadows. Engelmann spruce can be found along the riparian area of Foster Creek. Overall, mature trees within the proposed treatment areas average 8 to 14 inches diameter, and approximately 87-115 years of age (field measurements 2007 & 2008).

Down woody fuel loads are relatively light overall at less than 12 tons per acre, although there are higher concentrations of down woody fuels scattered throughout the project area.

Mountain pine beetle (MPB) activity has reached epidemic proportions throughout the Foster Creek drainage over the past 2-3 years, affecting both lodgepole pine and limber pine. Typically, lodgepole pine approximately 80 years in age or older are considered to be highly susceptible. Lodgepole pine over 80 years old and averaging 8 inches dbh are highly susceptible to attack by mountain pine beetle (Amman et al 1990). Surveys conducted in 2007 indicated that approximately 13 percent of the lodgepole pine greater than 6.5 inches in diameter at breast height have been killed, with a prediction that an additional 13 percent mortality predicted after the 2007 beetle flight (Sturdevant 2007). In the AJC project area, mountain pine beetle is currently attacking trees as small as 5 inches in diameter, and 60 years in age. Stand densities between 150-170 basal area per acre appear to be the most susceptible.

The FINDITS model was used to evaluate mountain pine beetle currently impacting lodgepole pine trees in the project area (Sturdevant 2007). This model incorporates a mountain pine beetle rating system based on basal area, diameter classes, tree species plurality and mountain pine beetle activity (Ibid.). Using field data collected in 2007, FINDITS estimated that the majority of lodgepole pine could be killed by mountain pine beetle over the next 3 years.

Fire/Fuels

Expected fire behavior for current conditions in Unit 10 (fuel model 6) was modeled using Fire Family Plus. On a 75 degree day you could expect:

- flame lengths to be approximately 7.8 feet
- 99% mortality of lodgepole pine

The rest of the units currently fall in a fuel model 8; however with the current beetle infestation and associated mortality, the fuel loads will continue to increase over time as the dead trees fall down moving the area to a fuel model 10. This fire behavior was modeled using Fire Family Plus. On a 75 degree day you could expect:

- flame lengths to be approximately 4.4 feet
- 97% mortality of lodgepole pine

In 1999 a human caused fire started and rapidly burned 30 acres less than ½ mile north of the Job Corps Center. The fire was slope and wind driven, and burned in lodgepole pine, juniper and limber pine. One other fire has burned in the project area within the last 50 years, and was the result of a lightning strike.

Crown Fire Concern

Crown base height (CBH), which is usually measured at the stand-level, is the lowest height above the ground at which there is a sufficient amount of canopy fuel to propagate fire vertically into the overstory tree canopies (Scott and Reinhardt 2001). The lower the CBH, the more likely a surface fire will burn into the tree canopies and develop into a crown fire situation which is very difficult to manage. Stand-level CBH range from 5 to 15 feet on average throughout the analysis area, which equates to a moderately high crown fire risk.

Home Ignition Zone

The “home ignition zone” describes a home or structure in relation to its surroundings within 100 – 200 feet of the structure (Cohen 2000). This zone principally determines a home or structure’s ignition potential in two ways: from flames (radiation and convection heating) and from firebrands that have been lofted in the air and falling directly on a structure (burning ember spot ignitions (Cohen et al 2008). By addressing vegetation and fuel conditions within the home ignition zone, the home ignition potential can be significantly reduced (Ibid).

The Job Corp campus and surrounding private land inholdings along Foster Creek and Foster Creek Road have been identified by the Anaconda Job Corps Center and Deer Lodge Community Wildfire Protection Plan as a high priority protection zone. This project proposes treating the hazardous fuel condition throughout the Anaconda Job Corps Center, along portions of Foster Creek Road, and the hillside situated east of the Job Corp campus for public safety. The majority of the AJC Corp buildings and structures are constructed with brick and stucco. As long as the AJC campus has been in operation, the vegetation features within the campus itself, have been routinely irrigated and mowed. Strips of trees dividing portions of the campus operations are maintained in an open-understory appearance and hazard trees are removed as needed to provide for public safety.

Figure 1: View of Unit 2

Figure 2: View of Unit 6

Figure 3: View of Unit 10

Purpose and Need

This project is proposed to reduce hazardous fuels and subsequently reduce the safety risk and loss of infrastructure on the Anaconda Job Corps Center, Administrative site, and private lands. By reducing fuel loads and breaking up fuel continuity, the ability to effectively suppress fires within the project area would increase. Not only would treatment help to protect the Anaconda Job Corps Center from unwanted consequences of fires starting in forested lands outside the administrative site, but treatment allows firefighters to more actively suppress human-caused fires starting adjacent to the center and burning into the forest.

The proposed project responds to the National Fire Plan which provides a strategy for a comprehensive approach to the management of wildland fire and hazardous fuels on Federal and adjacent State, tribal and private forest and range lands in the United States. This strategy emphasizes reducing the risk to communities and the environment by implementing vegetation treatment to reduce hazardous fuels.

Title I of the HFRA focuses primarily on expedited hazardous fuel treatment on some National Forest System and Bureau of Land Management lands at risk of wildland fire and insect or disease epidemics. The act encourages Federal agencies to involve State and local governments and citizens when developing plans and projects for vegetation treatment of Federal lands. The HFRA is consistent with community-based wildland fire planning, watershed planning, and related ongoing efforts under the National Fire Plan (http://www.forestsandrangelands.gov/NFP/index.shtml) and A Collaborative Approach for Reducing Wildland Fire risks to Communities and the Environment: 10-Year Comprehensive Strategy Implementation Plan (December 2006). The HFRA does not duplicate or replace these ongoing efforts.

The specific objectives related to the purpose and need for the Anaconda Job Corp Wildland Urban Interface Fuels Hazard Abatement project include:

- **Reduce hazardous fuels in the wildland-urban interface (WUI)**

The forest stands are generally lodgepole pine with juniper ladder fuels and surface fuels in the understory. The current fuel conditions make the area susceptible to rapid fire spread and promote high intensity fires and higher flame lengths.

Anaconda-Deer Lodge County defined the WUI in their Community Wildfire Protection Plan (CWPP). It is based on the

nationally-recognized HFRA WUI definition. The Anaconda Job Corps project area is within the county-defined WUI.

Proposed treatments would increase the effectiveness firefighting resources would have when fighting a wildland fire within the project area, adjacent to the AJC Center and private homes in the Foster Creek Drainage.

- **An increase in firefighter and public safety**

The difficulty of suppressing intensely burning wildfires increases significantly when populated areas are threatened. Not only are firefighters at risk, but forest users and the citizens of the threatened community are also in danger. The Anaconda Job Corps Center has an approximate population of 240 students living in 4 dormitories on the center with 70 additional staff members who live or work on site. The remaining facility consists of 31 additional structures. There are also approximately 5 private residences along Foster Creek Road above and below the Anaconda Job Corps Center.

The Anaconda Job Corps students use the surrounding forest for social and recreational activities, increasing human caused fire potential. In 1999 a human caused fire started and rapidly burned 30 acres less than ½ mile north of the Anaconda Job Corps Center.

The infrastructure is such that firefighting capabilities and the safety of the Anaconda Job Corps residents are limited or hindered because Foster Creek Road is the only access into and out of the area. Treatments would provide for more effective structure protection and safer evacuation in the event of wildfire.

The goals of the treatments are to break up the concentrations and continuity of beetle-killed lodgepole pine and live woody fuel, and change the potential fire behavior from a potential high intensity, high severity crown fire situation to low intensity, low severity surface fire type. The treatments would help create defensible spaces near private and Forest Service values at risk. This in turn would enable firefighters to better suppress fire, protect infrastructures and safely evacuate the Anaconda Job Corps residents and the public should a wildfire occur in the area.

- **Restoration of the vigor of aspen stands**

Lodgepole pine, Rocky Mountain juniper, and Douglas-fir are well established as understory and overstory trees in aspen stands. They are weakening the health and vigor of the aspen. Healthy stands of aspen have a ‘dampening’ effect on fire. Restoring a healthy component of aspen would reduce the risk from fire in the area surrounding the AJC Center.

- **Reduction of stand densities and removal of dead/dying/infested material**

The desired vegetation condition is to have park-like, open stands of forest vegetation around the AJC campus, free of potentially hazardous snags, and resilient enough to withstand a potential wildfire in the understory without killing a majority of the overstory trees in the area. Vegetation would consist of trees of low flammability such as aspen, and conifers with sufficiently wide crown spacing to avoid a crown fire.

Maintaining a low tree density, combined with changes in the species composition, would also help to minimize future bark beetle infestations and maintain open canopy conditions. Removing dead and dying trees would reduce the future cost of fire suppression efforts.

Desired Condition

The primary purposes of the Anaconda Job Corps project are: to reduce the potentially hazardous fuel situation that currently exists within the Foster Creek drainage immediately surrounding the Anaconda Job Corps; and protect the Center’s infrastructure and other structures found on adjacent private lands from a wildland fire event. To achieve these goals, the desired management would be:

1. Removal of dead/dying lodgepole pine trees to manage the amount of dead, standing fuel and reduce the potential for unplanned, unwanted fire behavior in subsequent years; reduce undesired fuel situation (ladder fuels),and change fire behavior from potentially high severity/intensity fire (crown fire) to a surface type fire of low intensity.
2. Perpetuate open-growing stands of lodgepole pine and Douglas-fir forests, averaging 6-12 inch dbh;
3. Promote the regeneration/development of more resilient, younger age class lodgepole pine/Douglas-fir.
4. Increase representation of early-seral species such as aspen (restore, maintain and increase the occurrence of aspen throughout the area as individual mature trees or large acreages composed of 2-3 distinct age-class components within each clone, where possible);
5. In the long term, regenerate and manage the forested areas for more resilience to natural disturbances.

The desired condition is to have park-like, open stands of forest vegetation around the AJC campus, free of potentially hazardous snags and resilient enough to withstand fire in the understory without killing a majority of the trees in the area. Vegetation features would consist of trees of low flammability such as aspen, and conifers with sufficiently wide crown spacing to avoid independent crown fire.

Structures within the project area and the administrative site would have defensible/survivable space as described in the local Community Wildland Protection Plan for the area or other local standards. Ingress and egress for firefighter and public safety is available, and structures can be defended safely. In the subdivisions, defensible/survivable space is the responsibility of the private home owners and would enhance the effectiveness of the fuel treatment within the project area.

After treatment, the Anaconda Job Corps Center would be rated low to moderate in both the Ignition Probability and Fire Risk/Wild Urban Interface Impact.

For the treatment areas directly surrounding the Anaconda Job Corps Center and Administrative Site and along the main roadway (Foster Creek Road #195), the target stand conditions for all proposed treatment units except Units 7 and 10, would be open-growing, park-like stands of aspen, lodgepole pine and Douglas-fir, with incidental amounts of spruce as you get near the riparian areas of Foster Creek. Overall tree density would remain low, in order to reduce crown fire potential. Initially, seedlings and sapling densities are likely to increase through natural regeneration (exceeding 400 stems to acre), but as stands age, the densities would be maintained at approximately 150-250 pole and mature trees per acre using mechanized thinning. This density, combined with changes in the species composition, would also help to minimize future bark beetle infestations. Minor amounts of older lodgepole pine that had escaped the current bark beetle epidemic may be found across the landscape. Understory vegetation will be primarily pine grass and various forb species, with lesser amounts of shrubs.

The overall objectives for treating proposed slashing and ignition zones (proposed units 7 and 10) are to remove the existing ladder fuels (removing the majority of sapling and pole-size conifer trees), and increase the spacing between tree crowns to reduce the potential for fire to move from one tree canopy to the next (active crown fire). Similar to the other proposed treatment areas, the desired post-treatment tree composition for these areas are open-growing stands (tree densities ranging from 150 to upwards of 250 trees per acre) of dry-site Douglas-fir, limber pine, aspen, juniper and lodgepole pine in six strategic locations across the hillside situated to the east and north of the Anaconda Job Corps Center (refer to project map). The treatments would break up the surface, ladder, and canopy fuel continuity across this dry, steep hillside. The target stand conditions for all treatment areas would provide a forested condition that would maintain a relatively low fire hazard for the areas immediately adjacent to and within the Anaconda Job Corps Center.

Figure 4: Example of Desired Condition

Public Involvement

The project was first listed in the Beaverhead-Deerlodge National Forest Schedule of Proposed Actions (SOPA) in the April – June 2007 issue and has appeared quarterly to date. This listing informed the public of our plan to analyze the Anaconda Job

Corps area for fuels/fire risk.

The Anaconda Job Corps WUI Fuels Hazard Abatement project area was defined in the Anaconda-Deer Lodge County Wildfire Protection Plan (CWPP) as an area with a high priority for treatment. This priority was determined using the Fire Mitigation Prioritization Matrix which considers four elements: 1) WUI Priority Protection Zone 2) Fire Behavior Fuels Model 3) Fire Regime Condition Class and 4) Ignition Probability

The CWPP was produced as a collaborative effort with the public and the following primary stakeholders:

- Anaconda-Deer Lodge Fire Council
- Anaconda-Deer Lodge County Commissioners
- Disaster and Emergency Services
- Tri-County Resource Advisory Committee
- Bureau of Land Management,
- USDA Forest Service
- Montana Department of Natural Resources
- Headwaters RC&D

A scoping letter, dated March 26, 2007, was mailed to 93 recipients, and included a map of the proposed treatment units. Ten individuals or organization representatives responded to the scoping letter.

A Draft Decision Memo for comment was mailed June 25, 2007 to the ten individuals and organizations that responded to the scoping letter. Six comments were received on this draft document.

On three separate occasions (6/26/07, 1/15/08, and 6/17/08) Pintler District Ranger Charlene Bucha Gentry met with the Anaconda-Deer Lodge County Commissioners. These were public meetings, with advance notice to the public, where the proposed project was discussed.

On May 20, 2008, forest archeologists met with the Confederated Salish and Kootenai Tribes of the Flathead Reservation and the Shoshone-Bannock Tribes of the Fort Hall Reservation. At this meeting the tribes were briefed on proposed forest projects including the Anaconda Job Corps Wildland Urban Interface Fuels Hazard Abatement project (PF Doc C006 and C007).

Because of the invalidation of the Categorical Exclusion for hazardous fuels reduction projects, the Beaverhead-Deerlodge National Forest has taken the Proposed Action and environmental effects analysis used to support the CE, along with public comments on the Draft Decision Memo, and developed this Environmental Assessment.

A public meeting was held during the Anaconda-Deer Lodge County Commissioners meeting on November 18, 2008 at 7:00 p.m. Pintler District Ranger Charlene Bucha Gentry gave a project briefing and was available to answer questions from the public. Advanced notice of this meeting was sent to local media.

Forest Plan Management Direction

The Environmental Analysis published in December 2008 was analyzed using the 1987 Deerlodge Forest Plan, prior to the revised Forest Plan implementation. Current management direction for the Beaverhead-Deerlodge National Forest is found in the 2009 Beaverhead-Deerlodge Forest Plan, implemented March 23, 2009. The plan describes forest-wide goals and objectives, standards and guidelines, and direction for subunits of the forest referred to as “Management Areas.” The management direction relevant to the project area is summarized below.

The project area is located in the Warm Springs Management Area in the Clark Fork Flint Landscape.

Discussions on all applicable Forestwide Standards can be found in the project file (PF Doc E003).

Table 3: Management Area Direction

Management Area	
Warm Springs Management Area Revised Beaverhead-Deerlodge	This area is managed for recreation, wildlife, and native fish conservation. Additional land uses and activities include timber production and harvest, livestock

Management Area	
Forest Plan (2009) p. 122-123	grazing and road restoration, and recreation residence tracts. Warm Springs, Foster Creek and Twin Lakes are fisheries key watersheds. Visitors may encounter: Vegetation changes from timber harvest or fire Many visitors particularly along the Pintler Scenic Route Motor vehicles on roads and trails in summer and fall Snowmobilers Livestock One standard in addition to the Forestwide Standards.

A Source Water Protection Plan has been developed for the public water system that serves the Anaconda Job Corps Center. This project meets the intent of that plan and protects the Center's water source.

Alternatives, Including the Proposed Action

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.

The continued development of the existing fuel condition and Mountain Pine Beetle hazard is the No Action Alternative. The treatment areas would remain as described in the Existing Condition section and current trends would continue. If no action is taken, potential fire behavior would continue to be at an elevated risk and fire suppression would grow increasingly difficult (refer to Table 6: Progression of Change in a Lodgepole Pine Stand). As a result, the Anaconda Job Corps Center facilities and residents as well as the private structures would continue to be threatened. Safe evacuation in the event of a wildfire would continue to be an elevated risk.

Specifically, the dead standing lodgepole pine would fall over and contribute to down woody fuel loadings, coupled with increased ladder fuel development. The risk of a severe stand-replacing fire would increase, which may equate to higher probability of damage values at risk such as the safety of the Anaconda Job Corps Center residents, watershed stability and wildlife habitat needs, increased need for expensive rural wildland urban interface protection, and increased rehabilitation costs.

Proposed Action

The Pintler Ranger District proposes to reduce hazardous fuels in the vicinity of the Anaconda Job Corps Center. This project includes 13 treatment units for a total of 645 acres adjacent to the Anaconda Job Corps Center and along Foster Creek Road above and below the Anaconda Job Corps Center. The project is located approximately 9 miles west of Anaconda, Montana, in T5N, R12W, Sections 16-21 (see attached map). Proposed units were chosen based on proximity to the Job Corp Center and Foster Creek Road, as well as terrain. Foster Creek road provides the only access to the Job Corp Center and private residences located to the north of the Center.

Proposed Treatment for Units 1, 2, 3, 4, 5, 6, 8, 9, 11, 12 and 13

The proposed treatments for these units are designed to reduce hazardous fuels by removing dead and dying lodgepole pine trees (trees 5 to 15 inches in diameter and larger) on approximately 152 acres affected by mountain pine beetle. Mountain pine beetle-affected lodgepole pine trees (dead/dying) would be the primary target for removal. Douglas-fir and aspen would be the preferred residual trees, along with mature lodgepole pine that may not be affected by mountain pine beetle. Harvested trees would be whole tree yarded to landing sites. The harvested dead trees in Units 2 and 8 would be made available for firewood removal by the general public. Where suitable, live trees are retained, post-treatment target basal area per acre could range from 60 to 120; and canopy cover ranging from 10 to 40 percent cover across the treated areas. Within all proposed treatment units, areas with heavy concentrations of debris (resulting from the harvest and slashing activities) would be hand piled and chipped or burned.

Dead and dying trees within the Riparian Conservation Area (RCA, a 300 foot buffer from streams) on the east side of Foster Creek Road will be retained for large woody debris recruitment in the creek channel and riparian area. No ground disturbing activities will occur within RCAs, except as noted in the Biological Assessment, which allows removal of dead and dying trees in areas west of Foster Creek Road, (Units 1, 2, 3, and 5) because these areas are outside the influence of the riparian zone.

Existing roads and trails within the stand would be used for skidding where available; additional skid trails would be designated by the sale administrator prior to skidding.

Units were chosen based on proximity to the Job Corp Center and Foster Creek Road, as well as terrain (slope). Foster Creek Road provides the only access to the Center and private residences located to the north of the Center.

> Response to Purpose and Need: The goals of removing dead and dying lodgepole pine trees are to maintain the health and overall vigor of these stands. Douglas-fir with larger fuller crowns would be retained, along with individual aspens and aspen clones. Incidental lodgepole pine not currently impacted by mountain pine beetle would also be retained if free of dwarf mistletoe or not damaged from salvage operations. These treatments would provide greater firefighter and public safety during suppression efforts around the area because of reduced fire behavior. Structures around the center would be protected with fewer resources because of the reduction in fuels.

Proposed Treatment for Units 7 and 10

Proposed treatment units 7 and 10 are designed as fuel breaks situated directly adjacent to the Anaconda Job Corp campus. Mountain pine beetle-affected lodgepole pine trees (dead/dying) would be the primary target for removal. In proposed units 7 and 10, dense concentrations of sapling and pole-size conifer trees 4 inches in diameter or less would be cut down and removed or burned on site. Areas with heavy concentrations of debris (resulting from the harvest and slashing activities) would be hand piled and/or burned.

> Response to Purpose and Need: As with the other proposed units, the goal of removing dead and dying trees is to maintain the health and overall vigor of these stands. Changing the horizontal and vertical dead and live fuel configuration adjacent to the Job Corp campus and outbuildings would provide greater firefighter and public safety during a fire event. Structures around the center would be protected with fewer resources because of the reduction in fuels. Breaking up concentrations of dense understory patches would help to minimize the chance of a surface fire reaching the upper canopies of mature trees and developing into a crown fire.

Aspen Management

All aspen (individual mature trees and large groups of clones) would be retained. Conifers found within healthy aspen clones would be considered for cutting or girdling to reduce competition for light and water, and to remove future conifer seed sources. Live conifers 15 inches in diameter or greater found within the clones, would be considered for girdling. Smaller live conifers within the clone would be cut and left on site. Openings in the canopy would allow for increased vigor and growth of individual aspen, and stimulate suckering (Sheppard 1996).

Snag Habitat / Retention

The revised Beaverhead-Deerlodge Forest Plan (2009) stipulates the following (Forestwide-direction, Ch. 3, p. 48): *Mechanical vegetation treatments will,*

> *Retain all snags greater than 20" dbh (except for hazard trees).*
>
> *In addition, do not reduce the number of snags greater than 15.0" dbh per acre in treatment units below the levels shown in the Table 12, calculated as an average for the total treatment unit acreage in a project area. This calculation allows variability among treatment units which produces a more natural clumpy distribution (Table 12, FP rev. Chapter 3, p. 48).*
>
> *If there are insufficient snags in treatment units, live trees in the same size class must be retained and counted towards the snag requirement. These would be in addition to any requirements of Standard 4.*
>
> *These per acre requirements do not apply to the treatment units if analysis shows the levels of snags will be met for the project area as a whole.*

The revised FP standards for the minimum average snags per acre to be retained in the lodgepole pine vegetation category is 6.4 snags per acre. Snags will be clustered adjacent to natural openings, near water, in valley bottoms or in aspen groves wherever possible. Table 4 displays the number of snags marked for retention in each proposed treatment unit.

Table 4: Number of Snags Retained in Proposed Units

Unit	Acres	Number of Snags Retained
1	14	84
2	11	66
3	6	36
4	8	48
5	16	96
6	37	222
8	12	98
9	42	252
11	3	0
12	1	0
13	8	48

All snags greater than 15”diameter (all soft and hard, all species) would be left in the unit for snag dependent species, except where they pose a safety hazard to operators and/or the public (if they are located within 1 tree length from a road open to the public for motorized vehicle travel). Lodgepole pine and Douglas-fir are the dominant mature tree components throughout the project area, averaging 8 to 14 inches in diameter. There are no dead or live lodgepole pine trees greater than 15 inches in diameter within the proposed treatment units. The project will not cut live trees larger than 15 inches dbh, which provides the opportunity for large snag availability in the future. This mitigation measure would ensure 1) retention of large snags where and when available, and 2) compliance with both the Forest Plan and Northern Region Snag Protocol. There is an abundant snag reservoir in the untreated areas of the Foster Creek drainage.

Figure 5: Dead and Dying (Hazard) Trees in the Administrative Site

Table 5: Treatment Units and Mitigation

Unit	Acres	Fuels Treatment	Mitigation
1	14	Remove dead/dying lodgepole pine & treat debris*	Aquatics: An effective sediment filter fence would be installed down gradient of the proposed landing. Aquatics: No ground disturbing activities will occur within RCAs, except as noted in the Biological Assessment, which allows removal of dead and dying trees in areas west of Foster Creek Road, (Units 1, 2, 3, and 5) because these areas are outside the influence of the riparian zone.
2	11	Fell and Buck Dead/Dying Trees for Firewood Gathering – treat debris*	Aquatics: No ground disturbing activities will occur within RCAs, except as noted in the Biological Assessment, which allows removal of dead and dying trees in areas west of Foster Creek Road, (Units 1, 2, 3, and 5) because these areas are outside the influence of the riparian zone. Scenery: To minimize visual impacts in do not allow equipment to access the unit within 75' of either side of the intersection with the Anaconda Job Corps Center access road. Minimize ground disturbance in this area from logging equipment, and tie unit into the adjacent opening on the west side of the unit. Skid trails will be laid out parallel to Foster Creek Road in this area.
3	6	Remove dead/dying lodgepole pine & treat debris*	Aquatics: No ground disturbing activities will occur within RCAs, except as noted in the Biological Assessment, which allows removal of dead and dying trees in areas west of Foster Creek Road, (Units 1, 2, 3, and 5) because these areas are outside the influence of the riparian zone. Scenery: In units 3, 4, and 5, retain all Douglas fir not within aspen stands, and retain small Douglas fir, especially where such groups break-up views of the units from Foster Creek Road.
4	8	Remove dead/dying lodgepole pine & treat debris*	Scenery: In units 3, 4, and 5, retain all Douglas fir not within aspen stands, and retain small Douglas fir, especially where such groups break-up views of the units from Foster Creek Road. Soils: To break up and restore areas of detrimentally compacted soil after harvest operations are complete, yarding/landing areas and trails will be ripped to a minimum depth of 6 inches.
5	16	Remove dead/dying lodgepole pine & treat debris*	Aquatics: No ground disturbing activities will occur within RCAs, except as noted in the Biological Assessment, which allows removal of dead and dying trees in areas west of Foster Creek Road, (Units 1, 2, 3, and 5) because these areas are outside the influence of the riparian zone. Scenery: In units 3, 4, and 5, retain all Douglas fir not within aspen stands, and retain small Douglas fir, especially where such groups break-up views of the units from Foster Creek Road. Soils: To break up and restore areas of detrimentally compacted soil after harvest operations are complete, yarding/landing areas and trails will be ripped to a minimum depth of 6 inches.
6	37	Remove dead/dying lodgepole pine & treat debris*	Soils: One of the yarding/landing areas for Unit 6 would be located in the previously disturbed and adjacent cleared area to the northeast of the existing sewage lagoon. Soils: To break up and restore areas of detrimentally compacted soil after harvest operations are complete, yarding/landing areas and trails will be ripped to a minimum depth of 6 inches.
7	32	Dense concentrations of	Soils: To minimize post fire treatment erosion and flooding risks to

Unit	Acres	Fuels Treatment	Mitigation
		sapling and pole-size conifer trees (4 inches dbh or less) would be cut down to minimize the chance of a surface fire reaching the upper canopies of mature trees and developing into a crown fire – treat debris*	Foster Creek and Job Corps Center facilities, prescribed fire broadcast burning would be limited to dominantly south or southwesterly aspect slopes, within the watershed sub-basin that drains directly into the Anaconda Job Corps Center vocational building complex. Outside of this sub-basin, burning may occur on all slopes.
8	6	Fell and Buck Dead/Dying Trees for Firewood Gathering – treat debris*	No mitigation necessary…
9	42	Remove dead/dying lodgepole pine & treat debris*	Soils: One of the yarding/landing areas for Unit 9 would be located in the previously disturbed old landfill area in the unit. Soils: To break up and restore areas of detrimentally compacted soil after harvest operations are complete, yarding/landing areas and trails will be ripped to a minimum depth of 6 inches.
10	461	Dense concentrations of sapling and pole-size conifer trees (4 inches dbh or less) would be cut down to minimize the chance of a surface fire reaching the upper canopies of mature trees and developing into a crown fire – treat debris*	Heritage: If cultural sites are found they will be avoided. Soils: To prevent severe soil burning, slash piles would be burned only when the underlying soil is wet or saturated as in early winter or spring. No slash piling or burning would occur in the existing wildfire burn area in the unit. No slash piling or burning would occur in the heavy conifer ground fuel area located in an unnamed drainage immediately west and downslope of the 7237 foot peak along the eastern edge of Unit 10. Soils: To minimize post fire treatment erosion and flooding risks to Foster Creek and Job Corps Center facilities, prescribed fire broadcast burning would be limited to dominantly south or southwesterly aspect slopes, within the watershed sub-basin that drains directly into the Anaconda Job Corps Center vocational building complex. Outside of this sub-basin, burning may occur on all slopes.
11	3	Remove dead/dying lodgepole pine & treat debris*	Soils: The yarding/landing area would be located in the previously disturbed and adjacent equipment storage yard area.
12	1	Remove dead/dying lodgepole pine & treat debris*	Soils: The yarding/landing area would be located in the previously disturbed and adjacent equipment storage yard area.
13	8	Remove dead/dying lodgepole pine & treat debris*	Soils: The yarding/landing area would be located in the previously disturbed and adjacent borrow pit.
TOTAL ACRES	**645**	*Within all proposed treatment units, areas with heavy concentrations of debris (resulting from the harvest and slashing activities) would be hand piled followed by chipping or burning.	

The following design features would be considered part of this decision.

Aquatics

1. Site-specific Best Management Practices (BMP's) or Soil and Water Conservation Practices (SWCP's) would be applied.
2. No fuel or other toxicant storage or fueling of equipment would occur within RCA's (Riparian Conservation Areas).
3. Recondition 0.9 miles of Foster Creek Road by constructing 4 or 5 drain dips to control surface water drainage, installing 1 culvert to control surface water drainage, and gravelling 1/3 mile of road to stabilize road surface.
4. All trees between Foster Creek Road, from the Forest boundary to the turn into the Anaconda Job Corps Center would

be marked with “No Firewood Cutting” signs to prevent future loss of large woody debris.

Fire/Fuels

1. “Jackpot” burning of heavy concentrations of debris and burning of handpiles would be monitored to ensure low risk of escape and to observe fire behavior.

Scenery

1. Low cut (less than 6 inches) visible stumps within 100 feet of Foster Creek Road.
2. Grind down or remove all visible stumps within 50 feet of Anaconda Job Corps Center residences and administrative buildings on the upper campus.
3. Retain all aspen.
4. Where possible, locate landings and slash piles so as not to be visible from Foster Creek Road and the Anaconda Job Corps Center residences and administrative buildings. Where landings and slash piles are located in these areas, recontour and reseed these areas after cessation of logging activities.
5. Dispose of slash promptly, and ensure 95% consumption of slash piles, with the remainder scattered. Within 50’ of Anaconda Job Corps Center residences and administration buildings, slash larger than 3” diameter will be removed.
6. Avoid creating unnatural patterns by meandering skid trails and, where openings are created, mimicking the form of natural openings.
7. Mimic natural patterns in treatment design and operations, especially in the elements of form and line. Create natural appearing, meandering edges, and tie into existing meadows and clearings. Retain smaller, low-branched trees along the back edge of the unit to minimize a "bole-edge effect", where feasible.
8. Remove dead standing whips, and trees damaged by logging operations. Retain small trees where they occur in groups or clumps.
9. Retain live trees and vegetation along the edge of Foster Creek Road to provide screening of harvest areas. This may be accomplished by limiting entry points to the harvest units from the road.

Soils

1. Harvest would occur during the dry season or when the ground is frozen to a minimum depth of 3 inches.
2. Riparian areas and poorly drained inclusions within the cutting units would be identified and excluded from tree removal activity.
3. Multiple pass skidding trails would be designated and located by the sale administrator, would be located on previously disturbed areas, and would be spaced no closer than 100 feet apart.
4. For all other units, yarding/landing areas would be located on previously disturbed areas (clearings, roads, trails) where possible.
5. To prevent post harvest soil damage and/or weed infestations, yarding/landing areas and haul/access trails will be effectively closed to non-authorized vehicle use.

Weeds

1. Spread slash and native material (e.g. needle mulch) over bare soil to prevent non-native species, minimize erosion potential and facilitate native species colonization.
2. Displaced topsoil and native plants would be stored and used to restore landings. The use of native seed would be required where seeding is deemed necessary.
3. Monitoring and weed treatment would occur in accordance with the BDNF Noxious Weed Control FEIS (2002).
4. In order to prevent the spread of noxious weeds into the project area, all off-road logging and construction equipment shall be cleaned and inspected prior to entry in the project area. This cleaning shall remove all soil, plant parts, seeds, vegetative matter, or other debris that could contain or hold seeds.

Wildlife

1. If threatened, endangered or sensitive species are observed at or within ½ kilometer of the project area notify the District Biologist within 24 hours.
2. If new (previously unknown), active Northern Goshawk nests are discovered in the project implementation area prior to or during the project implementation, activities within 100 meters of the nest would halt and the forest Service would be notified. For active northern goshawk nests, a 16 hectare (40 acre) no activity buffer would be established around the nest to conserve the nest area, and no activities would occur within a 68 hectare (170 acre) buffer until after August 15th.
3. Logging activity would not occur from March 15 through July 1 to remove the potential for impacts to denning and nesting mammals and birds both resident and migratory (i.e. fisher, black-backed, three toed and hairy woodpeckers). This also aids in reducing the potential for adverse effects to riparian habitats and upland soils.
4. No old growth would be treated. The stand does not meet old growth criteria (Green et al. 1992); however; if a patch of forest within the stand that has old growth characteristics (i.e. multi-storied with a large diameter tree component in the overstory (greater than 21 inches dbh), large diameter snags with excavated cavities, and large downed woody debris would be removed from any treatment activities.
5. Retention of 6.4 snags greater than 15” dbh per acre would be occur in treated areas grouped at the edge of treatment units, or in protected areas when snags of that size are available. Retain all live trees 15” and larger dbh to provide the opportunity for large snag availability in the future. All snags, including soft snags (Douglas-fir, ponderosa pine or snags in advanced decay) greater than 15” dbh and all snags of any kind over 20” dbh would be left in the unit for snag-dependent wildlife and potential raptor nest trees; unless they pose a safety hazard to operators and/or the public (i.e. are located within 1.5 - 2 tree length from a building or road open to the public for motorized vehicle travel).
6. Any fence reconstruction would be compatible with wildlife. The fence would have 3 wires with the following spacing top to bottom in inches: 12 – 10 – 16. The top height of the fence would not exceed 38 inches and the bottom wire would be smooth. For more details, refer to wildlife_fence in project file or http://www.fws.gov/pacific/jobs/orojitw/standard/fence-wldf.htm
7. If a raptor nest is determined to be active, no logging activities with the exclusion of hauling will occur within 100 meters of the nest until August 15. This includes the Red-tailed hawk nest should it be determined to be active during the year of project implementation.
8. Provide habitat for species requiring large woody debris in forested habitat types by retaining post project outcomes for regeneration harvest of the following 6 pieces per acre with small end diameter equal to or greater than 8 inches and 10-ft long.

Alternatives Considered but Not Analyzed in Detail

No other alternatives were considered in detail. According to the HFRA, when a proposed project is to be conducted in the wildland-urban interface and is located very near an at-risk community, the agency is not required to study, develop, or describe any alternative to the proposed agency action.

Environmental Impacts

This section provides a summary of environmental impacts of the alternatives considered in detail. It provides the necessary information to determine whether or not to prepare an Environmental Impact Statement. This assessment is consistent with the National Forest Management Act, 16 U.S.C 1604(g)(1) and with the management direction described in the Deerlodge National Forest Plan. The following analysis was compared against this management direction for consistency purposes. Further analysis and conclusion about the potential effects are available in reports for each resource and other supporting documentation cited in those reports.

Direct and Indirect Effects

Direct effects are caused by an action and occur at the same time and place. Indirect effects are caused by an action and occur later in time or farther removed in distance, but are still reasonably foreseeable (40 CFR 1500-1508).

Cumulative Effects

Cumulative impacts on the environment result from the incremental impact of actions when added to other past, present, and reasonably foreseeable future actions. Because cumulative effects vary in time and space, each resource, identified an analysis area to adequately measure cumulative effects of the proposed action.

Past, Present, and Reasonably Foreseeable Actions

Past actions are addressed by the Council on Environmental Quality (CEQ) in the following manner, "Generally, agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions." (CEQ June 24, 2005 memo). In other words, the effects of all past actions have created the current affected environment/existing condition, consequently specific past actions do not need to be identified for the cumulative impacts analysis. However, in general, past actions including timber harvest, mining and exploration, recreational activities, and small product removal (i.e. post and poles and firewood).

Present and reasonably foreseeable actions include road use and maintenance on National Forest System and private lands, trail use and maintenance, recreation sites, utility corridor maintenance, special-use events, and temporary road use permits.

Aquatics

No Action

Direct and Indirect Effects

Current conditions would continue. The upstream 1.5 kilometers of Foster Creek Road would not be improved and therefore would continue to be a low standard gravel road that does not meet Best Management Practices (PF Doc B003, p. 14).

Proposed Action

Direct and Indirect Effects

The Proposed Action 'may affect, but is not likely to adversely affect' bull trout and is consistent with the Endangered Species Act (Aquatics Report, p. 19). The Proposed Action would have 'no impact' on northern leopard frogs and 'may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or a loss of viability to the population or species' for boreal toads and westslope cutthroat trout (listed as sensitive species on the Region 1 Sensitive Species List) (PF Doc B003, p. 22 and PF Doc B002-a, p. 1).

The risks of adverse effects resulting from implementing this project are low. The greatest risk consists of introducing sediment into the stream. The location of the timber harvest activities and burning and the presence of a paved road between the near-stream units and Foster Creek will minimize the potential for introducing sediment into the stream. Inadvertent releases of toxicants (fuel or hydraulic fluid) from heavy equipment operating could occur but can be mitigated by strict adherence to the Aquatics design features (PF Doc B003, p. 19).

The Foster Creek 6th field HUC is designated an Inland Native Fish Strategy (INFS) priority watershed. Some activities will occur within identified Riparian Conservation Areas (RCAs), but a local watershed analysis has been prepared and the layout of this project complies with the goals outlined in this strategy (PF Doc B001, p. 1).

The biological assessment (BA) prepared for this project identified the local population of bull trout inhabiting the Warm Springs Creek watershed as functioning at risk for all four indicators of population health. The BA identifies the Warm Springs Creek local population as one of two local populations in the Upper Clark Fork River section 1 core area supporting most of the bull trout.

The BA determined that implementing this project poses little risk to the segment of the local population inhabiting Foster Creek or the Warm Springs Creek population. The USFWS concurred with this determination (PF Doc B002-b).

Cumulative Effects

The Proposed Action would not cumulatively result in adverse effects to aquatic ecosystems (PF Doc B001, p. 2).

The Forest does have specific bull trout restoration projects planned in the Warm Springs Creek watershed. One, the Storm Lake Creek Culvert Replacement project is waiting implementation. A second project to remove instream barriers to upstream fish movement in Forest Creek is currently undergoing consultation with the USFWS under section 10 of the ESA.

The proposed action would reduce hazardous fuels in a manner that does not harm bull trout and the forest is also implementing

projects designed specifically to improve conditions for the same local populations of bull trout (PF Doc B002-b).

Fire/Fuels

No Action

The effects of the No Action alternative would be a continued risk to the Anaconda Job Corps compound and to the surrounding forest. Fuels would continue to accumulate increasing fuel loading and increasing the fire intensity, decreasing time to evacuate the public, increasing the amount of fire resources to suppress the fire. As demonstrated in the 1999 fire on the North side of the project area where a human caused fire started in the valley bottom and burned to the ridge top. This fire was stand replacement and has resulted in a site change from forested to shrub grass. Dead trees would continue to be a safety issue in and around the compound. Fire behavior and intensity would reduce the effectiveness of initial attack and create a lag time for suppression efforts that would increase the danger to firefighters and public alike (PF Doc B007-a, p. 8).

Table 7: Current Fire Behavior (Fire Family Plus)

Unit	Fuel Model	Rate of Spread (chains per hour)	Flame Length (feet)	Mortality
7 & 10	Fuel Model 6	50.5	7.8	99%
1, 2, 3, 4, 5, 6, 8, 9, 11, 12, 13	Fuel Model 10 (with increase in fuel loads as dead trees fall)	6	4.4	97%

Proposed Action

Direct Effects

The effects of the Proposed Action would be greater firefighter and public safety during suppression efforts around the area because of reduced fire behavior. Structures around the center would be protected with fewer resources because of the reduction in fuels.

The Proposed Action would move the site from a fuel model 6 in Units 7 and 10 to a fuel model 8, and would maintain the site at a fuel model 8 in Units 1-6, 8, 9, and 11-13 by removing dead and dying trees before they fall down and create a fuel model 10. (PF Doc B007-a, p. 10)

Reduce Mortality

The most effective way to reduce mortality of lodgepole and limber pine is to move the site from fuel model 6 to a fuel model 8 in Units 7 and 10. In addition, keeping the other units in a fuel model 8 by removing dead and dying trees, rather than letting them move into a fuel model 10, over time would reduce mortality in the residual stand in the event of a fire as the table below illustrates. Behave plus runs indicate that in a fuel model 6 on a 75 degree day you could expect 99% mortality of lodgepole pine and in a fuel model 8 on a 75 degree day mortality would be only 46%. Removing ladder fuels and increasing crown spacing reduce the potential for fire to transition to the tree crowns (PF Doc B007-a, p. 10).

Reduced flame length and fire intensity to improve fire fighter/public safety and suppression efforts

While there are several ways of expressing fire intensity, fireline intensity is widely used as a means to relate visible fire characteristics and interpret general suppression strategies. A visual indictor of intensity (fireline intensity) is flame length. Again Behave Plus indicates that on a 75 degree day fuel model 6 flame lengths would be approximately 7.8 feet and fuel model 8 on the same day would be 1.4 feet. Flame lengths below 4 feet can be direct attacked with hand crews on the head and flanks of a fire to stop the spread of the fire. Flame lengths above 4 feet require heavy equipment to stop the fire spread. Maintaining a surface fire and keeping fire out of the crowns reduces flame length and rate of spread increasing fire fighter and public safety. Increased rate of spread from a crown fire increases the risk to public during evacuation. Crown fires spread two to three times faster than surface fires (Rothermel, 1983) (PF Doc B007-a, p. 10).

The table below illustrates the change in fire behavior from a fuel model 6 or 10 to a fuel model 8 under the same conditions.

Table 8: Change in Fire Behavior (Fire Family Plus)

	Rate of Spread (chains per hour)	Flame Length (feet)	Mortality
Fuel Model 6 (Existing Condition in Units 7 & 10)	50.5	7.8	99%
Fuel Model 10 (Expected Condition in Units 1-6, 8-9, 11-13)	6	4.4	97%
Fuel Model 8 (Desired Condition)	3.1	1.4	46%

Indirect Effects

Prescribed burns implemented in similar forest types on the Pintler District have been successful in killing smaller trees (0-5") and have had minimal effect on the 10" and larger lodgepole pine and Douglas-fir. Removing of smaller trees reduces ladder fuels and reduces the chance for a crown fire.

In the event of wildfire driven by up valley winds, spotting potential is reduced and stand replacement fire is unlikely. Up valley winds could push fire along the steep northerly slopes. These slopes would also influence fire spread up and away from the Anaconda Job Corps Center allowing suppression resources to safely defend structures in the valley bottom, and allow for safe evacuation.

Firefighters are often endangered, injured or killed digging fireline in the vicinity of snags. Removing the dead trees around the Anaconda Job Corps Center would add a measure of safety on a site that receives high use from students and increased human caused fire potential.

Treatments of national forest land would reduce fire intensity and stand replacement fire potential, but may not directly protect homes and structures. Studies indicate that wildfire mitigation focused on structures and their immediate surroundings is the most effective at reducing structure ignitions (Cohen and Saveland 1997, Cohen 1999, 2000, 2002; Scott 2003). Defensible space would eventually be established across ownerships in the vicinity of structures, allowing suppression personnel to defend homes and other infrastructure in a safer fire environment. Fire prevention programs (Firewise) and Fire Safe Councils or similar organizations are valuable resources in communicating to the public the need for clearing and maintaining fuels away from residences and structures, assisting residents in coordinating local hazard reduction efforts, and educating individuals on less flammable building designs and construction materials (PF Doc B007-a, p. 11).

Cumulative Effects

The analysis evaluated cumulative effects of other activities within the timber compartment 868 (118) (7,596 acres).

Timber Management – Wide-spread tree removal to support mining industry occurred in early 1900s; 98 acres clearcut in 1963; 118 acres clearcut in 167; 35 acres of post and pole treatment in 1983.

Wildfires – In 1999, a 30-acre human-caused wildfire started approximately ½ mile north of the Anaconda Job Corps Center. The fire was a stand-replacing, fast-moving, slope and -driven event, that burned lodgepole pine, juniper and limber pine.

Firewood gathering – The area is a popular for personal-use firewood gathering by the public. Material in proposed Units 2 and 8 would be made available for firewood removal by the general public. Firewood gathering activities will continue to occur throughout the Foster Creek and adjacent drainages long after the fuel management project is completed.

Wildland fire management - Aggressive wildland fire suppression actions would continue due to the concern for public and firefighter safety, the public and private infrastructures situated throughout the Foster Creek drainage and the limited evacuation routes. Suppression of human-caused fire starts and wildfires would continue under jurisdiction of the US Forest Service and State of Montana.

Private land management - Activities on private land inholdings with the analysis area, such as residential development, forest land management, etc. would continue to increase.

Future Fuel Maintenance – If the proposed treatments are implemented under this project, future management may evaluate and consider treatments to maintain low fuel loadings and reduce ladder fuels throughout the Anaconda Job Corps campus, sewage treatment area, trash disposal site and equipment storage areas. This would likely be evaluated under another NEPA analysis (PF Doc B007-a, pp. 11-12).

Heritage Resources

No Action

There will be no direct or indirect effects to heritage resources with the No Action Alternative (PF Doc B010, p. 7).

Proposed Action

A Class I Inventory (literature search and overview analysis) was completed for this project and no known heritage resources were found in the proposed project's Area of Potential Effect (PF Doc B010, pp. 2 and 7).

A Class II (sample survey) and Class III (intensive survey) were completed and no heritage sites were identified within or near the unit boundaries during the field inventory process (PF Doc B010, pp. 2 and 7).

Hydrology

No Action

No drainage improvements would occur on Foster Creek Road and the spur that accesses the pump plant; no removal of the fish barrier, draft site, earthen dam, or old bridge abutments would occur; no change in stream function on Foster Creek would be expected. Current conditions would continue (PF Doc B012, p. 3).

Proposed Action

Direct Effects

No stream crossings are planned, thus no direct effects (PF Doc B012, p. 3).

Indirect Effects

All activities are well beyond 300 feet from any live water or stream, or a road system exists between a harvest unit and a live stream. This means the risk of any sediment delivery is very low. The total treatment of area of approximately 650 acres represents about 5% of the total watershed area of Foster Creek, a very small portion. No measurable changes in streamflow regimes are expected due to the very limited removal of live overstory (PF Doc B012, p. 3).

Cumulative Effects

These effects consider all past, present and reasonably foreseeable future activities. This includes drainage improvements on Foster Creek Road and a spur which accesses the pump plant, removal of a fish barrier; removal of a draft site located near the pump house, removal of an earthen dam, and removal of old bridge abutments. An improvement in stream function on Foster Creek is expected due to a slight reduction in sediment delivery (due to road improvements), and removal/rehabilitation of the concrete barrier, culvert and draft site (PF Doc B012, p. 3).

The waters of Warm Springs Creek are listed as impaired due to physical substrate habitat alterations from channelization and Highway/Road/Bridge runoff (Non-construction related). The Water Quality Category is 4C, which means a TMDL is not required because no pollutant-related use impairment has been identified. Because no negative effects to water quality are expected, the management actions are consistent with water quality impairment listing for Warm Springs Creek (PF Doc B012-a).

Public Health and Safety

No Action

The effects of the No Action alternative would be a continued risk to the Anaconda Job Corps compound and to the surrounding forest. Fuels would continue to accumulate increasing fuel loading and increasing the fire intensity, decreasing time to evacuate the public, increasing the amount of fire resources to suppress the fire. Dead trees would continue to be a safety issue in and around the compound (PF Doc B007-a, p. 8).

Proposed Action

The safety of the Anaconda Job Corps Center facilities, residents, and staff as well as private structures and forest land would be improved. Reducing fuels changes fire behavior enough to allow direct suppression tactics by local firefighting resources. This increases the chance of suppressing the fire before it reaches structures, and allows for a more safe evacuation process (PF Doc B007-a, p. 9).

Sensitive Plants

No federally proposed, threatened, or endangered plant taxa occur in the proposed project. No effects (direct, indirect, or cumulative) to proposed, threatened, or endangered plant species will occur as a result of any alternatives selected for this project (PF Doc B013, p. 3).

Soils

No Action

Direct and Indirect Effects

The potential effects to the soil resource from not implementing the proposed treatments are principally related to direct soil burning that might occur as a result of a stand replacement wildfire at some future date, and to post fire soil erosion. The magnitude of soil burning associated with this kind of wildfire is dependent upon soil moisture, fire weather, and fire fuel characteristics. Detrimental soil burning is usually associated with some combination of extreme fire weather (high temperatures and low relative humidity), low soil moisture, and high accumulations of dry fuel, particularly thick layers of duff/litter or 1000 hours fuels. Once bare soil is exposed by severe burning, post fire erosion becomes a function of soil rock content and texture, slope of the ground, and the intensity and duration of post fire rain events.

Within the gentle to moderately sloping areas around the Anaconda Job Corps Center, the rocky medium texture soils have very low inherent rates of erosion. The dense conifer stands in this area do not currently have the kind of thick duff/litter layers or heavy concentrations of 1000 hour fuels likely to cause severe soil burning. Insect activity could, however, kill enough of the mature conifers to create higher loadings of these heavy fuels within the areas.

Within the steeply sloping grassland and limber pine/juniper areas above the Anaconda JCC, the thin medium textured soils are dominated by rocky surfaces of dry limestone gravels/ravel and have a high inherent rate of erosion. These slopes and soil types generally occur above an elevation of 6800 feet ASL. Patches of conifer duff and litter with grasses and scattered down limber pine represent the dominant fuel type, this fuel is not likely to increase substantially with insect activity as the conifer stands are of very low basal area. Any kind of burning from escaped fires in these areas could have direct detrimental effects to soil quality and indirectly affect either water quality in Foster Creek or facilities within the Anaconda Job Corps center. This is due to the very low live plant ground cover in these areas. Ground cover in these areas is dominated by litter and duff, which could be expected to be completely removed by any sort of fire activity. Without adequate ground cover, these areas would be unprotected from post fire rain storms. Intense post fire rain events would result in a moderate to high risk of damaging soil erosion, including the possibility of debris flows or floods, in the watershed directly above the Vocational Building portion of the center. Sediment from post fire events could easily reach Foster Creek as well (PF Doc B028, pp. 8-9).

Proposed Action

Direct and Indirect Effects

The Proposed Action would meet Region 1 soil detrimental impacts recommendations and Forest Plan Standards. Using mitigation that restricts main skidding and hauling to designated trails at no closer than 100 feet spacing will assure that detrimental soil compaction would be kept within guidelines for protection of soil quality (PF Doc B028, p. 9).

Log yarding or landing areas are places where detrimental soil disturbance can occur as a result of timber harvest activities. For the proposed harvest units, 16 log landing/yarding areas would be needed, each about .25 acres in size. Detrimental disturbance would not exceed 15 percent in any proposed activity area.

Potential indirect effects to the soil resource might include additional physical disturbances from illegal off road vehicle use of the trails within the units, and the potential for weed infestations associated with this illegal use. Post treatment closure to unauthorized vehicle use of the main haul access roads and trails to the treatment units would minimize these effects.

In the prescribed burn units, detrimental burning of the soil, and associated risks, would be minimized by burning the piles only when the underlying soil was wet or saturated as in early winter or spring. To minimize post fire treatment erosion and flooding risks to Foster Creek and Job Corps Center facilities, prescribed fire broadcast burning would be limited to dominantly south or southwesterly aspect slopes, within the watershed sub-basin that drains directly into the Anaconda Job Corps Center vocational

building complex. Outside of this sub-basin, burning may occur on all slopes.

Results of erosion modeling using the FS WEPP methodology indicate that the average annual erosion rate for all proposed harvest treatments is either at or below the allowable soil loss ("t" value) for the soil type. Long term soil quality and productivity would therefore not be impaired by the timber treatments proposed under this alternative.

Results of erosion modeling using the FS WEPP methodology indicate that the average annual erosion rate for all proposed prescribed fire treatments is either at or below the allowable soil loss ("t" value) for the soil type, and that none of the prescribed fire treatment units would experience detrimental soil erosion as a result of the most probable type of rainstorm. Long term soil quality and productivity would therefore not be impaired by the prescribed fire treatment units proposed under this alternative (PF Doc B028, p. 11).

Cumulative Effects

None of the proposed treatments, in conjunction with the implementation of mitigation measure and project design features, will result in detrimental soil disturbance that exceeds Regional or Forest guidance. No cumulative effects are anticipated in the proposed units. Within the cumulative effects analysis geographic area, none of the areas proposed for vegetation treatments have been affected by previous timber harvests or prescribed fire, nor are any additional treatments foreseen.

Proposed treatment unit 10 does contain a small area (approximately 25 acres) that was burned previously (less than 10 years ago) by wildfire. This wildfire area would not be subject to the proposed fuels treatments.

None of the proposed vegetation treatments are within currently permitted livestock grazing allotments, nor have past grazing activities had an effect upon the soil resources within the cumulative effects analysis geographic area (PF Doc B028, p. 12-15).

Vegetation

Features Common to Both Alternatives

Dead and Dying Stands

The revised Beaverhead-Deerlodge Forest Plan (2009) defines a "dead and dying stand" as… a stand where fire or bark beetle infestations are projected to create conditions where it is determined that previously mid or late seral stands will be set back to early seral stage by the disturbance. (FP 2009, p. 285)

The revised FP goes onto state that the definition of dead and dying does not require that all trees within the stand be dead or dying. A lodgepole pine stand is considered dead and dying where greater than 50% of the basal area is high hazard for mountain pine beetle (generally greater than 8 inches in diameter and over 80 years old), and a current within-stand infestation of mountain pine beetle (MPB) exceeds 10% of basal area, and were a current MPB epidemic is on-going within the Forest (FP 2009, p. 286). An additional criterion that includes evidence of a successful attack around the entire bole of the tree is considered when tree mortality is due to bark beetle infestation not related to a fire event.

Within the proposed treatment areas, mature trees average 8 to 14 inches diameter and approximately 87 to 115 years of age for both lodgepole pine and Douglas-fir (field measurements, 2006, 2007, and 2008). The number of trees per acre range from 230 and 500, with basal area estimates between 150 to 230 square feet per acre (Ibid.). According to the 2007 cruise measurements performed within the proposed units, approximately 170-180 trees per acre of the lodgepole pine (6.6 inches in diameter and greater) are dead or dying, which includes between 60 and 200 square feet of basal area per acre affected. This equates to roughly 40% to 87% of the basal area per acre affected. Updated estimates at the end of 2007 increased the number of lodgepole pine tree affected by MPB to 230 trees per acre on average (Gibson 2008), with lodgepole pine trees as small as 5 inches in diameter are being attacked. It is likely the number of dead/dying trees per acre (especially in the larger size classes) has increase since that time.

A Douglas-fir stand is considered dead and dying if stand stocking is expected to be reduced below 60 square feet of basal area due to current and projected mortality from either fire or bark beetles, within a 3-year period (FP 2009, p. 285). Douglas-fir is not affected by mountain pine beetle, and therefore not targeted for harvest under the proposed action alternative (PF Doc B015, pp. 3-4).

Wildland Fire Management

Aggressive wildland fire suppression actions would continue due to the concern for public and firefighter safety, the public and private infrastructures situated throughout the Foster Creek drainage and the limited evacuation routes (PF Doc B015, p. 10).

Firewood gathering

Personal use firewood gathering by the public would continue based on a firewood permit system (PF Doc B015, p. 10).

Insect and Disease Activity

Mountain pine beetle mortality, as well as other insect and disease activity, would continue to a lesser degree throughout the drainage. Other disease agents found in lodgepole pine, such as dwarf mistletoe and gall rust can be found, but pail in their effects when compared with the mortality from the bark beetle epidemic. Evidence of spruce budworm is present in the older Douglas-fir, causing light defoliation of the current year's needle growth (PF Doc B015, p. 10).

Access

Existing road use and maintenance, and utility corridor maintenance would continue throughout the project area (PF Doc B015, p. 10).

Old Growth Forest / Habitat

The revised Beaverhead-Deerlodge Forest Plan (2009) defines old growth habitat using Old-Growth Forest Types of the Northern Region by Green et al, 1992 (errata corrected 12/2007) (FP rev., Glossary, p. 295). According to Green et al (Ibid.), the minimum requirements for lodgepole pine and Douglas-fir trees to be considered old growth are as follows: lodgepole pine – minimum age 150 years, 12 trees per acre (10 inches diameter or greater), and minimum basal area of 50; and for Douglas-fir – minimum age 200 years, 5 trees per acre (19 inches diameter or greater), and minimum basal area of 60.

The proposed treatment areas do not meet the Green et al definitions for lodgepole or Douglas-fir old growth forest, because of the lack of trees per acre in a particular diameter size class and minimum age requirements. The mountain pine beetle epidemic has substantially affected lodgepole pine trees 5 inches in diameter and greater. Overall, mature trees within the proposed treatment areas average 8 to 14 inches diameter, and approximately 87 to 115 years of age for both lodgepole pine and Douglas-fir.

By early 2007 approximately 170 to 180 trees per acre (lodgepole pine, 6.6 inches in diameter and greater) were dead or dying. Between 60 and 200 square feet of basal area per acre are affected. This equates to roughly 40 to 87 percent of the basal area per acre is affected. Updated estimates at the end of 2007 increased the number of lodgepole pine tree affected by MPB to 230 trees per acre on average (Gibson 2008), with lodgepole pine trees as small as 5 inches in diameter are being attacked. It is likely the number of dead/dying trees per acre (especially in the larger size classes) has increase since that time.

The proposed action alternative does not consider any treatment activity in potential old growth stands or old growth recruitment stands (Schuelke and McNamara 2009). The activities being proposed in the AJC project will not alter the ability of the forest to become old growth in the future; however natural disturbance events could, such as further beetle infestations or wildfire. Since there will be no harvest or burning activities within these stands, forest succession will be allowed to continue on its present course. There would be no direct, indirect or cumulative effects to this resource when comparing the two alternatives. A listing of the vegetative features, stand numbers and old growth map are available in the project record (PF Doc B015, pp. 10-11).

No Action - Direct and Indirect Effects

The No Action alternative provides the resource specialist a means for evaluating the current ecosystem conditions as a baseline. With the no action alternative, none of the proposed silvicultural treatments (removal of beetle-killed and dying lodgepole pine), slashing of understory trees, and/or hand pile construction/burning would occur. The direct, indirect and cumulative effects of no action would be the forest stand progression trending away from the desired future condition that supports the purpose and need for protection of the Anaconda Job Corps Center and surrounding private land inholdings (PF Doc B015, p. 11).

Lodgepole Pine

The current mountain pine beetle epidemic would continue to progress through the remaining susceptible mature lodgepole pine trees. Overall lodgepole pine tree mortality would increase as beetles move to smaller and smaller diameter trees until the majority of lodgepole pine trees 5 inches in diameter and greater are killed. Winter brood survivability in the smaller trees should decline due to the reduced phloem thickness of these trees (Amman 1977; Randall 2000). Gaps in the forest canopies would increase with the lodgepole pine mortality. Initially, Douglas-fir would become the more dominant tree species as lodgepole pine dies out. Incidental mature lodgepole pine not affected by MPB would prosper. As described in Table 3 (under the Fuel Structure, Fire Behavior and Mountain Pine Beetle section), surface fuels would increase as the dead trees begin to fall over. Aspen and herbaceous vegetation (grasses, shrubs and forbs) would prosper with the increased sunlight. In the canopy openings, regeneration of lodgepole pine seedlings would occur; eventually contributing to the ladder fuel situation as trees

growing up through the heavy down woody material (PF Doc B015, p. 11).

Douglas-fir

Douglas-fir is found throughout the project area, ranging from 87-115 years of age, and averaging 8 to 12 inches in diameter. Barring any insect or disease or stand-replacing fire event, Douglas-fir would continue to increase in density and canopy layering. Ladder fuels would continue to increase as seedlings and sapling-sized trees continue to develop in the understory. Other species such as aspen, lodgepole pine, limber pine and juniper would develop along with the Douglas-fir. As stands progress, canopies would begin to fill in as trees grow, resulting in a decline in other species such as aspen, shrubs and other herbaceous vegetation. The density of trees within the project area would increase causing a decline in individual tree vigor (PF Doc B015, p. 12).

Aspen

Aspen is fairly well represented throughout the project area and can be characterized as one of the following: isolated, small groupings of older individuals found in conifer stands; large acreage, single-storied clones with conifers scattered throughout the clone; or numerous dead aspen snags within a conifer forest setting. Barring any disturbance, this species would prosper for a time with the openings in the forest canopies (due to lodgepole pine mortality), but would eventually be suppressed as Douglas-fir, younger lodgepole pine, juniper and other conifer trees increase in density and compete for moisture and nutrients (PF Doc B015, p. 12).

Fuel Structure, Fire Behavior and Mountain Pine Beetle Mortality

There is considerable uncertainty about fire behavior following a wide-spread mountain pine beetle epidemic such as that occurring in the Anaconda and Butte areas. Crown fires are possible both before an epidemic and after while needles remain on the trees (Kaufmann et al 2008). Mortality due to MBP changes the fuel complex or characteristics in terms of: fuel load and structure; microclimate and fuel moisture; and fire potential. These characteristics vary with the intensity of the beetle attack, initial stand conditions and the time following the attack.

The mean fire return interval for the Douglas-fir/lodgepole pine habitat type is 42 years; generally in the form of a thinning-type fire or stand-replacing (Arno and Gruell 1983). The role of fire as a stand-replacing agent becomes more pronounced when the natural fire regime is increased over time due to aggressive fire suppression. Eventually, the vertical arrangement of woody fuel (dead, standing lodgepole pine snags) evolves to the horizontal down woody fuel configuration where fuel loadings increase due to blow down, coupled with increased ladder fuel development as younger trees begin to regenerate in the understory. The risk of a severe stand-replacing fire increases, which may equate to higher probability of damage values at risk, such as watershed stability and wildlife habitat needs, increased need for expensive rural wildland urban interface protection, and increased rehabilitation costs. The immediate effects to vegetation would be dramatic where once forest-dominated areas would be replaced for a time by pine grass, aspen and burned snags. Lodgepole pine and minor amounts of Douglas-fir seedlings would become established many years later, with more occurring on the warmer, moister sites and fewer on the exposed, drier, southern slopes. As years progress, trees would begin to dominate the site once more as sapling/pole-size forests, then eventually mature trees, shading out the understory vegetation (Fischer and Clayton 1983). The progression and possible disturbance regimes seen today would continue.

Table 3 helps illustrate the progression of change overtime in a lodgepole pine-dominated forest in British Columbia, Canada, affected by mountain pine beetle (Taylor and Lavoie 2008) with no management action. Even though the study and findings were performed for a boreal lodgepole pine type forest, the change in fuel biomass and potential fire behavior overtime mirrors the expected changes we would anticipate in the beetle-killed, lodgepole pine-dominated forests found in the Anaconda-Butte, Montana area (PF Doc B015, p. 12).

Table 6: Progression of Change in a Lodgepole Pine Stand

Time	MPB Affects	Fuel Concern / Fire Potential
Mid-July (Year 0)	Green trees attacked in summer; tree dies.	Most of the dead needles remain on the tree. Although needles appear green, hold very little moisture (foliar moisture content falls to 5-15%), due to the disruption of water to the crown. Results in drier 1-hour fuels in forest canopy.
Following Spring/Summer, (Year 1-3)	Needles turn orange the following spring. Needles turn red the summer following	Dead needles (1-hour fine fuel) and branches (10-hour fuel) continue to remain on dead tree, but beginning to contribute to the surface fine

Time	MPB Affects	Fuel Concern / Fire Potential
	attack. Needles fall off in 2-3 years.	fuel as they fall from the trees. Potential fire type: Greater chance of erratic crown fire due to dry fine fuel component (dead, red needles). Crown fire could ignite and spread more readily under somewhat less extreme fire weather conditions than required if fuel moisture was higher as with live trees (Kaufmann et al 2008). Larger dead, dry fuels are vertically arranged (standing snags with red needles) – there would be no substantial contribution of new ground fuels during the first 1-3 years post-mortality.
Year 3-10	Small branches fall off snag over a 3 to 10 year period.	Increase in surface fine fuels as needles and branchwood fall. Microclimate under the original tree canopy changes (becoming drier) due to openings in the canopy. Potential fire type: Fuel structure of dead lodgepole pine stands changes significantly when needles fall to the ground. Little fine fuels remain in forest canopy (reduced crown bulk density) to support crown fire spread from tree to tree. If understory is void of larger down woody fuel, flame lengths/heights would be lower. Increased growth of grasses and other herbaceous vegetation may create a moist fuel bed during the growing season, but dry out near the end of the growing season. Crown fire would continue to be a concern in the mixed conifer stands. The surface fuel complex remains a concern, especially with a dense understory tree component (ie. ladder fuel component).
Year 10-20	Dead snags fall over in 10-20 years, potentially resulting in large surface fuel accumulation. Regeneration of new stand in progress.	Snags continue to fall and contribute to surface woody fuel loadings. Understory vegetation and residual trees may be released due to the increased light levels and reduce competition. Potential fire type: There would be a decrease in crown fires potential with the change in canopy cover continuity; however, the potential for severe surface fire intensities and greater flame heights increases as large amounts of biomass (boles and branches) becomes available as fuel generated by the fine surface fuels. Biomass suspended from the ground would dry out faster, and become available to support intense fire with a large release of heat. This in turn would cause high mortality in younger trees that survived or regenerated after the bark beetle attack.

From Taylor and Lavoie (2008), British Columbia Forest Service, Canada, study of the effects of mountain pine beetle on fuels and fire behavior.

More studies are needed to fully understand changes in fuel structure and fire behavior following mountain pine beetle epidemics. There is no doubt that the extent of the MPB epidemic and lodgepole pine tree mortality in the Anaconda and Butte areas will result in a profound change in the condition and arrangement of forest biomass (Kaufmann et al 2008).

Fuel Management within the Anaconda Job Corp campus' "Home Ignition Zone"

The 'home ignition zone' (Cohen 2000) describes a home or structure in relation to its surroundings within 100 – 200 feet of the structure. This zone principally determines a home or structure's ignition potential in two ways: from flames (radiation and convection heating) and from firebrands that have been lofted in the air and falling directly on a structure (burning ember spot ignitions (Cohen et al 2008). By addressing vegetation and fuel conditions within the home ignition zone, the home ignition potential can be significantly reduced (Ibid). As mentioned at the beginning of this document, the Job Corp campus and surrounding private land inholdings along Foster Creek and Road 195 have been identified by the Anaconda Job Corps Center and Deer Lodge Community Wildfire Protection Plan (CWPP) as a high priority protection zone. As long as the AJC campus has been in operation, the vegetation features within the campus itself, have been routinely irrigated and mowed. Strips of trees dividing portions of the campus operations are maintained in an open understory, and hazard trees are removed

as needed to provide for public safety reasons. Under the no action alternative, these maintenance measures would continue. However, the concern for managing the hazardous fuels situation found in the beetle-killed forests surrounding the Job Corp Center would not be addressed. The no action alternative would not meet the purpose and need expressed in the CWPP concerning for potential crown fire risk, nor for this project in terms of increasing firefighter and public safety during a wildfire event. The no action alternative would not address the concern for potential crown fire during the first three years after attack, or the expected fuel loadings that could occur 10-20 years post-mortality (PF Doc B015, pp. 13-14).

Forest Carbon

The acreage of lodgepole pine forests currently affected by the mountain pine beetle epidemic is extensive throughout the Foster Creek drainage. As a major disturbance on the landscape, the bark beetle epidemic and associated large-scale lodgepole pine mortality is affecting overall forest structure, development and forest carbon storage. Due to the amount of recent dead and dying trees, we estimate a decrease in the net ecosystem productivity (NEP) with the no-action alternative. Our assumption is based on recent scientific literature on forest carbon storage which will be discussed more in this section.

Basically, these stands have been converted from a carbon sink to a carbon source to the atmosphere. Under the no action alternative, these areas will remain that way until the carbon uptake by new tree regeneration exceeds the emissions from decomposing dead organic material. Barring a large scale fire, these stands will likely remain a carbon source for several years, or longer, depending on the amount of dead biomass left on the site, the length of time before new trees become reestablished, and their rate of growth once trees are reestablished. As new trees become established, the amount of carbon will accumulate rapidly for several decades. The NEP will increase until reaching an intermediate age, then gradually begin declining but remain positive until impacted by future disturbances (Law et al 2003).

Recent scientific literature confirms some general patterns of forest carbon storage and release over the period of forest stand development and natural or induced disturbances. As overall context, our nations forests have and continue to sequester vast amounts of carbon (nationally a net carbon sink sequestering far more carbon than is released), equivalent to approximately 10% of annual carbon dioxide emissions from burning fossil fuels (Heath and Smith 2004; Birdsey et al 2006). Law et al (2003) looked at changes in carbon storage and fluxes for ponderosa pine stands in central Oregon. They evaluated the net ecosystem productivity, or NEP, which is the balance between being a net carbon source and net carbon storage (referred to as carbon sink). Their evaluation concluded that NEP is lowest and negative (carbon source) in young stands (9-23 years), moderate in young stands (56-89 years), highest in mature stands (95-106 years), and low in old stands (190-360 years). Most mature and old stands remained a net sink of carbon. Pregitzer and Euskirchen (2004) synthesized results from 120 separate studies of carbon pools and carbon fluxes for boreal, temperate, and tropical biomes. They found that in temperate forests NEP is lowest (more towards source), and most variable, in young stands (0-30 years), highest (more towards carbon sink) in stands 31-70 years, and declines thereafter as stands age. These studies also reveal a general pattern of total carbon stocks declining after disturbance and then increasing, rapidly during intermediate years and then at a declining rate, over time until another significant disturbance (timber harvest or tree mortality resulting from drought, fire, insects, disease or other causes) kills large numbers of trees and again converts the stands to a carbon source. In this situation, carbon emissions from the decay of dead biomass, exceeds the amount of carbon removed from the atmosphere by photosynthesis within the stand. Over the long term (centuries) net carbon storage is often zero, if stands regenerate after disturbance, because re-growth of trees recovers the carbon lost in the disturbance and in decomposition of trees killed by the disturbance (Kashian et al 2006) (PF Doc B015, pp. 14-15).

Proposed Action - Direct / Indirect Effects of Alternative 2

Lodgepole Pine

Dead, dying and recently attacked lodgepole pine trees affected by mountain pine beetle would be the target species for treatment. Trees five inches in diameter or larger would be evaluated for removal. Within these stands, groups of small diameter trees or larger trees that are not affected by mountain pine beetle would remain. Beetle activity would be reduced, but not completely eliminated. In untreated areas, beetle attacks and mortality would likely continue barring a severe cold winter. In proposed treatment units 1, 2, 3, 4, 5, 6, 8, 9, 11, 12 and 13, Douglas-fir, aspen and spruce would remain where they occur. Overall stand characteristics would change from stands with high percentage of dead and dying trees to an open forest canopy condition. Grasses and shrub components would increase with addition sunlight, as would regeneration of lodgepole pine, Douglas-fir and aspen. Some large diameter dead trees would be retained to provide snags in accordance with Forest Plan standards.

Within the slashing/ignition zones, mountain pine beetle-affected lodgepole pine trees (dead/dying) would be the primary target for removal. These zones are designed as fuel breaks situated across the larger landscape of proposed unit 7 and 10. Dense concentrations of sapling and pole-size conifer trees (4 inches dbh or less) would be cut down to minimize the chance of a

surface fire reaching the upper canopies of mature trees and developing into a crown fire (PF Doc B015, p. 15).

Douglas-fir

Douglas-fir is not affected by mountain pine beetle, and therefore not targeted for harvest at this time. Following the removal of the dead and dying lodgepole pine, treated stands would be fairly open, consisting of live Douglas-fir trees with an occasional lodgepole pine and aspen. Canopy coverage would generally average 10-40 percent across each treatment unit. Barring any insect or disease event, Douglas-fir found in these stands would continue to increase in density and canopy layering, becoming the dominant tree species in the area. Increased sunlight would stimulate understory vegetation including growth of seedling and sapling Douglas-fir, lodgepole pine and aspen (PF Doc B015, p. 15).

Aspen

All aspen (individual mature trees and large groups of clones) would be retained. Conifers found within healthy aspen clones would be considered for cutting or girdling to reduce competition for light and water, and to remove future conifer seed sources. Live conifers 15 inches in diameter or greater, would be considered for girdling. Smaller live conifers within the clone would be cut and left on site. Openings in the canopy would allow for increase the vigor and growth of individual aspen, and stimulate suckering (Sheppard 1996) (PF Doc B015, p. 15).

Fire Structure and Fire Behavior

The removal of dead and dying lodgepole pine would mitigate the concern for potential crown fire situation during the first three years after attack, and fuel loadings that could occur 10-20 years post-mortality. Following treatment, the distribution of Douglas-fir found in each treatment unit would be fairly patchy, arranged as clumps or individual trees. Individual tree crowns may touch in the clumps, but overall, space would exist between tree crowns across the treatment areas. This would help reduce the likelihood of crown fire (PF Doc B015, pp. 15-16).

Fuel Management within the Anaconda Job Corp campus' "Home Ignition Zone"

As stated under the no action alternative, the 'home ignition zone' describes a home or structure in relation to its surroundings within 100 – 200 feet of the structure (Cohen 2000). This zone determines a home or structure's ignition potential from flames (radiation and convection heating) and from firebrands falling directly on a structure (Cohen et al 2008). The majority of the AJC Corp buildings and structures are constructed with brick and stucco. As long as the AJC campus has been in operation, the vegetation features within the campus itself, have been routinely irrigated and mowed. Strips of trees dividing portions of the campus operations are maintained in an open understory, and hazard trees removed as needed to provide for public safety reasons.

While it is understood that the home ignition zone principally determines the potential for WUI fire disasters, Forest Service Manual direction states: "The Forest Service's primary responsibility and objective for structure fire protection is to suppress wildfire before it reaches structures." (FSM 5100, sec. 5137). The purpose and need of the project is to provide these complementary, fuel-break type treatments adjacent to the home ignition zone to improve protection effectiveness and firefighter and public safety surrounding the Job Corp Center campus 'home ignition zone', the ingress/egress routes to the Center, and other private residences situated within the Foster Creek drainage. Finney and Cohen (2003) suggest that wildland fire risk can be improved by: (1) changing wildland fuels for a "fireshed" involving a wide area around a community (including areas where fires can come from); (2) Treating fuels and reducing fire behavior immediately adjacent to the structures, to change fire behavior relevant locally to the ignition of structures; and (3) changing the properties of the structure.

The proposed actions address Finney and Cohen's fire risk suggestions with the exception of the last. The responsibility for preventing a structure from burning within the 'home ignitions zone' largely falls on the owner of the property, not the federal, state and county fire managers. There are several ongoing efforts by the local Forest Service, State and county fire departments, such as Firewise programs, to help inform and assist private land owners (PF Doc B015, p. 16).

Forest Carbon

The treatments being proposed would reduce on-site carbon sources in two ways: by removing the dead and dying lodgepole component that has the potential to oxidize stored carbon into atmospheric carbon and by releasing carbon to the atmosphere through the burning actions. Forested environments over time are renewable carbon sinks. With the removal of the dead trees, overall carbon sequestration would be begin to increase more rapidly in the treated stands when compared to the no action alternative, by: increasing the health and vigor of the trees left on site; increasing the health and vigor of the understory vegetation; and promoting regeneration of the next forested stand. In general, such management actions as those proposed in the project could improve the resilience of forests to climate-induced increases in frequency and intensity of disturbances such as fire and insect and disease epidemics, and utilize harvested trees for long-lived forest products and renewable energy sources

may help sustain the current strength of the carbon sink in U.S. forests (Birdsey et al. 2006; 2007) (PF Doc B015, p. 16).

Cumulative Effects

The vegetation analysis evaluated cumulative effects of other activities within the 7,596 acres analysis area. The vegetation analysis will review current conditions and future conditions 10 and 30 years from today.

Timber Management – Wide-spread tree removal to support mining industry occurred in early 1900s; 98 acres clearcut in 1963; 118 acres clearcut in 1967; 35 acres of post and pole treatment in 1983.

Wildfires – In 1999, a 30-acre human-caused wildfire started approximately ½ mile north of the Anaconda Job Corps Center. The fire was a stand-replacing, fast-moving, slope and wind-driven event that burned lodgepole pine, juniper and limber pine.

Firewood gathering – The area is a popular for personal-use firewood gathering by the public. Material in proposed Units 2 and 8 would be made available for firewood removal by the general public. Firewood gathering activities will continue to occur throughout the Foster Creek and adjacent drainages long after the fuel management project is completed.

Wildland fire management - Aggressive wildland fire suppression actions would continue due to the concern for public and firefighter safety, the public and private infrastructures situated throughout the Foster Creek drainage and the limited evacuation routes. Suppression of human-caused fire starts and wildfires would continue under jurisdiction of the US Forest Service and State of Montana.

Private land management - Activities on private land inholdings with the analysis area, such as residential development, forest land management, etc. would continue to increase.

Future Fuel Maintenance – If the proposed treatments are implemented under this project, future management may evaluate and consider treatments to maintain low fuel loadings and reduce ladder fuels throughout the Anaconda Job Corps campus, sewage treatment area, trash disposal site and equipment storage areas. This would likely be evaluated under another NEPA analysis (PF Doc B015, p. 17).

Weeds

No Action

Direct, Indirect and Cumulative Effects

Invasive plants exist in the units particularly along Foster Creek Road. Human disturbance, travel, and use, in the project area is likely to result in an increased abundance of invasive species. Monitoring and weed treatment would occur in accordance with the BDNF Noxious Weed Control FEIS (2002) (PF Doc B013, p. 2).

Proposed Action

Direct, Indirect and Cumulative Effects

Design features and mitigation measures have been applied to the Proposed Action and would help prevent the spread of invasive species. Monitoring and weed treatment would continue to occur in accordance with the BDNF Noxious Weed Control FEIS (2002) (PF Doc B013, p. 2).

Wildlife

Some elements of wildlife habitat require a detailed analysis and discussion to determine potential effects. Other elements do not require detailed analysis because they may or may not be affected; may be affected at a level that does not influence use, occurrence or the decision to be made; or can be adequately addressed through design of the project. Wildlife species were reviewed for their relevancy to the Proposed Action. Some species were not analyzed further; the rationale for these decisions is provided in the Wildlife Report (pp. 3-5).

Threatened and Endangered Species

Yellow-billed Cuckoo

Direct, Indirect and Cumulative Effects

The Proposed Action will have ‘no effect’ on the yellow-billed cuckoo. The project is located in dry lodgepole pine and Douglas-fir habitats whereas yellow-billed cuckoo appear in willow/cottonwood riparian areas. As such, the species was not analyzed in detail (Wildlife Report, p. 6).

Sensitive Species

Of the R1 sensitive species, ten species are known to occur in the analysis area and/or have potential habitats for at least a portion of the year and are described below.

American Peregrine Falcon

No Action

Direct, Indirect and Cumulative Effects

The No Action alternative would have 'no impact' on the American peregrine falcon (Wildlife Report, p. 8).

Proposed Action

Direct, Indirect and Cumulative Effects

There is no current or historic peregrine falcon nesting in the analysis area. There would be no direct, indirect or cumulative effects caused by the Proposed Action. For these reasons the project will have 'no impact' on the peregrine falcon (Wildlife Report, p. 8).

Bald Eagle

No Action

Direct, Indirect and Cumulative Effects

The No Action alternative would have 'no impact' on the bald eagle (Wildlife Report, p. 9).

Proposed Action

Direct, Indirect and Cumulative Effects

Implementation of this project and reasonably foreseeable activities would not cause an increase in the amount of housing development, road construction, or logging on private lands, all factors that increase the risk of eagle mortality through various eagle/human interactions. The project would not affect any current or historic nest or communal roost sites associated with nesting given none occur in or near the analysis area. No large trees or snags (>15" dbh) would be removed through project activities. When considered with all past and reasonably foreseeable activities, the project would not affect the existing ability of bald eagles to occupancy the analysis area or the viability of eagle populations on the Forest as a whole. The Anaconda Job Corps Project would have 'no impact' on the bald eagle or its habitat (Wildlife Report, p. 9).

Black-Backed Woodpecker

No Action

Direct, Indirect and Cumulative Effects

The No Action alternative would have 'no impact' to the black-backed woodpecker. Current conditions provide snag and foraging habitat for the black-backed woodpecker. The No Action would allow for continued use of these habitats until such time as the food source no longer exists and snags fall down (Wildlife Report, p. 11).

Proposed Action

Direct, Indirect and Cumulative Effects

The Proposed Action 'may impact individuals or habitat, but will not result in a loss of species viability or create significant trends toward federal listing' (Wildlife Report, p. 11).

Removal of dead and dying trees would occur on approximately 14% (150 of 1,071 acres) of insect killed potential woodpecker habitat in the analysis area. Snag habitat will be maintained above Forest Plan standards, and follows recommendations by Bull et at. (1997) and the Northern Region Snag Protocol (USDA-FS 2000). Old growth is abundant and well distributed Forest-wide and no old growth would be treated. Direct effects to breeding woodpeckers are not anticipated as ground disturbing activities will not occur at any time during the breeding season (including from nest building in mid March through mid July when young leave the nest) (Wildlife Report, p. 11).

Fisher

No Action

Direct, Indirect and Cumulative Effects

The No Action alternative will have ‘no impact’ to the fisher (Wildlife Report, p. 13).

Proposed Action

Direct, Indirect and Cumulative Effects

The Proposed Action will have ‘no impact’ on the fisher.

Fisher occurrence in the analysis area is rare. Impacts on potential fisher habitat in the analysis area will be small (1% of marginal habitat). The project is consistent with management recommendations of Witmer et al. (1998) for fisher. Spruce-fir habitats, old growth, and riparian corridors will not be impacted; therefore the most suitable habitats will be maintained. Access for trapping will not change. Existing connectivity will be maintained. Fisher habitat is abundant and well distributed with more than sufficient amounts to sustain a viable fisher population on the Forest (Wildlife Report, p. 12).

Flammulated Owl

No Action

Direct, Indirect and Cumulative Effects

The No Action alternative will have ‘no impact’ on the flammulated owl (Wildlife Report, p. 14).

Proposed Action

Direct, Indirect and Cumulative Effects

The Proposed Action would have ‘no impact’ on the flammulated owl. No effects from the Proposed Action are anticipated as the proposed treatments occur in lodgepole pine areas, which is not a preferred vegetation type for flammulated owl. Suitable habitat does not exist in or near any of the proposed units. A formal survey using a modified Avian Science Center protocol (Cilimburg 2009) will take place prior to project implementation between May 15th and July 12th. A station will consist of 10 minutes listening and calling for owls using a Foxpro caller. Should an owl be located, an attempt to locate the nest tree will be made. Should a nest cavity be found, the tree will be retained. Seasonal restrictions will minimize impacts to Flammulated owls, should an owl and/or nest be found. Additionally, snag retention criteria included in the conservation measures will also reduce impacts to flammulated owls and other cavity nesters (Wildlife Report, pp. 13-14).

Gray Wolf

Wolves are found throughout western Montana. Populations in Montana are considered recovered and have been recently de-listed (Federal Register 2009). Wolves are now considered Sensitive in Region One as a result of that delisting for 5 years. The state lists them as a Species of Concern (Wildlife Report, p. 14).

No Action

Direct, Indirect and Cumulative Effects

No effects to the Gray Wolf are anticipated under the No Action alternative. Therefore, the determination call is the same as the proposed action (Wildlife Report, p. 15).

Proposed Action

Direct, Indirect and Cumulative Effects

The project’s small size location in a highly roaded area would not impact key wolf habitat or the wolf prey base (see elk section below), would not increase wolf/human interactions, and would not affect wolf population viability or the existing ability of wolves to occupy or disperse through the analysis area. Therefore, the Anaconda Job Corps Project will have ‘no impact’ on the continued existence of the wolf (Wildlife Report, p. 15).

North American Wolverine

No Action

Direct, Indirect and Cumulative Effects

The No Action alternative would have ‘no impact’ to the wolverine (Wildlife Report, p. 16).

Proposed Action

Direct, Indirect and Cumulative Effects

The Proposed Action will have 'no impact' on the wolverine population or species viability.

More than any other factors, wolverines are susceptible to mortality through hunting and trapping and human-caused disturbance near den sites (Hornocker and Hash 1981, Copeland 1996, Weaver et al. 1996). The project will not affect hunting or trapping season access and is far removed from any potential denning habitat located at higher elevations. The project will not impact existing security habitat in the north end of the analysis area. Ungulate carrion and potential movement of wolverine from denning to elk winter range will not be impacted. Given no direct or indirect effects are anticipated, cumulative impacts will not occur (Wildlife Report, p. 16).

Northern Bog Lemming

No Action

Direct, Indirect and Cumulative Effects

The No Action would have 'no impact' on bog lemmings (Wildlife Report, p. 18).

Proposed Action

Direct, Indirect and Cumulative Effects

The Proposed Action would have 'no impact' on the northern bog lemming. No preferred bog fen or wet sedge habitats are proposed for treatment. Given no direct or indirect effects are anticipated, cumulative impacts are not expected (Wildlife Report, p. 17).

Spotted Bat

No Action

Direct, Indirect and Cumulative Effects

The No Action alternative would have 'no impact' on spotted bat (Wildlife Report, p. 18).

Proposed Action

Direct, Indirect and Cumulative Effects

The Proposed Action 'may impact individuals or habitat, but will not result in a loss of species viability or create significant trends toward federal listing' for spotted bats because activity is not anticipated in the cliff areas and activity will not occur during foraging hours

Riparian habitat will not be impacted. All activities associated with the proposal will occur during the day, therefore any bats that may use forested and riparian areas in and around the project area at night will not be disturbed. Limestone cliffs that may provide suitable roosting habitat are within the maximum burn area and may be affected should fire break away from the proposed slash and burn units which could displace bats at the time of implementation (Wildlife Report, p. 18).

Townsend's Big-Eared Bat

No Action

Direct, Indirect and Cumulative Effects

The No Action alternative would have 'no impact' on Townsend's big-eared bat (Wildlife Report, p. 19).

Proposed Action

Direct, Indirect and Cumulative Effects

The Proposed Action 'may impact individuals or habitat, but will not result in a loss of species viability or create significant trends toward federal listing' for Townsend's big-eared bat. Project activities will not occur in or near any abandoned mines. Old growth roosting habitat will not be impacted since trees within the project area do not meet the Green et al. (1992) definition of old growth. Cliffs within the analysis area are not within the slash and ignition zones, however are within the maximum burn area. There is no risk of disturbing nocturnal foraging and no risk of disturbing roosting or water sources (Wildlife Report, p. 19).

Management Indicator Species

Elk

No Action

Direct, Indirect and Cumulative Effects

Effects under the no action alternative are mixed. Weed encroachment currently effects winter range for big game species in the area. The no action alternative would continue to facilitate weed dispersal, but potentially at a slower rate then the proposed action. For this reason, mitigation directed at weed control has been included in the proposed action. Additionally, some of the south facing slopes currently have conifer encroachment, thereby reducing foraging opportunities for big game species. Encroachment is expected to increase in the absence of fire (Wildlife Report, p. 20).

Proposed Action

Direct, Indirect and Cumulative Effects

The project area does not include security areas as defined by Hillis et al., nor does it include state identified winter range. No impacts are expected under the proposed action. Mitigation directed at weed control is included in the proposed action which may facilitate improved forage in those areas (see Vegetation Report). Finally, juniper berries, needles and young branches can provide alternative foraging to big game (Lovaas 1958) and many other species during extreme winters when grass is completely covered under snow. This is not a primary food source for big game and retaining juniper on the south facing slopes would have minimal effects on overall forage availability (Wildlife Report, p. 20).

Mountain Goat

No Action

Direct, Indirect and Cumulative Effects

No impacts to Mountain goat are expected under the No Action alternative (Wildlife Report, p. 21).

Proposed Action

Direct, Indirect and Cumulative Effects

The project area does not include security areas as defined by Hillis et al. (1991), nor does it include state identified winter range. No impacts are expected under the proposed action (Wildlife Report, p. 21).

Species of Interest

Canada Lynx

The Final EIS for the Northern Rockies Lynx Management Direction (NRLMD) was completed in March 2007 with the Record of Decision (ROD) signed March 23, 2007 (USFS 2007, pg 29.). The purpose of the NRLMD was to incorporate management direction in land management plans that conserves and promotes recovery of Canada lynx, by reducing or eliminating adverse effects from the land management activities on the National Forest System lands, while preserving the overall multiple-use direction in existing plans. This direction applies to projects and activities in occupied habitat (USFS 2007). An area is considered to be occupied when: (1) there are at least 2 verified lynx observations or records since 1999 on the national forest, unless they are verified to be transient individuals; or (2) there is evidence of reproduction on the national forest (USFS 2007). Lynx surveys were conducted on the Forest between 1999 and 2001 as part of a National Lynx Survey effort. Through this effort, the BDNF was determined to be unoccupied, secondary habitat (USFWS and USFS 2006) and continues to be considered unoccupied (USFWS 2009). A protocol to survey currently unoccupied lynx habitat has been developed and is managed by the National Carnivore Coordinator.

The NRLMD states unoccupied forests should consider the management direction when developing projects, but are not required to follow the direction until such time as they are occupied by Canada lynx. For the Anaconda Job Corps Hazardous Fuels project, the Forest evaluated the management direction (See Wildlife Report Appendix A). The Job Corps fuels project falls within mapped Wildland Urban Interface (WUI) and is therefore subject to vegetation guideline 10 (VEG G10) which states: Fuel treatment projects within the WUI as defined by HFRA should be designed considering Standards VEG S1, S2, S5, and S6 to promote lynx conservation. Those standards were evaluated in Appendix A. The Anaconda Job Corp project is fully compliant with the NRLMD standards and guidelines.

The most recent stand initiation project in LAU 101 (encompassing the project area) occurred on about 200 acres in the 1960's

and would now provide snowshoe hare habitat. No stand replacement fires have occurred in this LAU recently either.

Additionally, this project would only remove dead and dying lodgepole pine and would not affect preferred lynx habitat. Dead and dying lodgepole pine on dry sites does not provide cover for primary prey species, and does not intercept snow or moderate weather. As a result, there would be no change in the amount of available habitat for lynx should this forest become occupied at a later time. At least six pieces of large woody debris per acre with small end diameter equal to or greater than 8" and at least 10-feet long would be retained maintaining these habitat components in the salvaged units as required by Forest Plan Wildlife Standard 12 (USFS 2009) (Wildlife Report, p. 21).

Bighorn Sheep

The most of the analysis area on FS land is in bighorn sheep habitat, 2,000 acres of which is considered winter range. The project would remove dead and dying lodgepole and trees less than 4 inches in diameter within about 75 acres of winter range. Douglas-fir trees are not affected by mountain pine beetle, and therefore would be retained within the units. Canopy coverage would generally average 30-40% across these units and would continue to increase in density and canopy layering. Increased sunlight would stimulate understory vegetation (refer to vegetation report). About 100 acres of modeled winter range falls within the conifer slash and ignitions units (Wildlife Report, Map 5).

The Warm Springs Management Area has an objective to reduce noxious weeds in bighorn sheep range

Quality of thermal cover within the project boundaries may be improved in the long term by opening up stands and improving stand vigor. The removal of woody vegetation may improve the quality of forage within project boundaries through understory vegetation stimulation provide. However weeds, spotted knapweed in particular, exist in the project area (see weeds section and TES Plants BE) and burning may promote an expansion which could result in a reduction of quality forage. There is a sizeable body of evidence showing spotted knapweed to have negative effects on most big game species. However, spotted knapweed's effect on bighorn sheep forage quality is not fully understood. In the Gilpin range, British Columbia, California bighorn sheep utilized diffuse and spotted knapweed seedheads as primary forage when snow depth was in excess of 8 inches (20 cm). As snow cover receded in January and February, knapweed basal rosettes were the largest component (80%) of their diet. Rocky Mountain bighorn sheep also utilized knapweed seedheads and basal rosettes throughout the year in the Robson/Syringa Park area, British Columbia (Miller 1990).

Most recent population estimates for HD 213 (MFWP 2005), meet FWP goals for that HD. Bighorn sheep are frequently seen using the knob at the north end of burn unit 10, but do not frequent the lower portions of the project area (Vinkey pers. com.). Project related effects to bighorn sheep are varied. Hunting access and exposure to domestic sheep would not change. The burn units contain both summer and winter sheep habitat although sheep are usually found only at the peak at the northeast corner of the project area (Vinkey pers. comm). The reduction of conifers within these units may increase risk to predation in the short term; reduce potential overcrowding; and may also increase winter forage. Project related disturbance may displace individuals, but would not alter available habitat across the analysis or greater cumulative effects area. Given the relatively small project area compared the surrounding 150,000 acres of available sheep habitat, and minimal use of the project area, viability of this species across its range is not anticipated to be impacted by this project (Wildlife Report, pp. 21-22).

Great Grey Owl

Duncan and Hayward (1994) describe great gray owl habitat as mid- to late-successional forests, usually with a component of wet meadows, marshes, lakes or other openings that support a high prey base (e.g., small mammals). Great gray owls use a variety of forest types throughout their range (Bull and Duncan 1993). On the BDNF the species is known to use spruce-fir, lodgepole pine and Douglas-fir cover types (Hayward and Verner 1994). There is no evidence that the great gray owl is dependent on "old growth" forest, however nests are typically located in large diameter trees. For nest sites, this owl often uses old hawk or raven stick nests or natural depressions on broken-topped snags or stumps and also accept artificial nest structures (Bull and Henjum 1990, Nero 1980). Thus, the actual nest structure and its support can be fairly unimportant in nest site selection versus the nest site habitat and availability of nearby foraging habitat. In southeastern Idaho and Wyoming, nests were found in mid-to-late successional stages of Douglas-fir forests on flat land with herbaceous understory, which is both abundant and available to them (Franklin 1988). Additionally, clear-cuts and natural openings, like meadows were associated with nest sites. In this portion of its range it is estimated that nearly 80% of Great gray owls use lodegpole pine/Douglas-fir/aspen habitats (Franklin 1988). Great gray home ranges are often small, and depend on food supply. Because fledglings leave the nest before they can fly, both trees that are well off the ground, leaning over to other trees and are deformed but that are near meadows and openings (but still in timber) provide good habitat (Bull and Henjum 1990).

Mature to old growth forest comprises 64.1% of the Deerlodge NF, and about 21% of the mature to old growth forest is in Inventoried Roadless/Wilderness Status (B-D NF Wildlife Habitat Viability Analysis, Query 1 – Mature to Old Growth Cover-

types by Inventoried Roadless/Wilderness Status, Duncan and Hayward 1994).

A Great Gray Owl protocol specific to Region One has not been adopted in part because this species is not included in the R1 Sensitive Species list or the USFWS Birds of Conservation Concern (USDI-FWS 2008). A protocol developed for Northwest Forest Plan was used for this project (USDA-FS and USDI-BLM 2004), A model 48 B Foxpro caller, was used to broadcast Great grey owl calls approximately every tenth of a mile throughout the units. The survey consisted of 1 minute of silent listening followed by 5 minutes of broadcasting and listening intermixed. The survey took place on April 21st and 22nd, 2009. No great gray owls were detected. The only birds detected were three separate western screech owls near Foster Creek. Screech owls are secondary cavity nesters and are not known to exhibit high cavity fidelity from year to year. Project activities will take place outside of the March breeding season and similar habitat is widespread and abundant in the cumulative effects area.

Based on the wide distribution of habitat for great gray owl on the Forest, and the marginal great gray owl habitat in the Analysis Area, the project is not expected to increase risk to viability of this species (Wildlife Report, pp. 22-23).

Northern Goshawk

The northern goshawk occurs in a variety of forested areas throughout North America (Squires and Reynolds 1997). The goshawk is a generalist, opportunistic predator. Prey items are taken on the ground, on vegetation, in the air, and include red squirrels, woodpecker, ground squirrels, chipmunks, hares, songbirds, and grouse that rely on a variety of forested and non-forested habitats (Reynolds et al. 1992, Clough 2000, Squires 2000, Kennedy 2003). Red squirrels in particular are common, their habitat is common, the project area is relatively tiny, that they won't be excluded from the area, and alternative prey species will be available. Alternatively, stand replacement fire could have widespread negative effects to red squirrels. Goshawks can use small patches of mature habitat to meet their nesting requirements within a mosaic of habitats of different age classes (detailed in Samson (2006a) including extensive internal citations). For example, on the BDNF mature habitat quantified in PFA's centered on nests averaged only 11.3% of 420 acres (Clough 2000), whereas, on the Targhee in Wyoming mature habitat averaged 60% (Patla 1997). Productivity levels of goshawks in managed forests are varied (Moser and Garton 2009, Clough 2000, Patla 1997). The Clough (2000) study occurred in a heavily managed landscape had greater than reproductive success than those of Patla (1997). Moser and Garton (2009) found that so long as greater than 39% of the breeding area (170-ha surrounding the nest) contained potential nesting habitat following harvest; goshawk breeding reoccupancy was likely. They also found that nesting success was a function of winter and spring weather rather than harvest activities meeting the above criteria (ibid).

During a field review, the soils scientist observed a pair of possible NOGA in unit 6 simply described as "large raptors in the forest". The wildlife biologist returned a few days later and observed a red-tailed hawk perched at the top of tree near the purported NOGO sighting. While in unit 9 a pair of red-tailed hawks were observed circling the AJC sewage pond and soon became aggressive. Their nest was confirmed approximately 400 meters from the possible NOGO sighting. On June 19, 2007, the wildlife biologist conducted an additional survey in attempt to locate the purported NOGO pair. The red-tailed-nest was still active and the adults were extremely aggressive. They escorted the biologist throughout units 6, 9, and 10. Several attempts were made to broadcast NOGO wails using a model 48 B Foxpro caller, however this drew in the red-tailed hawks and the NOGO broadcast survey was concluded so as not to draw in any NOGO and subject them to conflict with the red-tailed hawks (Crannell and DeStefano 1992). It is unlikely that another pair of territorial raptors would use these units given the aggressiveness of the red-tailed hawk pair that year. During a field review on April 21st 2009, this red-tailed hawk was no longer active. The lodgepole pine nest tree has died due to insect infestation.

Inter-specific competition is not well understood. Goshawks may be excluded from nest areas by other raptors, although it is common for goshawks and other raptors to nest in close proximity to one another (Squires and Kennedy 2006). Forest owls, the great gray owl in particular, have used nests built by goshawks. Several species of hawks and owls, and numerous mammalian predators, can potentially compete with goshawks for prey. These include red-tailed hawk, Cooper's hawk, great horned owl, fox, coyote, bobcat, Canada lynx, weasel, and American marten (Ibid.).

Changes in the structure and composition of forested habitats, especially changes that result in reduced forest canopy, may favor the habitat needs of competitors (La Sorte et al. 2004), thereby potentially decreasing relative habitat availability to goshawks (Squires and Kennedy 2006). Gatto et al. (2005) and Reynolds et al. (1992) both indicate that goshawks have some dietary overlap in prey species albeit with distinct and differing habitat associations between goshawk and red-tailed hawks. A review of Gatto et al. (2005) and Reynolds et al. (1992) both indicate that those shared prey species are those that occupy open unforested, forested, and forest edge areas. Approximately 48% of red-tailed hawk diet over-lapped with goshawk. Both red-tailed hawks and goshawks are opportunistic predators and would take prey species as they are available. Thus, the potential for competition between the two species exits. They are no studies documenting the replacement of goshawks by red-tails as a result of habitat alteration. If red-tails do replace goshawks the threshold at which this occurs is not known. Reynolds et al.

(1992) recommend vegetation management treatments that maintain suitable goshawk habitat at a home range scale

If the red-tailed hawk nest remains inactive, a NOGO survey based on Kennedy and Stahlecker (1993) and Hargis and Woodbridge (2006) will be conducted prior to implementation. Call stations will be approximately 300 m apart and last approximately 3 minutes per station. The wailing call will be broadcast in the 4 cardinal directions for 10 seconds a piece followed by 30 seconds of listening. Then the call will be broadcast for 10 seconds in a single direction followed by 30 seconds of listening. This is repeated for each cardinal direction until all 4 are complete.

A single nest was documented within the Cumulative Effects area in 1994 (MNHP 2009). This nest is approximately 5 kilometers from the project area (see Map 6). The Samson (2006a) summarized recent (2000 and newer) studies on the effects of vegetation treatments on northern goshawks that show: (1) the majority of goshawk pairs move from nest stands when stand structure is modified by more than 30%; (2) human disturbance is not a factor if 70% of the nest stand structure is maintained and timber management operations are time restricted during the nesting period; (3) treatments have no effect on goshawk breeding area occupancy, nest success, or productivity 1 to 2 years after treatment; (4) no difference in the productivity of northern goshawks occurs in logged versus un-logged areas.

To meet disturbance thresholds in numbers (1) and (2) above, during implementation of this project, no treatments or treatment-related disturbance would occur at any time in an occupied nest areas (if found) to ensure 100% of the nest area (Reynolds et al. 1992) is conserved. This would be achieved by placing a conservative 40-acre no harvest buffer around any discovered nests. In addition, no ground disturbing activities would occur within any new PFA from mid-April through August 15 to ensure that a goshawk family is adequately protected during the courtship, egg-laying, incubation, early nestling, and late fledgling periods.

All silviculture treatments are concentrated in 150 acres of potential foraging habitat. No preferred Douglas-fir nesting or foraging habitat would be impacted. The remaining Douglas-fir could still provide foraging habitat and would eventually become the dominate species thereby providing preferred habitat. While some of the smaller understory trees would be removed to alleviate concerns for crown fire, not all understory would be cut down which would support goshawk prey species. To comply with the large woody debris standard provided in the revised Forest Plan (2009), 6 large logs per acre with the smaller end diameter 8 inches or larger and 10 feet long will be retained. Goshawks and goshawk nesting and foraging habitats are abundant and well distributed across the forest and region (Samson 2006a). The project would not compromise northern goshawk viability (Wildlife Report, pp. 23-24).

Pine Marten

The pine marten use mature mixed conifer forests (MNHP 2009) and lodgepole pine forests extensively in southwestern Montana, and Douglas fir and whitebark pine forests to a lesser degree (Fager 1991, Kujala 1993, Coffin 1994). Foraging and denning sites are generally dominated by moist, spruce and subalpine fir with large-diameter deadfall and lush ground cover that supports abundant red squirrels, mice and voles (Buskirk and Powell 1994). Marten require subnivean access for prey and cover. Coarse woody debris provides structure that intercepts snowfall, creating subnivean tunnels, interstitial spaces, and access holes, and was found at used and unused access points. For this reason, marten area associated with coarse woody debris (Buskirk et al. 1989, Buskirk and Powell 1994, Sherburne and Bissionette 1994). Coarse woody also provides habitat for marten prey species (Bull and Blumton 1999, Hodges and Sinclair 2005). Martens are vulnerable to disturbance during the breeding season (mating occurs in July, implantation of the fertilized embryo occurs in February) as well as when the young are born (March) in the den through independence from their parents (late June). Homerange sizes are a maximum of around 1 square mile.

Marten are considered widespread and common on the BDNF. The state of Montana has an unlimited trapping season on pine martens, and 247 martens have been trapped out of Deer Lodge County between 1994 and 2004. Marten is one of the most frequently trapped furbearer species in all hunting districts in (MFWP 2002, 2003, 2004, 2006). Trapping records show that a number of marten have been trapped in the area each year (ibid.). Trapping mortality in an area can be as high as 50%, however, new marten will move into unoccupied territories almost immediately after an area is vacated (Fager 1991). Thompson (1994) hypothesized that marten may be more susceptible to trapping when regular access to the under the snow environment is impeded by snow crusting, when prey availabilities are low, or when they inhabit intensively logged landscapes. Pine marten populations are thought to fluctuate widely due to periodic failures in prey survival and reproduction.

During a forest wide habitat assessment using SILC data and GIS technology, marten habitat was defined as mature to old growth subalpine fir and Engleman's spruce (spruce-fir), and lodgepole pine using the Region One definitions (Green et al. 1992). Buskirk and Ruggiero (1994) described pine marten habitat as mesic late-seral conifer forests with complex physical structure near the ground. Based on current best available habitat information for the Deerlodge NF, it appears that habitat is abundant and well distributed across the forest for pine marten. Mature to old growth spruce-fir and lodgepole pine comprises

52.9% of the Deerlodge NF. About 34% and 61% of mature to old growth lodgepole pine, and spruce-fir, respectively are in Roadless/Wilderness Status. (B-D NF Wildlife Habitat Viability Analysis, Query 1 – Mature to Old Growth Cover-types by Inventoried Roadless/Wilderness Status; Buskirk and Ruggiero 1994).

The analysis area and larger cumulative effects area for marten is dominated by high road densities that bisect all land ownerships. This project will not increase road densities or recreational use of the area; therefore trapper access would not increase. Spruce/fir will not be impacted. Management recommendations for supporting viable populations of pine marten and marten prey (Warren 1990) call for leaving 40% of marten home ranges in mature and old growth. Old growth of any kind will not be impacted. Dead and dying lodgepole will be removed however; live trees left in the understory would provide some habitat for marten. Additionally, 6 pieces per acre with small end diameter equal to or greater than 8 inches and 10-ft long will be retained post harvest providing habitat for species such as the pine marten that use large woody debris in forested habitat types (Buskirk et al. 1989, Sherburne and Bissionette 1994) (Wildlife Report, pp. 24-25).

Boreal Owl

Boreal owls are considered uncommon but not rare in Montana and common, widespread and abundant globally (MFWP 2009). Boreal owls are associated with high elevation spruce fir forests but have been documented using a variety of types of forest (Hayward et al. 1993). Hayward et al. (1993) found owls singing in even age lodgepole-pine forest on the Beaverhead Forest however noted that multistoried forest was not available in the study area and that the majority of the owls they found were in stands with components of older forest. Nesting begins in late March or April and young fledge mid June to mid July (ibid.). Boreal owls nest in woodpecker cavities with a preference for pileated cavities, but also have been found nesting in flicker cavities (ibid.). Hayward et al. (1993) recommends managing nest habitat by focusing on large woodpeckers, snag habitat (conifers larger than 14.9 inches dbh), and aspen larger than 12 inches dbh. The project is not in preferred spruce fir forest, and would retain snags larger than 15 inches dbh.

A survey was conducted using a modified Hayward et al. (1993) protocol. A FoxPro caller was used for broadcast surveys beginning on April 27, 2009. The survey consisted of 2 minutes of silent observation, followed by a mix of boreal owl calls and silent observation for a duration of seven minutes. Boreal owl calls were broadcast approximately ¼ of a mile apart. A great horned owl was detected in unit 6, but no Boreal were detected during the survey (Wildlife Report, p. 25).

Migratory Birds

Under the National Forest Management Act (NFMA), the Forest Service is directed to “provide for diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives.” (P.L. 94-588, Sec 6 (g) (3) (B)). The January 2000 USDA Forest Service (FS) Landbird Conservation Strategic Plan, followed by Executive Order 13186 in 2001, in addition to the Partners in Flight (PIF) specific habitat Conservation Plans for birds and the January 2004 PIF North American Landbird Conservation Plan all reference goals and objectives for integrating bird conservation into forest management and planning.

Migratory birds of conservation concern have been identified by the USFWS (2008) and federal agencies are encouraged to minimize impacts to these species. The project falls within Bird Conservation Region 10 which encompasses the Northern Rocky Mountains. Migratory species identified include: Bald Eagle, Swainson's Hawk, Ferruginous Hawk, Peregrine Falcon, Upland Sandpiper, Long-billed Curlew, Yellow-billed Cuckoo, Flammulated Owl, Black Swift, Calliope Hummingbird, Lewis's Woodpecker, Williamson's, Sapsucker, White-headed Woodpecker, Olive-sided Flycatcher, Willow Flycatcher, Loggerhead Shrike, Sage Thrasher, Brewer's Sparrow, Sage Sparrow, McCown's Longspur, Black Rosy-Finch, and the Cassin's Finch. 4 of the species above have potential to be impacted by implementation of the project: and have not already been analyzed. The Williamson’s sapsucker and white-headed woodpecker are associated with conifer forests and excavate their own cavities. Effects to these species are comparable to the effects of the black-backed woodpecker. Habitat is abundant across the analysis area and project activities occur outside of the breeding season. The Olive-sided flycatcher is associated with post-fire habitat but can also be found in forest openings (Hutto and Young 1999). They are most common in spruce and aspen and rarely found in lodgepole pine (Hejl et al. 1995). Casey (2000) recommends retaining forested habitat around riparian and wetland habitats and retaining snags and large trees. No activities will take place in riparian or wetland habitats. Large trees will be retained and 6.4 snags per acre will be left. Additionally, no activities will take place during the breeding season.

A Memorandum of Understanding (MOU) between the USFS and USFWS was agreed to in December of 2008. This MOU meets the requirements of Executive Order 13186, 66 Fed. Reg. 3853 (2001). This MOU outlines a collaborative approach to promote the conservation and reduce the take of migratory birds. The purpose of this MOU is to strengthen migratory bird conservation by identifying and implementing strategies that promote conservation and avoid or minimize adverse impacts on migratory birds through enhanced collaboration between the USFS and the USFWS, in coordination with State, Tribal, and local governments. Within the National Forests, conservation of migratory birds focuses on providing a diversity of habitat

conditions at multiple spatial scales and ensuring that bird conservation is addressed when planning for land management activities. Forest Service responsibilities relative to project level planning have been considered and incorporated into the development and design of the project. Seasonal restriction intended to reduce disturbance during breeding season and snag retention standards are found in the Wildlife Conservation Measures. In particular, the known red-tailed hawk nest will be protected if it is found to be active during the year of implementation. With the exception of hauling, no logging activities will occur within 100 m until August 15th. Additionally, all snags larger than 15” and all live trees will be retained, including the nest tree (see Wildlife Report, Wildlife Map 7).

Additionally, red-napped sapsuckers and three-toed woodpeckers were detected during field review. The sapsucker was detected in an aspen stand. Sapsuckers are typically associated in softer trees like aspen, but are also found in larch, deciduous and mixed woodlands (MNHP 2009). Existing aspen stands in the project area are expected to benefit from implementation of this project. Conifers will be cut or girdled within the stands to alleviate competition for light and water. Project effects to three-toed woodpeckers are comparable to black-backed woodpeckers. Habitat is abundant across the analysis area (Wildlife Report, pp. 25-26).

Federal, State, and Local Agencies Contacted

Anaconda-Deer Lodge County Commissioners

Bureau of Land Management

Granite County Commissioners

Headwaters RC&D

Montana Department of Fish, Wildlife & Parks

Montana Department of Natural Resources

Montana State Historic Preservation Office

Town of Philipsburg

USDA Anaconda Job Corps Center

USDA Forest Service, Bitterroot National Forest

USDA Forest Service, Beaverhead-Deerlodge National Forest

USDI Fish & Wildlife Service

Tribes Contacted

Assiniboine Tribe

Blackfeet Tribe

Chippewa Cree Tribe

Crow Tribe

Fort Belknap Tribe

Gros Ventre Tribe

Salish-Kootenai Tribe

Shoshone-Bannock Tribe