Specialist's Report for Fire/Fuels in the JoCat Resource Area

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SPECIALIST'S REPORT FOR FIRE/FUELS IN THE JOCAT RESOURCE AREA

1. Regulatory Framework for Fire/Fuels

The authority for fire management on National Forest System Lands is described in Forest Service Manual (FSM) 5100 - Fire Management (PF Doc. FF-07). The objectives of fire management are (FSM 5140, PF Doc FF- 08):

1. To use fire from management ignitions or natural ignitions in a safe, carefully planned, and cost-effective manner to benefit, protect, maintain, and enhance National Forest System resources.

2. To reduce future fire suppression costs and unwanted effects.

3. To restore natural ecological processes.

4. To achieve desired conditions and attain management objectives adopted in approved forest land and resource management plans (forest plans).

The current IPNF Forest Plan objective for fire management is to implement efficient fire protection and use programs based on management objectives, site-specific conditions, and expected fire occurrence and behavior (CR-002). Management area standards and goals provide direction for appropriate use of prescribed fire and initial attack strategies. Forest-wide standards require that Fire Management Plans are to be guided by management area standards. Human life and property are to be protected, and activity fuels should be treated to reduce their potential rate of spread and fire intensity so the planned initial attack organization can meet initial attack objectives.

The Forest Plan identified three management area designations for National Forest System lands in the JoCat Resource Area (SR-02 Forest Vegetation, page 1). Appropriate initial attack strategies (confine, contain and control) are to be used to meet forest plan direction. Prescribed fire is to be used as needed to meet silvicultural objectives and the objectives of the management area.

The *Federal Wildland Fire Management Policy and Program Review* was chartered by the Secretaries of the Interior and Agriculture to examine the need for modification of and addition to Federal fire policy. The review recommended a set of consistent policies for all Federal wildland fire management agencies. In adopting the policy, the Federal Agencies recognized the role of wildland fire as an essential ecological process and natural change agent that will be incorporated into the planning process (USDI and USDA 2001a, PF Doc. FF- 09). The severe wildfire seasons in recent years throughout the country have made it clear that fire cannot be excluded from fire-dependent ecosystems. On the other hand, because of developed areas and state and private commercial forests, fire cannot be fully restored to its historic character without severe consequences to humans, except perhaps in a few of the largest wilderness areas (Brown et al. 1994, in Hardy and Arno 1996, PF Doc. FF- 10).

After the record-breaking wildfire season of 2000, the President requested a national strategy for preventing the loss of life, natural resources, private property, and livelihoods in the wildland/urban interface. Working with Congress, the Secretaries of Agriculture and Interior jointly developed the National Fire Plan ***(www.fireplan.gov)*** to respond to severe wildland fires, reduce their impacts on communities, and assure sufficient firefighting capabilities for the future. The National Fire Plan (NFP) is a long-term commitment based on cooperation and communication among federal agencies, states, local governments, tribes and interested publics. The federal wildland fire management agencies worked closely with these partners to prepare a 10-Year Comprehensive Strategy, which was completed in August 2001 (PF Doc. FF-11). The four goals of the 10-Year Comprehensive Strategy are to improve fire prevention and suppression, reduce hazardous fuels, restore fire-adapted ecosystems, and promote community assistance. In response to the 10-Year Comprehensive Strategy goal of promoting community assistance, Shoshone County completed a Fire

Mitigation Plan to aid in the protection of the communities within the county (CR-020). The Shoshone County Wildland Urban Interface Fire Mitigation Plan is a HFRA (Healthy Forests Restoration Act) compliant Community Wildfire Protection Plan (CWPP). The plan identifies a goal to reduce the rate of fire spread and acres of land burned by forest fires through the implementation of targeted fuel mitigation treatments where the landscape has the potential to sustain fires that threaten communities in the rural urban interface.

The plan identifies that portion of the JoCat Resource Area within one half mile of Forest Highway 9 as a secondary resource protection zone for Shoshone County (PF Doc. FF-02, FF-03). The goal for this zone is to provide safe travel routes and protect vital infrastructure in the county. Although the JoCat Project was not initiated in response to the Shoshone County Fire Mitigation Plan, it will meet some goals of the Shoshone County Fire Mitigation Plan.

While the purpose and need of the proposed action is not specifically designed to help accomplish the all goals of the 10-Year Comprehensive Strategy, it will further two of the guiding principles of the Strategy: to reduce hazardous fuels and to maintain and restore fire prone ecosystems at a landscape scale. The National Fire Plan, the 10-Year Comprehensive Strategy, and the Implementation Plan for the Strategy (PF Doc. FF-12) can be accessed on the internet at ***www.fireplan.gov***.

2. Methodology for the Fire/Fuels Analysis

Several sources of information were used to assess the existing conditions in the JoCat Resource Area. The fire history of the Coeur d'Alene River Ranger District, including the JoCat Resource Area, has been recorded and mapped by the Forest Service since its inception. Fires were initially mapped with colored pencil on a district map, but are now digitized and placed in a GIS (Geographic Information System) coverage. A map of the recorded fire history for the JoCat Resource Area was used to make assumptions as to when effective fire suppression began (PF Doc. FF-03). Additionally, a fire history study of the Idaho Panhandle National Forests was conducted by Zack and Morgan (1994; PF Doc. FF-13). The information gathered by this study and the subsequent conclusions drawn from it are relevant to the JoCat project area and was used to help characterize the existing condition of the area.

Records of fire ignitions are compiled by the Forest Service (1960 to 2005) and Idaho Department of Lands (1981 to 2005), and kept in a national database. These records include the year, size, location, and cause of each fire reported. Records for fire ignitions in the area of Prichard Creek above Eagle were used in this analysis (PF Doc. FF- 04).

Fire Regime Condition Class (FRCC) was not analyzed for the JoCat Resource Area. This relatively new analysis tool is important when considering the landscape scale, but the JoCat Resource Area is relatively small in size, only two alternatives are considered, and the proposed treatments will have only a small effect at the landscape scale. Therefore a full FRCC analysis between alternatives was not warranted.

In general, past Forest Service fire management practices of suppressing all fires in combination with insect epidemics and the introduction of White Pine Blister Rust have effectively moved the bulk of unmanaged timber stands on the IPNF well toward Condition Class 3 - high departure from the central tendency of the natural (historical) regime. It can be easily argued that most timber harvest activities now being initiated on National Forest lands combined with subsequent treatment of created activity fuels by prescribed fire methods tend to improve FRCC ratings at the stand scale.

The analysis considered effects of management actions in terms of three fire behavior indicators (flame length, probability of torching, and crowning index). A reduction in these three indicators demonstrates probable success in reducing the risk of a severe wildland fire. **Flame length** is important because only flame lengths of 4 feet or less can be safely attacked directly using hand crews. **Torching** trees produce aerial fire brands making spotting and spread more likely. Torching can be the trigger leading to fire into the timber stand canopy, or crowns. The **crowning index** reflects the density of the tree canopy, and its ability to sustain an active crown fire. When crown fires occur, suppression is extremely difficult and large wildfires usually develop. See Specialist's Report on Fire/Fuels for more information on these three indicators.

Features Related to Activity Fuels Management

The Action Alternative includes specific design features that would be followed during project implementation to protect resources in the JoCat Resource Area.

- *Surface or understory fuels in harvest units would be treated through the use of prescribed burning, grapple piling and burning, hand piling and burning, or lop and scatter treatments. Because post-harvest fuel conditions cannot be completely predicted, assessments are commonly conducted by a fire/fuels specialist and a silviculturist after completion of harvest activities. A determination is made as to whether the planned activities could be implemented safely and effectively, or if some modification of the planned fuels reduction methods is required to meet the objectives of the silvicultural prescription. Additional needs may include slash piling, fireline construction, leave tree protection, or slashing. Post harvest activities would include prescribed burning (and related work, as needed) to reduce fuels, fuel continuity, and fuel ladders, and re-introduce fire as an intermediate disturbance process.*
- *Burning would take place only when soil moistures are above 25 percent.*
- *Based on past experience, approximately 10-20 percent mortality of overstory trees should be anticipated as a result of prescribed burning. Salvage of this mortality would not occur without further analysis as appropriate under NEPA.*

Features Designed to Protect Air Quality

The Idaho Panhandle National Forests is a member of the Montana/Idaho Airshed Group, which is composed of members who conduct a “major” amount of prescribed burning and the regulatory and health agencies that regulate this burning. The intent of the Airshed Group is to minimize or prevent smoke impacts while using fire to accomplish land management objectives and/or fuel hazard reduction (PF Doc. FF- 14).

The monitoring unit of the Montana/Idaho Airshed Group coordinates burning and smoke emissions to minimize smoke accumulation and provides smoke dispersion forecasts and air quality monitoring support for burners in the Airshed Group. Between January 2nd and February 27th of each year, members submit to the Monitoring Unit a list of all prescribed burns planned for the current calendar year through an Internet-based reporting system for tracking and reporting prescribed fires. This burn reporting system allows members to build preseason burn lists directly into the program’s master database, propose burns on a daily basis, and report accomplished burns. Daily during the burning season, land managers post proposed burns before 11:00 am; the monitoring unit considers proposed burns together with expected ventilation or smoke dispersion conditions and existing air quality to determine burn recommendations for the following day (with concurrence from the Idaho Department of Environmental Quality). These procedures limit smoke accumulations to legal, acceptable limits. The District strictly complies with these procedures, and has had no air quality violations.

Historically, prescribed burning on the Coeur d'Alene River Ranger District occurs in the spring and fall seasons over a total time span of 45 to 60 days during each season. All burning complies with federal, state and local regulations. Prescribed burning during spring or fall would generate less smoke than a much hotter stand replacing summertime wildfire (PF Doc. FF- 14).

Existing Conditions

Broad Scale Fire History

Fire is the major disturbance factor that produces vegetation changes in our ecosystems. Changing or removing the role of fire results in substantial changes in the ecosystem. Fire has burned in nearly every ecosystem and nearly every square meter of the coniferous forests and summer-dry mountainous forests of northern Idaho, western Montana, eastern Washington and adjacent portions of Canada. Fire was responsible for the widespread occurrence and even the existence of western larch, lodgepole pine, and western white pine. Fire maintained ponderosa pine on sites throughout its range at the lower elevations and killed ever-invading

Douglas-fir and grand fir (Spurr and Barnes 1980, PF Doc. FF- 15). Many ecosystems are regularly recycled by fire; life for many forest species literally begins and ends with fire. According to Zack and Morgan (1994; pages 19-22; PF Doc. FF- 13) there are generally three types of fires that occur in forested ecosystems:

- ***Nonlethal fires*** *- fires that kill 10% or less of the dominant tree canopy. A much larger percentage of small understory trees, shrubs and forbs may be killed or burned back to the ground line. These are commonly low severity surface and understory fires, often with short return intervals (a few decades or less).*
- ***Mixed severity fires*** *- fires that kill more than 10%, but less than 90% of the dominant tree canopy. These fires are commonly patchy, irregular burns, producing a mosaic of different burn severities. Return intervals on mixed severity fires may be quite variable.*
- ***Lethal fires*** *- fires that kill 90% or more of the dominant tree canopy. These are often called "stand-replacing" fires and they often burn with high severity. They are commonly crown fires. In general lethal fires have long return intervals (140-250+ years apart), but affect large areas when they do occur. Local examples of these types of fires would be the Sundance and Trapper Peak fires of 1967 that burned over 80,000 acres in a relatively short time period during late summer drought conditions.*

The Coeur d'Alene River drainage historically had a variable fire regime of long return interval, large, lethal fires mixed with shorter return interval non-lethal and mixed severity fires. Fires were more frequent in watersheds on the periphery of the Coeur d'Alene Basin, adjacent to and downwind from the drier, pine dominated Rathdrum Prairie (FF-13, Zack and Morgan 1994, page 34). Prior to Euro-American settlement (1880), the mean fire return interval within the Interior North Fork of the Coeur d'Alene River was 62 years. The mean fire return interval on the Rathdrum Prairie face and the Hayden Lake watershed was 55 years (Zack and Morgan 1994, page 27; PF Doc. FF- 13).

"Severity" refers to the degree to which a site may be altered or disrupted by a fire which is often determined by the degree of soil heating.

"Return interval" refers to how often a particular type of fire occurs.

"Fireline intensity" is the energy release rate per unit length of fire line and is a physical parameter that can be related to flame length.

The fire history analysis of the Coeur d'Alene Basin conducted by Zack and Morgan in 1994 drew the following conclusions:

- *In addition to cycling carbon and nutrients, the infrequent large lethal fires played a dominant role in resetting the successional sequence and structuring the vegetation matrix across the landscape. However, the nonlethal and mixed severity fires were also important. Most stands (within the Coeur d'Alene Basin) apparently experienced an average of one to three of these low severity burns between lethal fires. These lower severity fires would reduce ground fuels, reduce ladder fuels, thin stands, and favor larger individuals of fire resistant species (larch, Douglas-fir, and ponderosa pine), than if these mixed severity and nonlethal fires had not occurred.*
- *Lower severity fires structured how the landscape responded when a lethal severity fire did occur. The lower severity fires increased the proportion of the landscape with big trees and open canopies that would not sustain a crown fire. Reduction of ladder fuels would mean that even high intensity fire might not reach tree canopies in some cases. The larger trees that grew as a result of this thinning would be more likely to survive even intense fires. The net result would be that even lethal severity fires would be likely to leave more individual residual trees and patches of residual trees than if the lower severity fires had not occurred. The effects of lethal fire events would be less uniform as a result of the lower severity fires*

Zack and Morgan (1994, page 1; PF Doc. FF- 13) found that since 1540, on average there has been one major fire somewhere in the Coeur d'Alene River Basin every 19 years. However, since the mid 1930's, fire control

efforts have become effective, and the last major stand-replacing fire in the Coeur d'Alene River Basin occurred in 1931. The primary impact of fire control has been to eliminate underburns and mixed severity fires which served as the thinning agents that favored early seral species such as western larch and ponderosa pine.

JoCat Resource Area Fire History

The JoCat Resource Area has been affected by several large fire events in the past. Fires in 1889 burned in the west and southern portion of the Resource Area with some large spots in the north and eastern portion. The fires of 1910 burned most of the area, engulfing the earlier burned patches. These large fires burned most of the Resource area over a period of only 20 years.

Forest Service and Idaho Department of Lands records show that 45 fires have been detected and suppressed in the upper Prichard area. The majority of these fires were kept very small, with a total of just 272 acres burned. The lone exceptions were the Gold Chest Fire of 2003 which was 82 acres, and the Revett Fire of 2006, which was 163 acres. Approximately 65% of the reported fires were caused by lightning and the remaining 35% were human-caused (PF Doc. FF- 04).

Implications of the Current Mountain Pine Beetle Epidemic

The JoCat Resource Area has a number of stands that are dominated by lodgepole pine, which is heavily infested with mountain pine beetle. This insect epidemic is causing high mortality rates in the lodgepole pine in the upper Prichard Creek drainage near the Bitterroot Divide and has been building for several years.

The natural progression of mountain pine beetle epidemics in lodgepole pine stands leads to a buildup of forest fuels that will soon be a definite concern to the fire management agencies in Shoshone County. Due to distance from urban areas and structures, these timber stands are not an immediate, extreme fire danger threat. Because of the relatively young age of these stands, there is little ground fuel present (USFBPS Fuel Model 8) and they would only burn rapidly under the most extreme conditions of low fuel moistures and high winds which would likely result in a crown fire event.

FF-1. Picture of the forest floor beneath a lodgepole pine stand showing a typical USFBPS Fuel Model 8.

However, as the years pass the dead trees will begin to fall in lodgepole pine stands attacked by mountain pine beetle and fuel conditions will rapidly change to an extremely hazardous situation. The Fuel Model 8 would become a heavy Fuel Model 10. Dead tree boles do not decay rapidly on drier, upper slopes when not in contact with the ground. The sheer number of dead tree boles in these stands will ensure that as the trees fall, a large number of boles will remain suspended above the ground and therefore will not decay rapidly. This will lead to a period of 15 to 30 years when the area is likely to contain a layer of tree boles 3 or more feet in depth. This is an extremely hazardous fire management situation. If the present situation is left untreated, this will add up to a difficult fire management situation in the future for this area.

The best example of this extreme situation occurred in the Greater Yellowstone Fires of 1988. Another example in the Northern Rockies that older fire managers always referred to prior to 1988 was the 1961 Sleeping Child Fire on the Bitterroot National Forest in Montana. Fires burn very hot in these fuel conditions, and are extremely resistant to control efforts. Fireline construction is very slow due to the sheer volume of material that must be cut out of the way and moved to enable a crew to dig fireline to mineral soil. There is no place to put the cut material that is far enough from the fireline where it will not present an ignition hazard when the fire burns up to the fireline, or the line is burned out. Therefore spot fires across the lines are

frequent and very difficult to control. Additionally, safety zones are infrequent and escape routes must be cut out to reach them, further slowing crew progress. Also the number of snags that firefighters have to deal with greatly increase safety concerns. Fire managers become very reluctant to directly attack any fire when these conditions exist on the ground due to the serious safety considerations.

Another difficult aspect of fire management under these conditions, is the spread of the fire by spotting. There will be decaying material on the ground from the first trees that fell in the stand of dead trees. Decaying woody material is the perfect receptor for firebrands to ignite new fires ahead of the flaming front. Fire Behavior Prediction Models, such as BEHAVE, would not predict rapid spreads in a heavy fuel Model 10, however fire spread by spotting is not considered in the model. Spread by spotting is very unpredictable except for the fact that it **will** happen. The number of spot fires and their distance from the flaming front could easily double or triple the actual spread rate over the predicted spread rate of a fire in these fuel conditions.

A recent publication, *The Influence of Previous Mountain Pine Beetle (Dendroctonus ponderosae) Activity on the 1988 Yellowstone Fires* (Lynch et.al., 2006, PF Doc. FF- 06) confirms that older mountain pine beetle epidemics had more influence than recent epidemics on the spread of the 1988 fires. The study was limited to spatial comparisons of mountain pine beetle epidemics vs. fire spread (and compared other environmental factors as well), and found a definite correlation of an older epidemic's influence (where fallen trees have greatly increased ground fuels) on fire spread, whereas a correlation with a more recent epidemic (where trees would have not yet fallen to the ground) was not evident.

The study did not and could not compare the safety aspects and difficulty of fighting fire in the conditions encountered due to the volume of down material facing fire managers during the fires. This author was assigned to the Area Command at West Yellowstone for 27 days in August and September 1988 and had conversations with Planning Section personnel on every Incident Management Team assigned to the Yellowstone Fires during that time. All commented on the aforementioned difficulties of fighting fire under these conditions. An additional concern mentioned was that spot fires were very hard to detect by aerial remote sensing technology when heavy concentrations of down material effectively "hid" small spots from above.

Timber stands with a high component of western larch comprise a considerable part of the Resource Area. Due to the absence or suppression of low to moderate intensity wildfires, these stands have become dense with a mix of tree species. Low to moderate intensity fires would have thinned out some of these other species and favored the more fire resilient larch. Currently, ground fuels are also generally low in these stands, and the three fire behavior indicators would be similar to the lodgepole pine stands described above.

The timber stands along Forest Highway 9, especially below the road, are very dense young sawtimber stands. Ground fuels are a little higher in these areas and understory vegetation denser than described above. With the added understory fuels, torching would likely occur. This torching, in conjunction with steeper slopes, would likely result in a higher probability of crown fire than in other locations.

3. Environmental Consequences

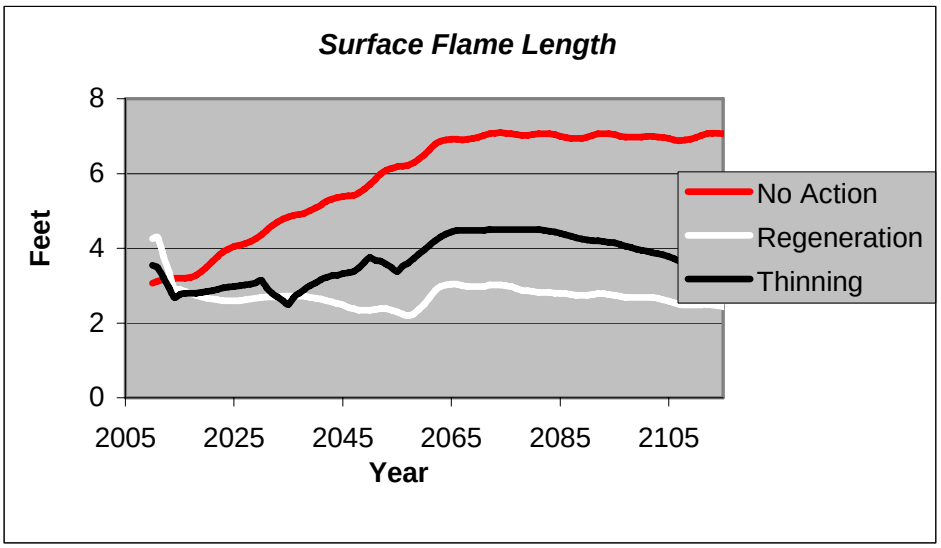
The following graphs briefly compare natural timber stands (or No Action) and effects of management actions in terms of three fire behavior indicators (flame length, probability of torching, crowning index). A reduction in these three indicators demonstrates probable success in reducing the risk of a severe wildland fire. These figures show a typical stand. Effects vary somewhat between stands depending on site conditions and other factors. In general, most natural vs. managed stand comparisons will show similar trends for these indicators.

A. Flame Lengths

Only flame lengths of 4 feet or less can be directly attacked safely using hand crews. Once flame lengths surpass this mark, other suppression tactics are usually employed. These could include using engines, dozers, and air resources, as well as indirect attack. Indirect attack means that suppression forces would establish a

fireline in a safe and defensible place where they believe the fire can be stopped, and attempt to hold the fire at that location as it came to them. Tactical firing operations are commonly used extensively in indirect tactics. Using indirect tactics often result in more acreage burned (NWCG 1993, page B-59; PF Doc. FF- 16). In addition, as surface fuels and flame lengths increase across the landscape, the likelihood is greater that the fire will climb into the canopy and become a crown fire. Crown fires have the largest immediate and long-term ecological effects and the greatest potential to threaten human settlements near wildland areas (Graham et al. 2004, page 20; PF Doc. FF- 17). The figure below shows an example of how flame lengths can be affected by proposed treatments.

Figure FF-2. Flame length over time.

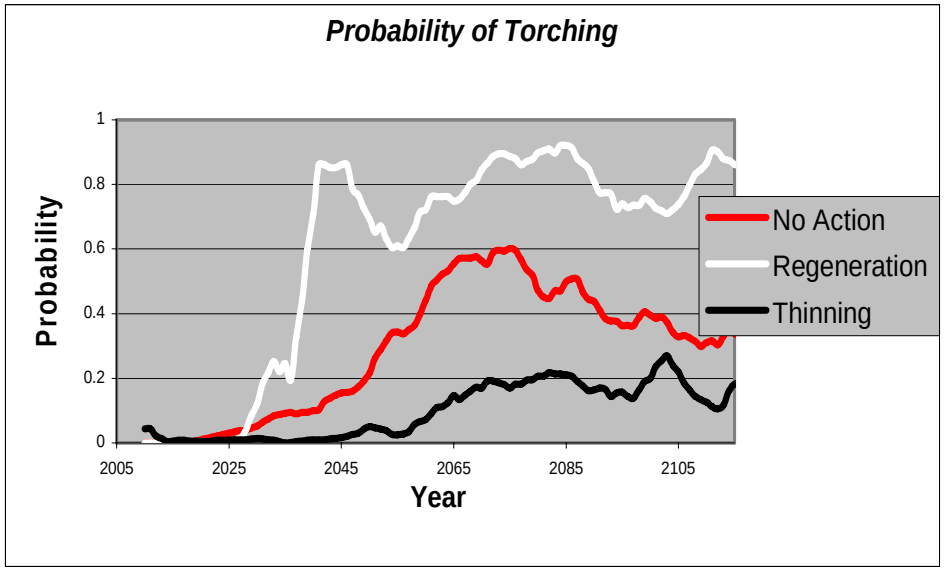


Under the No-Action Alternative, flame lengths in a typical stand would surpass the four-foot mark over time, while with either regeneration or thinning treatments, surface flame lengths remain below 4 feet for much of the modeling period. With thinning or regeneration treatments, flame lengths would increase as slash is created from harvest operations, then subside after slash is treated. Activities under the action alternative would reduce surface fuels and the associated flame lengths. With either of the proposed harvest activities, surface flame lengths are reduced for over 100 years. Although flame lengths vary widely among the stands in the resource area, without management action, they all exhibit the same trend shown in this graph - increasing flame lengths over time as surface fuels build.

B. Probability of Torching and Crowning Index

Effects of thinning and regeneration treatments on crown fire behavior under specific weather conditions are shown in the following figures. These figures describe one representative stand, and effects vary somewhat between stands depending on site conditions and other factors. In general natural and managed stands will show similar trends for these indicators. The probability of torching is the proportion of places where smaller trees are present and torching is possible. The higher the probability of torching, the more ladder fuels and the higher the likelihood that the fire will climb into the tree crowns. The figures below show an example of how torching and crowning can be affected by proposed treatments.

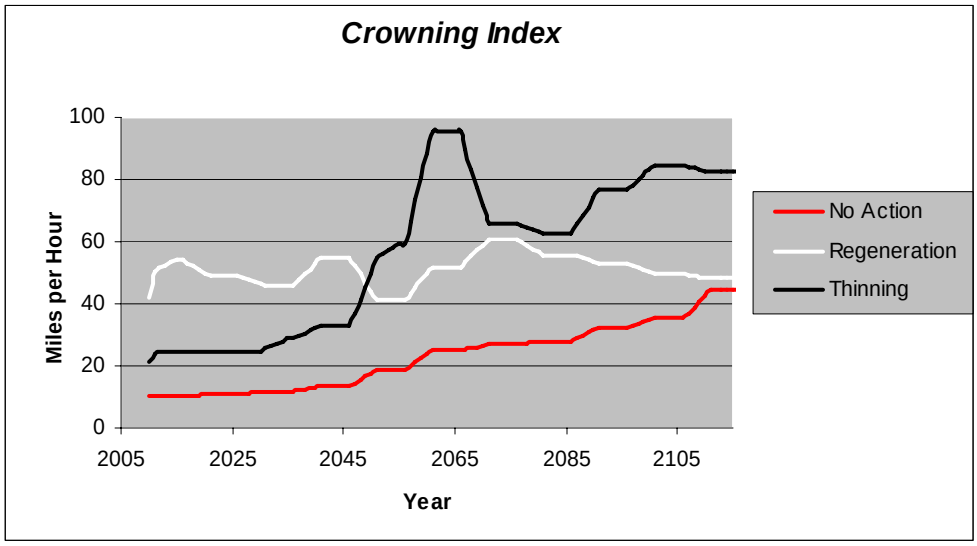
Figure FF-3. Probability of torching.



With no action, the probability of torching will generally increase in a typical stand over time. Thinning and burning reduces the probability of torching because it reduces ladder fuels. Regeneration treatments typically increase the probability of torching because of the abundance of small trees with branches close to the ground. This increased torching hazard in a regeneration treatment is offset by the sparse crown fuels and low crown fire hazard after a regeneration harvest.

The crowning index reflects the density of the tree canopy, and its ability to sustain an active crown fire. **When the crowning index increases, it means that it takes a stronger wind to keep the fire in the crowns of the trees – a higher crowning index means a lower crown fire hazard.** The effects of thinning and regeneration treatments on the crowning index are shown in Figure FF-3. The thinning treatment increases the crowning index compared to no action, i.e. crown fire hazard decreases because canopy fuels and the overall density of the canopy have decreased. The regeneration harvest increases the crowning index even more – there is very little crown fire hazard when crown fuels are sparse, such as after a regeneration harvest. Both the thinning treatment and regeneration treatments provide improvements in crown fire hazard over no action. This is a long-term effect, and if all stands were modeled, some may not show such a significant improvement; however stands would show the same trend of an immediate decrease in canopy fuels that lasts for many years, in most cases.

Figure FF-4. Crowning Index.



Under the No-Action Alternative, a typical stand would sustain an active crown fire with less than 10 mph windspeeds. Thinning would substantially reduce crown fuels, increasing the crowning index and reducing the crown fire potential of the stand. Regeneration harvest reduces the crown fire hazard even more. With no action, the crowning index would remain significantly lower throughout the modeling period, which means that it would take less wind to sustain an active crown fire.

C. Effects Under the No-Action Alternative

Direct and Indirect Effects of the No-Action Alternative

Direct effects (those which are caused by the action and occur at the same time and place) to fire and fuel conditions would be minimal if not absent under the No-Action Alternative, because no activities are proposed under the No-Action Alternative.

The primary effects of the No-Action Alternative would be indirect and cumulative as a result of the ongoing and reasonably foreseeable activities (EA, Appendix A). Surface fuels would continue to accumulate. The successional changes in stand structure that affect fire behavior would also continue on their current trend. Figure FF-5 displays the effects of the process of surface fuel accumulation over time, if no action is taken. Flame lengths would increase over time as the fuel load builds. Flame lengths would surpass four feet within 20 years under the No-Action Alternative. The actual time would likely be less that 20 years in lodgepole pine stands with mountain pine beetle mortality. Although it is possible that wildland fire use will be employed in the future in parts of the Resource Area, it is not a reasonably foreseeable activity, therefore this analysis was completed assuming that the current full fire suppression policy would continue; no natural ignitions would be allowed to burn as wildland fire use fires.

Under the no action alternative, the direct and indirect effects are that the western larch stands would see a much slower transition to higher ground fuels. However, the torching and crowning index would continue to increase. Competition between the trees in these dense stands would result in a gradual self-thinning process as suppressed trees die and fall to the ground. Since western larch does not do well with competition, many of these trees would likely be western larch. Some Douglas-fir, grand fir, and subalpine fir (more susceptable to insects and disease) would also make up part of the future down tree component. Increased ingrowth by more shade tolerant species would increase potential for torching during a fire event. These “ladder” fuels would provide the mechanism to get fire into the crowns of the trees. This could lead to a stand replacing wildfire and loss of the healthy larch component.

With no action, direct and indirect effects are that the very dense stands below Forest Highway 9 would continue to add ground fuels through self-thinning. Torching and crowning index is already high, given the laddering of fuels and the steepness of slopes in some areas. The torching and crowning index would be expected to remain high in these areas as ground fuels increase providing the fire intensity and flame length needed to lead to fire up in the canopy. The intensity of heat generated by a crown fire would make it extremely difficult if not impossible to travel on this section of Forest Highway 9 during a fire event.

Cumulative Effects of the No-Action Alternative

Effects of past fire suppression policy and actions are a primary factor in determining cumulative effect of this project. No-Action represents the continuation of current fire management direction, which means the effects of over 85 years of fire suppression would proceed on their current trend. The No-Action Alternative reflects the continuation of surface fuel accumulation, as well as the changes in fire behavior associated with a change in forest structure and species. Successful fire suppression without prescribed fire causes an increase in amount and continuity of the living and the dead material that fuels fires (Saveland 1998, page 4; PF Doc. FF-18). The continued loss of fire-resistant species would continue to lead to forests that are less resilient to fire, meaning that they could experience more pronounced fire effects and an increased amount of mortality associated with a wildfire.

With No-Action, potential wildfire behavior would continue the trend away from historic conditions, creating an increasing challenge to fire suppression forces, especially in lodgepole pine dominated stands infested with mountain pine beetle. Fire behavior would continue toward more intense levels, and therefore be more dangerous to firefighters. Stands where insect and disease activities are increasing would also contain more snags (and eventually more large down material), which are particularly dangerous for firefighters.

Fire exclusion has many effects that are documented in the publication *Cascading Effects of Fire Exclusion in Rocky Mountain Forests*" (PF Doc. FF- 19). Those effects are summarized here. Fire exclusion causes forest composition to change from early seral, shade-intolerant tree species to late seral, shade-tolerant species. Stand structure also changes from single-layer canopies to multiple-layer canopies. An important stand characteristic that changes with advancing succession in the absence of fire is the increase in the amount of dead and live biomass - forest fuels. Fuels loadings generally increase in the absence of fire because of a myriad of ecological factors. First, long fire return intervals mean live fuels have longer times to grow and dead fuels have longer periods to accumulate on the ground. Next, crown fuels increase because late seral, shade-tolerant species tend to have more biomass in the forest canopy due to their high leaf areas, and biomass tends to be well distributed over the height of the trees. Stand leaf area generally increases over successional time because shade-tolerant species generally have longer needle retention times, higher leaf area/sapwood ratios, and more leaf mass in the crown. Higher leaf area usually requires additional conducting tissue for support, which means a tree often needs to produce more branch and twig wood along greater portions of its stem. Because late seral species are shade tolerant, there are many smaller seedlings and saplings present in the understory to take advantage of any gaps in the canopy. So, the greater crown biomass distributed along greater parts of the stem, coupled with high seedling and sapling densities, creates ladder fuels that allow flames from surface fires to readily climb into the forest canopy and initiate crown fires.

Surface fuel loadings increase as fire is eliminated because the greater crown biomass ultimately results in increased leaf and woody material accumulating on the forest floor because the recycling process of fire is absent. Dense crowns also reduce solar radiation attenuated to the forest floor, which may lower soil temperatures resulting in decreased decomposition rates and still higher branch and litter accumulations. Duff and litter depths generally increase proportionate to the crown closure and leaf area because of the additional needle fall and reduced decomposition.

Landscapes tend to become more homogeneous as fire is removed because succession eventually advances all stands to similar communities dominated by shade-tolerant species. Even though late seral species may differ across a landscape depending on site, the multi-layer structures of these late seral stands are nearly identical across most biophysical settings. Landscape structure (spatial distribution of patches) also changes with fire exclusion as landscapes generally become less fragmented, have lower patch density, and evolve decreased patch diversity, which often results in more contagion, corridors, and large patches. Larger patches and high

homogeneity tend to foster more continuous crown and surface fuels, which can then burn in large fires that create still larger patches and so on in this downward "fire-exclusion" spiral.

Soil properties change as fire effects are reduced and succession advances in an ecosystem. Organic matter generally increases with decreased fire frequency, and this improves pore space, water-holding capacity, and aggregation. However, when soils with thick organic horizons are burned, some of the volatilized organic matter often moves downward and condenses to form a water repellent layer that impedes infiltration and can contribute to massive erosion.

The No-Action Alternative would not reduce fuels in the JoCat Resource Area. No actions would be taken to promote fire resilience in the timber stands, to reduce fuels along Forest Highway 9, or to decrease future fuel loadings in mountain pine beetle infested lodgepole pine stands.

Under the No-Action Alternative, Fire Regime Condition Class would not improve at the stand or landscape scales, and lack of management activities would continue to trend the landscape towards Condition Class 3. This approach would not re-introduce the effects of fire; restore vegetation composition/structure; or trend fuels to resemble the landscape's natural (historical) range.

D. Effects Under the Action Alternative

Under the Action Alternative, all harvest treatments would be followed by fuel reduction treatments as required in Forest Service Policy and Forest Plan Standards. Underburning and jackpot burning would be the primary treatments, although mechanical methods (such as grapple piling and burning) and hand treatments (such as lop and scattering slash and hand piling and burning) would be used. Jackpot burning is similar to underburning. Jackpot burning focuses more on fuels concentrations where as underburns attempt to get a continuous fire across the entire treatment unit. For ease of discussion, underburning will refer to either treatment. Activities that reduce surface fuels (low vegetation, woody fuel, shrub layer) decrease the chances that a surface fire would be able to ignite ladder fuels and canopy fuels (Graham et al. 2004, page 23; PF Doc. FF- 17).

Treatments under the Action Alternative would be consistent with and would further the goals of the 10-Year Comprehensive Strategy Implementation Plan (www.fireplan.gov) to reduce hazardous fuels and restore fire-adapted ecosystems. Treatment units range in size, which is an important aspect of landscape and fuel variability. Discontinuities in surface, ladder and crown fuels interrupt fire spread, but relatively small patches may not have a substantial effect on relatively large fires. Treatments of individual stands under a given prescription would probably be irrelevant to fire behavior and effects at the landscape scale, because wildfires are often larger than individual treatment units (Finney and Cohen 2003, page 356; PF Doc. FF- 20). Some treatments proposed span several stands and therefore may be large enough to affect the ability to control a large fire in a localized area. Retention of some beetle mortality areas would reduce overall effectiveness of fuel reduction treatments across the treatment area, however most of these retention areas are higher in the basin and closer to major ridge lines that may slow fire runs.

Direct and Indirect Effects of Prescribed Burning Under the Action Alternative

Prescribed burning after timber harvest is an important aspect to fire and fuels considerations of the Action Alternative. Prescribed fire can effectively alter potential wildfire behavior by influencing multiple fuel bed characteristics (Graham et al. 2004, page 24; PF Doc. FF- 17), including:

- Reducing the loading of fine fuels, duff, large woody fuels, rotten material, shrubs and other live surface fuels, which together with compactness and continuity change the fuel energy stored on the site and potential spread rate and intensity.
- Reducing horizontal fuel continuity (shrub, low vegetation, woody fuel strata), which disrupts growth of surface fires, limits buildup of intensity, and reduces spot fire ignition probability.
- Increasing compactness of surface fuel components, which retards combustion rates.

Activities under the action alternative would reduce surface fuels and the associated flame lengths. As

previously described, with thinning or regeneration treatments, flame lengths would increase as slash is created from harvest operations, then subside after slash is treated. With either regeneration or thinning treatments, surface flame lengths are expected to remain below 4 feet for a long period of time when prescribed burning follows treatments. In most cases, this would allow for direct attack suppression by hand crews should a wildfire occur.

Prescribed burning is required to be implemented using a prescription and detailed burn plan in order to control and predict the effects of the fire. Common effects of prescribed burning include surface fuel reduction, understory and overstory mortality, duff consumption, soil heating, and mineral soil exposure. Although prescribed burning creates smoke that contains particulate matter, the proposed activities would substantially reduce the PM2.5 (particulate matter less than 2.5 microns in size) emissions of potential wildfires (PF Doc. FF- 14).

The effects of a prescribed fire can be controlled by careful ignition in the appropriate weather conditions. Weather conditions, however, cannot be predicted with total accuracy, so there is some risk of escape with every prescribed fire that is ignited. The presence of private land in the JoCat Resource Area slightly increases the values-at-risk, and dictates very careful implementation of any prescribed burning. Many prescribed burns have been carried out in the Coeur d'Alene River Ranger District in the past, and based on that history, it is reasonable to expect that prescribed burning under the Action Alternative would be implemented safely and effectively, with little effect to private property.

The boundaries of the proposed treatment areas were established, where possible, with consideration of the prescribed burning to occur after the harvest, and will likely allow efficient ignition and control of prescribed fires. Whenever possible, changes in aspect and shaded draws would be used as boundaries; these areas often have higher fuel moistures (especially in the spring), and in many cases burn with very little intensity, if at all. Natural fuelbreaks, provided by current areas of low fuels loading, will be utilized in many areas. Constructed fireline would be used to contain prescribed burns when necessary (a machine fireline will be utilized to separate unit 5 which will be underburned from unit 6 which will have lopped and scattered logging slash mixed with advanced regeneration). Even with careful forethought and planning, prescribed burning can be uncertain, and small burned areas outside of the designated treatment areas should be expected. These "slop-overs" are commonly of low fire intensity, relatively small (less than 1 acre), quickly contained, and result in insignificant effects. This is likely to occur along the midslope roadless area boundary where units 8 and 15 will have prescribed fire introduced. Fire is only expected to burn a few hundred feet into the roadless areas. The fire would be expected to be low intensity. Some fire in this area may have some benefits of feathering the edges of the proposed treatment units along this boundary.

Direct and Indirect Effects of Commercial Thinning Under the Action Alternative

The Action Alternative includes commercial thinning harvests. Tree thinning by commercial harvesting can reduce vertical and horizontal continuity of the tree canopy and limit initiation and spread of crown fires, especially when done in conjunction with prescribed burning (Finney 2005, page 1720, PF Doc. FF- 21). However, any canopy removal could have the adverse effect of increasing potential mid-flame wind speed, thus increasing flame lengths and spread rates. Scott and Reinhardt (2001, pages 31-32; PF Doc. FF- 22) have addressed this subject. They state, "The increased fuel-level wind speed coupled with increased insolation also leads to lower dead fuel moisture in treated stands during summer. These two factors tend to exacerbate surface fire behavior. However, properly executed treatments also tend to reduce the crown fire potential. Crown fire mitigation treatments often represent a tradeoff – the decrease in crown fire potential comes at the expense of increased surface fire spread rate and intensity. The greatly increased spread rate and intensity of crown fires makes this tradeoff reasonable."

The relationship between the forest canopy, surface fuel moisture, soil moisture and fire behavior and effects is complex and has many aspects which must be considered when determining effects. In addition to those site factors that remain constant, current weather, season of the year, presence of drought and the characteristics of the fire in question are all very important but highly variable factors that influence fire behavior and effects.

The thinning by timber harvesting included under the Action Alternative would immediately cause an increase in surface fuel loading, as well as an immediate decrease in ladder and crown fuels. The unmerchantable branches and other fuels that are left after harvest will substantially increase the fuel load, and consequently the potential flame lengths on any given site. This fuel load would then pose a slash fire hazard for a short period of time (one to three years), until the fuel on the site was treated with an underburn or other slash treatment method such as grapple piling and burning. Once treated by prescribed fire, the fuel hazard is dramatically decreased for some time.

Depending on the amount of fuel on the site and the potential effects of a prescribed burn to the remaining overstory, several methods may be used to control the effects of a prescribed burn. Slashing of the understory, protection of leave trees by pulling slash away from their boles, and piling and burning of slash are possible methods that could be used to decrease the slash load on a site and prepare the site for safe and efficient underburning.

Any type of human activity increases the possibility of ignition and wildfire. Common ignition sources include equipment and vehicle operation, smoking, and arson. A timber sale contractor is required to have fire suppression equipment on site and to take necessary fire precautions to prevent a wildfire from occurring. In the event of extreme fire conditions, harvest activities would be regulated or suspended until conditions improved. A timber sale administrator closely monitors the fire prevention requirements of the timber contract throughout the timber harvest operations.

Commercial thinning under the action alternative should result in an improvement in Fire Regime Condition Class in the western larch dominated stands. The removal of competition from other tree species and subsequent burning treatments would mimic in many ways a natural, mixed severity fire. Because of its tolerance to fire, a predominance of western larch in a stand may give future fire managers an option to use management ignited fire as a tool in these stands to maintain low ground fuel loading and reduce brush and shade tolerant tree in-growth and tend to move the stand back toward Condition Class 1 .

Direct and Indirect Effects of Lodgepole Pine Removal and Salvage Harvests Under the Action Alternative

The Action Alternative includes the removal of mountain pine beetle infested lodgepole pine and trees likely to become infested in the immediate future. All removal harvests are followed by activity fuel reduction treatments, in this case underburning, so they both result in a reduction in surface fuels once activities are completed. Salvage and overstory removal units will have logging slash lopped and scattered. This treatment gets the fuels on or close to the ground surface so they will decompose more quickly. As previously discussed, the natural process of dead trees falling to the forest floor has many adverse effects when it occurs over a short period of time and on a large scale as is the usual result of an insect epidemic. Obviously, removal of the potential source of heavy fuel loads greatly reduces those adverse effects.

If the potential fuel loading is greatly reduced, remaining trees that die will likely be in contact with the ground soon after falling, speeding the decomposition process. Scattered tree boles and tops do not present a dangerous barrier to firefighters needing to travel to a safety zone, and fireline construction is not significantly impeded. Firefighters are used to dealing with a “normal” amount of snags that occur in natural stands not effected by high levels of insect and disease activity, and can mitigate those safety hazards with a moderate amount of work and associated risk. Firefighter supervisors are more willing to directly attack fires when such safety considerations are more manageable.

Salvage harvesting will probably not result in a change from Fire Regime Condition Class 2 or 3 to Condition Class 1 because the stands would not change from a late-seral to an early-seral structural stage. Removal harvest treatments would change condition class at the stand level with the re-introduction of fire through prescribed burning, but would not change the overall condition class at the landscape level.

Direct and Indirect Effects of Fuel reduction below FH 9 Under the Action Alternative

Heat and smoke greatly effect the ability of public or emergency vehicles to use travel routes during a wildfire event. By reducing the fuel loading near a public road that is likely to be a main travel route in an emergency event, public safety is aided. The Action Alternative would likely reduce potential fire behavior to flame lengths of less than 4 feet and the potential for crown fire nearly eliminated along the treated areas adjacent to FH 9 and a much safer situation would be created. As previously stated, the Action Alternative will further the goal to provide safe travel routes and protect vital infrastructure that is stated in the Shoshone County Fire Mitigation Plan.

This specific fuel reduction treatment will not result in a change in Fire Regime Condition Class because it will not change the structural stage, overstory canopy cover, or species composition of the treated areas. It is also very limited in extent and will only affect portions of the treated stands.

E. Cumulative Effects under the Action Alternative

Cumulative effects are those that would result from the Action Alternative in addition to the incremental impacts of past, ongoing and reasonable foreseeable actions (described in the EA, Appendix A). Fire suppression is the primary action to be considered when evaluating cumulative impacts in the fire/fuels analysis. The Action Alternative would take steps to counteract the effects of fire exclusion as previously noted, with the reduction of future heavy fuel loading. The trend of fire behavior and effects away from historical conditions would be interrupted, since early seral, less dense, single layer canopies would be promoted. Dead and live biomass in the form of surface and crown fuels would be reduced, and in many cases, ladder fuels would also be reduced for a period of time. Treatments designed to increase the proportion of fire-resistant tree species such as western larch in stands will enhance stand fire resilience because these trees typically have thicker bark, taller crowns, and a higher canopy base height (Graham et al. 2004, page 36; PF Doc. FF- 21).

Research also suggests that fire growth and severity of a large wildfire under extreme weather conditions were mitigated by fuel treatments that included prescribed burning. Longevity of treatment benefits was suggested to improve with unit size. Observations of fire movement near fuel treatments indicate that overall fire growth and large fire sizes can be reduced (Finney 2005, page 1721, PF Doc FF-21). The action alternative contains some conjoined units that will take advantage of the potential decrease in fire behavior associated with treatment of larger areas.

It is almost impossible to separate indirect effects from cumulative effects when fire suppression is considered. Fire suppression has been effective in the JoCat Resource Area for over 85 years, and the incremental effect of suppressing each small fire in the watershed would have (over time) promoted late seral species rather than early seral species, changing the historical structure of those stands, which in turn would change the way they would respond to fire (Zack and Morgan 1994, page 32; PF Doc. FF- 13).

The reduction in fuels under the Action Alternative would alter potential fire behavior and intensity, and could also affect fire severity. Activities under the Action Alternative would promote early-seral, fire resistant species such as western larch, which are more likely to survive even intense fires, reducing future potential fire severities. Even if the larch were killed in a fire, it is possible that the seeds would survive to regenerate the stand with early-seral species. Without species such as western larch on-site, natural regeneration of that species after a wildfire would be much less likely.

The planned harvest treatments in the Resource Area may create or maintain a desirable mosaic of vegetation in the resource area (Brackebusch, PF Doc. FF- 23). Fuel mosaics can result in delayed fire spread or reduce fire intensity, reducing the risk of unwanted fires escaping initial attach. Brackebusch recommends that these mosaics be tied to natural, fire resistant features of the terrain. However, in certain extreme weather conditions, fires often spread by long distance spotting and are not controllable despite previous fuel management activities.

The spatial arrangement of vegetation influences the growth of large fires. Patches of vegetation that burn relatively slower or less severely than surrounding patches can reduce fire intensity, severity, or spread rate, or may force the fire to move around them by flanking (at a lower intensity), which locally delays the forward progress of a fire (Graham et al. 2004, page 29; PF Doc. FF-17).

It is neither possible nor desirable to "fireproof" fire-dependent ecosystems, but active land management can reduce potential effects of severe fire. Federal land management agencies can mimic natural disturbances, but it is essential for managers to consider that current conditions may be considerably different from those conditions that occurred historically. Reintroduction of native processes such as fire without modification of structural patterns, fuel loadings, and spatial distributions can produce unpredictable and undesirable effects (Quigley et al. 1996, pages 165 and 184; PF Doc. FF- 24). Multiple treatments may be needed to regulate vegetation structure, composition, and associated biomass loadings. Long management horizons may be required to restore unhealthy ecosystems to more sustainable conditions. The most effective means to restore long-term forest health would be through managing tree density, species, and fuels to improve the dominance and distribution of seral species (Harvey, et al. 1995; PF Doc. FF- 25).

Because of the uncertainty involved in prediction where a fire will start and which way it will spread, the more acres that are treated to reduce fuels across a landscape, the better an alternative will be at reducing the likelihood of an uncontrolled wildfire.

Activities under the action alternative would likely affect the Fire Regime Condition Class in treated stands by restoring fire effects, altering current vegetation composition/structure and fuels to more resemble the landscape's natural (historical) range. Treated stands would move toward Condition Class 1, rather than the current trend toward Condition Class 2 and 3.

Cumulative Effects on Private Lands

Timber harvest on private lands tends to remove trees of highest economic value and typically removes large fire-resistant seral species. Natural regeneration is often relied on to fill created openings, which usually favors shade-tolerant Douglas-fir and grand fir over early seral species such as ponderosa pine and western larch, which are more fire resistant. Logging slash can remain untreated on the site, contributing to higher fire intensities should a wildfire occur. However, there is documentation that post harvest fuels treatment and planting to seral species is occurring in some areas. Harvest activities on private lands are inspected by the Idaho Department of Lands to determine if logging slash disposal meets the Idaho Forest Practices Act, however slash reduction methods on private lands rarely involves underburning techniques commonly used by the Forest Service.

4. Consistency With Forest Policy and Legal Mandates for Fire/Fuels

The Forest Plan (PF Doc. CR-002, page II-38) identifies two standards regarding fire management.

Forest Plan Fire Management Standard #1

Fire protection and use standards are specified by management area. Cost effective fire protection programs will be developed to implement management direction based on on-site characteristics that effect fire occurrence, fire effects, fire management costs and fire caused changes in values.

Forest Plan Fire Management Standard #2

The Fire Management Action Plan will be guided by the following Forest-wide standards:

a. Management area standards.

b. Human life and property will be protected.

c. Fire will be used to achieve management goals according to direction in management areas. Implementation guides will be prepared for prescribed fire projects and programs identified in Table 10 (Forest Plan Appendix F) using unplanned ignitions.

d. Management area standards will be used in Escaped Fire Situation Analyses (now called a *WFSA-Wildfire Situation Analysis*) as a basis for establishing resource priorities and values.

e. The appropriate suppression response for designated old-growth stands in all management areas except in wilderness will result in preventing the loss of old growth. Fire policy in relation to old growth within wilderness will be provided in specific management direction developed for each wilderness area.

f. Activity fuels will be treated to reduce their potential rate of spread and fire intensity so the planned initial attack organization can meet initial attack objectives.

g. Forest Fuel Management Fund expenditure priorities are:

   (1) Natural fuels that pose a threat to human life and property

   (2) Unfunded activity fuel projects

   (3) Areas where fuels/fire behavior is a threat to management area objectives

Following is a description of how each alternative meets these Forest Plan standards. Forest Plan standards 2d and 2e relate to wildfire suppression policy and requirements that are outside the scope of this project, and therefore compliance with these standards is not described. This project does not determine Forest Fuel Management project expenditure priorities, so compliance with standard 2g is not addressed.

No-Action Alternative

The No-Action Alternative would not use prescribed fire to help meet the goals of the management areas within the resource area. The alternative would not help develop cost-effective fire programs because it would allow far more intense potential fire behavior to exist in stands that, with treatment, would primarily exhibit low intensity, easily controlled fire behavior. Under the No-Action Alternative, severe fire effects, large wildfire management costs, and fire caused changes in values could reasonably be expected; these results could likely be prevented or reduced with actions that treat forest fuels.

The continued succession of fuels and vegetation, mortality from insects and disease, and the exclusion of fire would create areas where the trend in fire behavior characteristics would in time be inconsistent with the goals, objectives and standards established in the Forest Plan. No activity fuels would be created under the No-Action Alternative, so there is no need to treat activity fuels, which is consistent with the Forest Plan.

Action Alternative

The Action Alternative would use timber harvest, prescribed fire, and hand fuels treatment to help meet the goals of the management areas within the resource area, consistent with the Forest Plan and the Shoshone County Wildland Urban Interface Fire Mitigation Plan. The alternative would help develop cost-effective fire programs by making substantial progress toward reducing potential intensities of wildfire in areas affected by past fire suppression. By inference, the more area treated to restore and maintain stands toward historical species composition, the better the alternative meets the Forest Plan goals. The Action Alternative would best meet the goals, objectives and standards of the Forest Plan because it would reduce the severity of fire effects, the costs of potential wildfire, and fire-caused changes in values on the treated acres. Treatments under the Action Alternative would begin to trend stands away from potential fire behavior that could threaten human life and property in the resource area. The activity fuels created would be treated in a manner that is consistent with the standards of the Forest Plan.

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Report on Forest Vegetation Related to the Proposed Jo-Cat Resource Area Project

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SPECIALIST'S REPORT ON FOREST VEGETATION IN THE JO-CAT RESOURCE AREA

1. Regulatory Framework for Forest Vegetation

The regulatory framework for the management of vegetative resources on the Idaho Panhandle National Forests includes the:

- *1987 Forest Plan for the Idaho Panhandle National Forests*
- *Multiple-Use Sustained Yield Act of 1960*
- *Endangered Species Act of 1971*
- *National Forest Management Act of 1976 (NFMA)*
- *Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA)*
- *Idaho Forest Practices Act*
- *Forest Service regulations and policy*

Consistency with specific Forest Plan standards and vegetative/silvicultural requirements of RPA and NFMA is provided in section 5 of this Forest Vegetation report. Forest Plan Management Areas (MA) in the Jo-Cat Resource Area are displayed in the table below.

Table VEG-1. Forest Plan Management Areas in the Jo-Cat Analysis Area.

Forest Plan Management Allocation	% of Jo-Cat Resource Area
1 – timber production emphasis	51
9- unsuitable for timber production	48
16 – aquatic habitat emphasis	1

Note: as part of this analysis, the MA 9 allocation was verified

2. Methodology Used in the Forest Vegetation Analysis

2.A. Scale of the Forest Vegetation Analysis Area

The geographic area used for the analysis of existing vegetative conditions and to assess effects to forest vegetation follows the Jo-Cat Resource Area boundary (2,106 acres Forest Service and 159 acres private lands), except when discussing allocated old growth. The analysis area for allocated old growth follows the boundary of Old Growth Management Unit (OGMU) 113 (7,969 acres) (PF Doc. VEG-2). Where appropriate, information is provided at both the resource area scale, old growth management unit scale and the Coeur d'Alene River Basin scale to provide a landscape perspective.

2.B. Analysis of Forest Vegetation Conditions

Methodology for Analysis of Existing Forest Vegetation Conditions

The interaction of successional development (as represented by habitat types in Copper et al., 1991, PF Doc. VEG-R1; USDA, 1997 PF Doc. VEG-R15 and Smith and Fisher, 1997, PF Doc. VEG-R16) and disturbances such as fire, insects, diseases, and human influences result in the species composition, structure and landscape arrangement of an ecosystem (PF Doc. VEG-5 and VEG-11). Clearly, existing conditions reflect past natural disturbances and management activities.

This analysis uses various landscape scales to set the context of stands (and treatments) within the context of the Resource Area and the Coeur d'Alene River Basin. Part of this analysis includes a comparison to reference conditions developed in the Geographic Assessment for the Coeur d'Alene River Basin (USDA

IPNF, 1998; PF Doc. CR-025). The purpose of the Geographic Assessment was to develop a scientifically-based understanding of the processes and interactions occurring in the Coeur d'Alene River Basin, so that management activities can be developed to promote healthy and resilient ecosystems. In order to maintain healthy, sustainable ecosystems, it is important that species are well adapted to the environmental variability inherent in the ecosystem and to maintain forest structures necessary to support ecosystem diversity and productivity. The Geographic Assessment for the Coeur d'Alene River Basin (USDA IPNF, 1998, pp. 28-31, 33, 36-40; PF Doc. CR025), concluded that the basin lacked health and resilience due to a substantial reduction from reference conditions in western white pine, ponderosa pine and western larch; a reduction from reference conditions in old forest structure; and an increase in smaller patches across the basin, with shrub/seedling/sapling stands demonstrating the largest decrease in size. These findings are consistent with the Columbia Basin Assessment (ICBEMP, 1997, pages 37 and 59-67; PF Doc. VEG-R10), the Northern Region Overview (USDA, 1998, PF Docs. VEG-R8 and VEG-R9), and Analysis of the Management Situation for the Revision of the Kootenai and Idaho Panhandle Forest Plans (USDA, 2003, Chapter 3; PF Doc.VEG-R21). The Jo-Cat Resource Area is consistent with these findings; however, this Resource Area is relatively small (0.28% of the basin), has proportionally more cool habitats, was entirely burned in 1910 and has more lodgepole pine than the average condition of the Coeur d'Alene Basin.

In terms of vegetation, the Geographic Assessment identified the risks associated with conversion to shade tolerant, drought and fire intolerant species from shade intolerant, drought and fire tolerant species. Since a single resource risk cannot be considered in isolation, the Geographic Assessment identified the risks to hydrologic, aquatic, wildlife and recreation along with the interrelationships of these risks. The Geographic Assessment proposed a strategy for risk management that strove to be both integrated and adaptive. This approach is consistent with Interior Columbia Basin Ecosystem Management Project (ICBEMP). The project interdisciplinary team considered these recommendations as they developed the proposed action. The Geographic Assessment found that vegetative restoration and watershed restoration, with wildlife as an additional issue are a priority for restoration.

Another facet of the Jo-Cat forest vegetation analysis included development of a desired condition for forest vegetation in the Jo-Cat Resource Area (PF Doc. VEG-8). It is based the Jo-Cat Resource Area using direction from the Forest Plan and tiering from data and recommendations from the Geographic Assessment and UCRB. This desired future condition was used for comparing the present condition of the Jo-Cat Resource Area with anticipated conditions under the No-Action and Proposed Action over time.

Methodology for Analysis of Effects to Forest Vegetation

Of primary concern in terms of forest vegetation in the Jo-Cat Resource Area is the need for a healthy and resilient forest ecosystem. A healthy and resilient forest ecosystem will supply the balance of species composition, structure, landscape arrangement, growth and health sufficient to meet the multiple resource objectives for this Resource Area including wildlife, recreation, aquatics, fire/fuels, visual quality, etc. The forest vegetation analysis addresses two key issues in the Jo-Cat Resource Area: forest composition and forest structure (current condition and desired future condition at the Jo-Cat scale within the context of the Coeur d'Alene basin). In addition, this vegetative analysis will focus on the extent the proposed action addresses the 3 main issues in the Purpose and Need: recover a portion of the timber value being lost and projected to be lost to mountain pine beetle attacks; promote long term western larch resiliency; and reduce potential fire intensities while maintaining the general visual character along the SRPZ (Secondary Resource Protection Zone) travel corridor in Jo-Cat. A mountain pine beetle outbreak has been taking place for several years in the area and is expected to continue until host depletion. The immature sawtimber size western larch in the resource area presents a unique opportunity to contribute both to the long lived seral species composition and the likelihood of the long lived seral areas becoming old structure. Fuel loads resulting from insect-killed trees is a management concern.

Forest composition is indicated through stand changes in:

- *Percent forest cover type (specifically from Douglas-fir and grand fir to the long-lived early seral species - western larch and white pine), either by basal area dominance in stands of trees greater than 5 inches diameter at breast height, or by trees per acre in stands up to 5 inches diameter at breast height*
- *Portion of resource area with lodgepole pine and mountain pine beetle mortality as well as the amount of harvest in lodgepole with mountain pine beetle mortality*
- *Opportunities to improve resiliency of existing white pine or western larch and how treatments address these opportunities.*

Forest structure is indicated through stand changes in:

- *Percent of the area in each structural stage (shrub/seedling/sapling, small to medium timber, and mature/large timber)*
- *Opportunities to maintain/improve long-lived early seral species (western larch) resiliency in order for it to reach old structures.*
- *Landscape arrangement, as measured through change in patch sizes.*

1.5% (32 acres) of the Jo-Cat Resource Area is allocated as old growth. No alternative proposes treatments in allocated old growth.

Allocated old growth is addressed as part of the forest structure analysis (as a subset of the mature/large timber stage). The definitions for old growth and the direction for allocation of old growth are from the 1987 Forest Plan (USDA, 1987; PF Doc. CR002), the Regional Task Force Report "Old Growth Forest Types of the Northern Region" (Green and others, 1992, corrected 2/2005; PF Doc. VEG-R20), and Forest Supervisor letters of direction for implementing old growth standards (PF Doc. VEG-28). The table below is a synopsis from Green and others, 1992 (corrected 2/2005) to display some of the minimum standards used as part of the definitions for old growth types in the OGMU 113 — clearly these are not the only considerations for old growth allocation (see full document Green and others, 1992, corrected 2/2005; PF Doc. VEG-R20).

Table VEG-2. Minimum Standards for Old Growth Types in the Jo-Cat Analysis Area *(see* Green and others, 1992, corrected 2/2005*; PF Doc. VEG-R20).*

Forest Type	Habitat Group	Minimum # of trees per acre greater than threshold diameter (dbh)	Large tree threshold diameter (dbh)	Minimum age of large trees (years)	Minimum basal area (square feet/acre)
ponderosa pine, Douglas-fir or western larch	warm-dry	8	21"	150	40
Douglas-fir, grand fir, western hemlock, western larch or white pine	moderately warm-moist	10	21"	150	80
subalpine fir and mountain hemlock	moderately warm-moist and cool-moist	10	17"	150	80
subalpine fir and mountain hemlock	cool-dry	10	17"	150	60

The old growth definition is considered valid when taking into account recent scientific information. In addition, the desired future condition for vegetation takes into account restoration of old growth, as part of the broader mature, large timber structural stage.

The review of OGMU 113 used Forest Plan definitions and standards and followed a 4-step methodology which included:

1) *a detailed review of allocated old growth in OGMU 113 in TSMRS (VEG-32);*
2) *a detailed review of all stands in OGMU 113 to search for stands not previously allocated that currently meet allocation definitions and could be allocated (VEG-31);*
3) *the wildlife biologist and silviculturist reviewed landscape arrangement and consistency with Forest Plan Old Growth Standards, before final allocation in the OGMU was made (see VEG-34). In addition, August 2004 digital aerial photos were used to determine if changes (natural or man caused) had occurred that may change allocation since the last field exam. (Current landscape arrangement info (patch/block analysis) VEG-35); and*
4) *as part of the effects analysis, a review of proposed treatment units for potential old growth definition criteria also was accomplished (VEG-37).*

Validation of the data items used for old growth allocation is provided in PF Doc. VEG-4.

2.C. Information Sources and Other Tools Used in the Forest Vegetation Analysis

The purpose and need of this resource analysis is focused on:

- treat areas with current and high risk of mountain pine beetle mortality;
- enhancement of current component of western larch; and
- reduction of potential fire intensities along SRPZ travel corridor.

Field reconnaissance was used as the primary tool to analyze the effects of treatments in reference to the purpose and need. This was possible because the resource area is relatively small (<2200 acres National Forest lands) and the purpose and need is focused. This field reconnaissance was accomplished by the certified silviculturist and experienced field foresters, technicians and entomologists. Field notes are found as part of the silvicultural diagnosis at PF Doc. VEG-3.

Other data items used for this analysis include: a) stand data from TSMRS and FSVeg (stand forest type, size class, habitat type, past harvest, stand basal area, stand tree per acre and tree age, old growth allocation (TSMRS special use code)); b) insect and disease aerial detection flight information; c) soils landtype derived vegetation response units (VRU); d) precipitation maps from the State of Idaho; and e) FIA data. For all items above except TSMRS and FSVeg, information collection methodology and data reliability are found in the project file under the respective categories.

The **timber stand management resource system (TSMRS) database** contains management information for National Forest System lands. PF Doc. VEG-4 includes a detailed description of individual data items used for the Jo-Cat analysis, methods to gather this data and a validation of the data items using combinations of recent stand exams, field reviews and aerial photo reviews.

ArcView/ArcMap spatial computer software was used extensively to analyze existing conditions and the proposed action. Copies of the base maps used (along with data associated with map polygons) are found in PF Doc. VEG-2. In addition, a stand base map and basic stand data as well as explanations on how to use available IPNF GIS data sets is found at http://www.fs.fed.us/ipnf/eco/yourforest/gis/index.html#veg.

Professional knowledge and experience with local silviculture, insects and disease conditions and outcomes as well as various silviculture, ecology, fire/fuels and insect and disease **references** were used to develop this specialist report. Some references are listed at the end of this report. A more extensive list of vegetative references is found in the reference portion of the project file for this specialist report. These references in addition to an even longer list of references not found in the project file are combined with specialist experience to allow a full range of vegetative information and understanding.

3. Overview of Vegetative Conditions in the Jo-Cat Resource Area

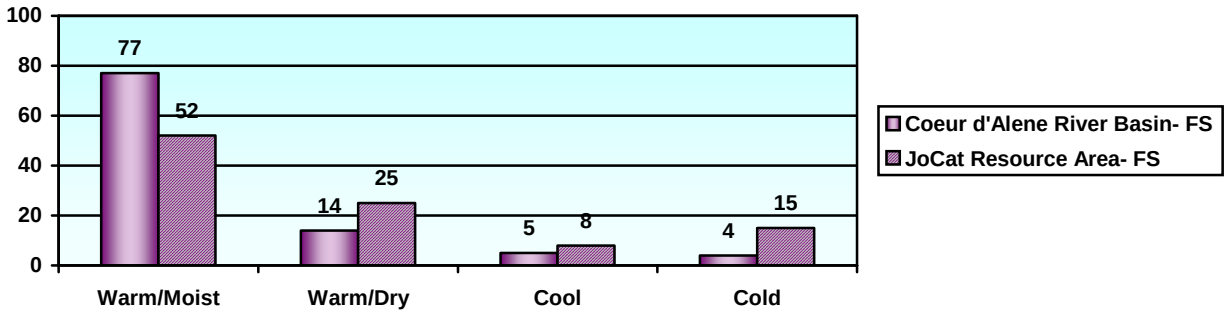
3.A. Setting

Vegetation is a fundamental part of terrestrial ecosystems. More than 80 years of fire research have shown that physical setting, weather and fuels combine to determine wildfire intensity and severity. Of these three factors, fuel (vegetation) is the only factor that can be changed through management (Graham et al., 2004, page iv; PF Doc. VEG-R13). Vegetation is a basic element of wildlife habitat and is a critical factor regulating hydrologic regimes. Ecosystem vegetative structures are a function of climate, physical site, seed and/or plant species available in an area, disturbance history and successional processes between disturbances. Most landscapes are a mosaic reflecting the interaction between disturbance history and succession. This interaction is a keystone process shaping the landscape vegetation mosaic (Zack and Morgan, 1994, page 5; PF Doc. VEG-R14). This Jo-Cat vegetative overview will summarize soils, climate and patterns of successional development and disturbance in terms of general trends based on habitat type groups.

The vegetation in northern Idaho is a result of the productive ash cap soils and the prevailing climatic pattern. The loess, ash cap soils range from 6 to 16 inches deep across the Coeur d'Alene River Basin. These soils are highly productive due to both the availability of elements and ability to hold moisture. Of note is the current scientific hypothesis related to tree disease susceptibly and the availability of particular elements from specific meta-sedimentary parent materials/rock types, such as potassium. Further discussion of this subject is found in the Soils Specialist Report. All resource activities maintain soil productivity by abiding with the Forest Plan Standards, the Soil Nutrition Guidelines from the Soil Nutrition Cooperative (PF Doc. VEG-41 and SR-17) and guidelines listed in the prescription associated with minimum levels of soil moisture for prescribed burning and coarse woody debris (see Soils Specialist Report for more detail).

The climatic pattern for the area is characterized by westerly winds that carry maritime air masses from the northern Pacific across the northern Rocky Mountains during winter and spring. Precipitation occurs mainly between November and February, with only 12 percent of the annual precipitation occurring between July and September (USDA, 1998, page 12; PF Doc. CR-025). The inland maritime airflow provides northern Idaho with abundant moisture (25-60 inches per year) and moderate temperatures. Located close to the Idaho/Montana divide in the east central portion of the Coeur d'Alene River Basin, the Jo-Cat Resource Area receives an average of approximately 50 inches of moisture annually (PF Doc. VEG-39).

Figure VEG-1. Percent Habitat Type Groups on National Forest System lands in the Coeur d'Alene River Basin and the Jo-Cat Resource Area comparable Vegetative Response Units (VRU's) (PF Docs. VEG-10 and VEG-5).



3.B. Ecosystem Disturbances

Ecologist Aldo Leopold once referred to ecosystem health as the capacity of the land for self-renewal. Forest health has been defined as the condition of a forest when it is: resilient to change; biologically diverse over a large area and able to provide a sustained habitat for vegetation, fish, wildlife and humans (Deffer-Robinson et al, 2006, PF Doc. VEG-R69). Resiliency is the ability of the ecosystem to respond to disturbances. Resiliency is a measure of repetition or redundancy of ecosystem processes and therefore an indicator of ecosystem fragility (Borman and Likens, 1979 in: Toman and Ashton, 1996, page 370; PF Doc. VEG-R33). Resiliency is one of the characteristics that enable the ecosystem to persist in many different states or successional stages. For this analysis, ecosystem disturbance agents include fire, insects, disease, and timber harvest.

Figure VEG-2. 1910 Fire occurred in many areas of the Coeur d'Alene River Basin and the Jo-Cat Resource Area.

Although fire is often discussed in context to habitat type groups (Figure VEG-1) an additional broader picture of fire as a disturbance agent and its spatial and temporal characteristics at various basin and watershed scales is needed. Prior to European settlement in the Coeur d'Alene River Basin, fire was the most important disturbance occurring across the landscape. Fire in this landscape is characterized as a mixed severity fire regime.

The historic mixed severity fire regime is complex with both fuels and climate as major influences (Schoennagel, Verlen and Romme, 2004; PF Doc. VEG-R25). Zack and Morgan (1994; PF Doc. VEG-R14) describe fire history within the Coeur d'Alene River Basin (1.5 million acres in size, of which three quarters of a million is managed by the Forest Service). Their report indicates that fires covering greater than five percent of this forest occurred on an average of once every 20 years. Overall, Zack and Morgan (1994; PF Doc. VEG-R14) found there was great variation in fire frequencies, patterns and fire severity on the landscape scale. The variation in fire severity was due to different fuel types, burning conditions and terrain that allowed individual trees, patches of trees, and snags to survive even through the most severe fires. These remnants became the seed source for the regeneration following the fires. Large patch size (tens of thousands of acres) of stand replacement fires was a common pattern throughout the basin over long periods of time, often burning entire watersheds or groups of watersheds in a single event. While this pattern was dominant, other non-stand replacement fires, as well as various insects and diseases, and the variable patterns of species and seed source left by stand replacement fire, would tend to create complexity to the more or less homogenous patches left by stand replacement fires.

Historic mining took place in the Upper Prichard drainage in the 1870 to 1900 period. The number of people in the area and the use of fire to clear areas for mining indicated some harvest and man caused fires likely occurred. The major wildfires of 1889, 1910 and 1919 spread throughout portions of the Coeur d'Alene Basin. Based on tree and stand year of origin, the 1910 fire event had major influence in the Jo-Cat Resource Area. This fire created very large patches (250 acres to multiple thousands of acres) of regeneration with some areas of mixed severity. Viable seed sources and in turn regeneration also varied across this landscape following fire. The specialist's report on Fire/Fuels provides a more detailed discussion of fire history in the Upper Prichard Area.

Insects in the Coeur d'Alene River Basin and the Jo-Cat Resource Area

Insect trends 1988-2003 are reported for the IPNF in the 2003 Forest Plan Monitoring Report (page 13-14, PF Doc. CR-022). Insect status is based on annual aerial insect and disease detection flights (PF Doc. VEG-40), stand exams, field reconnaissance (PF Doc. VEG-3), and photo interpretation (PF Doc. VEG-3). Bark beetles common to the Coeur d'Alene River Basin include mountain pine beetle, western pine beetle, Douglas-fir beetle, and fir engravers. While the effects of disease most often create change over a longer period of time, insect mortality is often dramatic. These insects have always been present in this ecosystem and can have a dramatic effect when appropriate hosts and weather conditions are suitable. The greatest biological factor affecting bark beetle populations is often the availability of food, which is determined by the condition of their host species within the forest. Short-term increases in fuel loading (due to bark beetle caused tree mortality) may have historically led to increased moderate intensity fires and created small to large openings for the reintroduction of seral species. In some cases, insect infestations may have contributed to large stand-replacing fires (USDA, 1998, p. 30; PF Doc. CR-025).

Historically, mountain pine beetle played a major agent of change in mature white pine (USDA, 1998, p. 29; PF Doc. CR-025) and lodgepole pine. Outbreaks were recorded in the early 1900's that killed up to 50% of the mature white pine in some stands and spread over thousands of acres of the Coeur d'Alene River Basin (USDA, 1988, p. 30; PF Doc. CR-025). Mountain pine beetle is the most aggressive bark beetle of lodgepole pine. The endemic level of mountain pine beetle in lodgepole is a periodic epidemic (PF Doc. VEG-53). During the course of an outbreak, in as few as five years, in excess of 80% of the lodgepole pines over 5 inches may be killed (Gibson, 1990, PF Doc. VEG-R74, pg. 12). The mountain pine beetle has played an historic role in the dynamics of lodgepole pine ecosystems. By periodically invading stands and creating large amounts of fuels, which are eventually consumed by fire, creating favorable conditions for regeneration, the beetle has increased the probability that lodgepole pine will reoccupy the site at the expense of other species (PF Doc. VEG-R45, page 310). In the absence of fire, because lodgepole pine is seral on most habitat types where it is found, depletion by the beetle hastens succession by climax species (PF Doc. VEG-R74, page 12).

It is important to note that much of the Jo-Cat Resource Area lodgepole pine fall within the highly susceptible species, age and diameter ranges for mountain pine beetle mortality. Significant mountain pine beetle mortality in lodgepole pine is occurring within and around the Jo-Cat Resource Area. This outbreak started several years ago in western Montana and progressed easterly into the CDA and St. Joe basins. Aerial detection surveys from 2001 to 2005 have tracked this infestation, showing dead and dying lodgepole pine that have resulted from this persistent infestation (PF Doc. VEG-40, VEG-R76 and VEG-54). In 2002, the mountain pine beetle in lodgepole outbreak in the Superior and Plains/Thompson Falls Ranger Districts (the east boundary of Jo-Cat) was characterized as more expansive and aggressive than have ever been recorded in the area (and)…likely to continue to increase…until most lodgepole over about 6 inches d.b.h. have been killed (PF Doc. VEG-R76).

The current infestations in the Jo-Cat area will likely sustain further beetle-caused mortality and the area is expected to be under attack for several years or as long as conditions are favorable and susceptible hosts remain. Mountain pine beetle infestation is expected to continue until host depletion. In a recent timber sale of mountain pine beetle mortality on the district (Lookout Divide Beetle) 76% of the merchantable lodgepole in treated stands were dead (PF Doc. VEG-55). It is projected that the dead sawtimber component in 10 years in proposed Jo-Cat salvage and lodgepole removal units (without harvest) will be 62 to 97% with an

average of 82% of the sawtimber lodgepole pine (PF Doc. VEG-56). Only merchantable lodgepole (greater than 7 inches d.b.h.) was used in this case because smaller lodgepole have often been suppressed for more than 50 years, have low vigor/crown and limited and/or very slow potential to release (page 309, PF Doc. VEG-R45; page 422, PF Doc. VEG-R77; and page 13, PF Doc. VEG-R78). The percentage of loss of the stand trees per acre is largely a function of the species (susceptible host) composition of these areas.

Douglas-fir beetle and fir engravers have always been present throughout the Coeur d'Alene sub-basin. The substantial increase in dominance of Douglas-fir and grand fir across the Coeur d'Alene Basin increased the effects these bark beetles have overall. The Douglas-fir beetle tends to kill the large diameter (>14" size) Douglas-fir that are 80 years of age or greater. The presence of root disease in many of the Douglas-fir forest types has resulted in higher endemic levels of the Douglas-fir beetle and the propensity for rapid beetle population buildups during favorable conditions (Lockman and Gibson, 1998; PF Doc. VEG-R28). Fir engraver beetles typically kill mature grand fir during periods of drought. Drought conditions and fir engraver damage were common in the Coeur d'Alene Basin and Jo-Cat Resource Area from 2000 to 2004. It is now at endemic levels. Little if any Douglas-fir beetle and fir engraver damage is currently found in the Jo-Cat Resource Area. This is in contrast to much of the Coeur d'Alene Basin with the Douglas-fir beetle epidemic following the ice storm of 1996-97 and drought related fir engraver mortality 2003-2005.

Figure VEG-3. Visible damage by the mountain pine beetle infestation (Jo-Cat Area 2006).

Diseases in the Coeur d'Alene River Basin and the Jo-Cat Resource Area

Disease trends 1988-2003 are reported for the IPNF in the 2003 Forest Plan Monitoring Report (USDA, 2003, page 13-14; PF Doc. CR-022). Additional information of disease status in the Jo-Cat Resource Area is based on annual aerial detection flights for insects and disease identification (PF Doc. VEG-40), stand exams and silviculturist field recon (PF Doc. VEG-3) and photo interpretation (PF Doc. VEG-3).

In the absence of fire, forest insects and diseases drive forest succession by affecting tree species, size, and stand density. Insects and diseases outside of the historic disturbance range are considered signs that the functions of these disturbance agents are not resilient over the long term.

Root diseases are the primary disease group found in the Coeur d'Alene basin and the Jo-Cat Resource Area. This group of diseases include: Armillaria, Annosus and Schweinitzii. In general, these diseases cause the tree roots to weaken to the point of eventual starvation of water and nutrients. Generally, crown thinning, windthrow, breakage, beetle attacks and mortality follow infection. Approximately 46% of the Coeur

d'Alene River Basin has a moderate to high probability of insect and disease agents affecting the timber vegetation (USDA, 1998, page 29; PF Doc. CR-025). Douglas-fir is the most susceptible species to these diseases in this area followed by grand fir and sub-alpine fir. Douglas-fir represents 59% of the Jo-Cat Resource Area. Other species are also susceptible; however levels of resistance vary over their lives. Root disease and insects often act together in this ecosystem, with root disease weakening a tree that is then killed by insects or other cause. Root diseases, though present, is not currently a major causal agent of mortality in the Jo-Cat Resource Area. An extensive literature summarization related to root diseases is found at PF Doc. VEG-R67.

White pine blister rust is a non-native disease that was introduced into this area in the early 1900's. Blister rust is a fungal disease that forms cankers on branches or stems of trees that eventually kill or weaken the tree. In the decades following introduction, white pine was infected over the entire Coeur d'Alene River Basin; trees were either killed and/or harvest was accelerated to recover their economic value. White pine historically dominated approximately 45 percent of the Coeur d'Alene Basin, it currently is about 4 percent. Loss of mature white pine and the continuing mortality of younger trees due to blister rust have led to the increase in Douglas-fir, grand fir and hemlock now seen across the basin. Efforts were made to control blister rust through eradication of the alternative hosts, currant and gooseberry. Although these methods had been somewhat successful in the eastern United States, topography and landscape scale in the west prevented success and the program was dropped in 1968 (Neuenschwander et al., 1999, pages 5, 8, 10, and 12; PF Doc. VEG-R18). Emphasis shifted to development of genetically rust-resistant trees that can be planted throughout the natural range of white pine. There have been successes, both regionally and on the district, in genetically improving tree resistance, planting those trees and then using cultural treatments such as pruning to improve survival (Schwandt, Marsden and MacDonald, 1994; PF Doc. VEG-R19). These programs are continuing.

The white pine cover type is not represented at the stand scale in the Jo-Cat Resource Area however individuals are found broadly scattered on many moist sites. White pine blister rust is present in the Prichard watershed. Areas planted with white pine (and tended for maintenance of white pine) as well as remnant natural white pine trees are the most likely white pine to become a long-lived seral component over the very long term in the Resource Area depending on continued disease resistance.

A variety of **dwarf mistletoes** are present (and considered a management issue) locally on western larch and Douglas-fir, but are generally not considered a landscape-level problem in the Coeur d'Alene River Basin. Their presence is likely due to the number of mistletoe-infected trees that survived mixed severity fires. These mistletoe-infected trees then infected natural regeneration that resulted from the opening of growing space by fires. Mistletoe causes growth loss and sometimes mortality. Since mortality from this small parasitic plant is slow in large trees the primary concern is avoiding infection in young larch, which can be killed much more rapidly. Removal of heavily infected overstory trees can help avoid infection of the understory. Larch dwarf mistletoe, while only minimally present in the Jo-Cat Resource Area, is considered a management issue either in immature/mature stands of western larch or in areas potentially planned for western larch regeneration.

Past Timber Harvest in the Jo-Cat Resource Area

A review of aerial photos and the TSMRS data base do not indicate timber harvest within the resource area on federal lands. Selective harvest and clearing occurred related to road building (Forest Highway 9 reconstruction involved about 24 acres) as well as mining exploration (about 2.5 miles of dozer trail and excavation). Harvest has occurred on about 30 acres of private land within the Resource Area.

More information about past activities is provided in the EA, Appendix A.

4. Existing Conditions and Effects to Forest Vegetation

4.A. Changes to Forest Plan Timberland Suitability

Appendix M of the Forest Plan indicates that on-site inspection may be used to revise timberland suitability. Forest Plan suitability was often based on broad-scale inventory data without the benefit of field verification. In the Jo-Cat area, suitability decisions seem to have been made based on general elevation breaks. The Jo-Cat analysis included a detailed stand by stand review (using field data, field reconnaissance, photo interpretation, and professional experience) for treatment units (PF Doc. VEG-17 and 18). This review changed 588 acres from unsuitable (MA9 strives to maintain and protect areas unsuited for timber production) to suitable (MA1 has timber production emphasis).

Figure VEG-11. Forest Plan Management Areas and Proposed Adjustments to Suitability in the Jo-Cat Resource Area (PF Doc. VEG-17 and 18).

Forest Plan Suitability Changes in the Jo-Cat Resource Area	% of Jo-Cat Resource Area	Proposed Adjustment to MA Designation in Jo-Cat Resource Area (% of resource area)
suitable	51	79
not suitable	48	20

4.B. Forest Composition

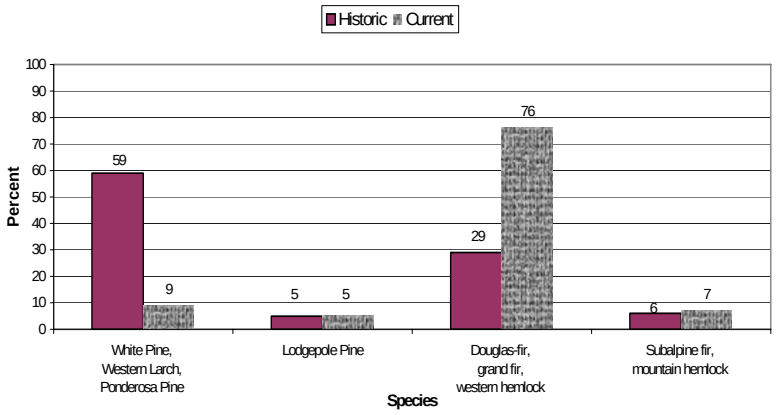
Existing Forest Composition in the Coeur d'Alene River Basin and Jo-Cat Resource Area

Coeur d'Alene River Basin:

The findings of the Geographic Assessment indicate that there has been a tremendous change in species composition within the **Coeur d'Alene River Basin** over the last 100 years (USDA, 1998, pages 36-37; PF Doc. CR-025). This change is also consistent with the Upper Columbia River Basin (USDA, 1997; PF Doc. VEG-R10) and Northern Region Overview (USDA, 1998; PF Docs. VEG-R8 and VEG-R9). While the Forest Plan does not mandate management at the levels of historic species compositions and structures (or size classes), these are helpful reference points to understand what trends may be needed over the long term to create increased resiliency in the ecosystem. It should be recognized that it may not be desired or feasible to return to actual historic conditions.

Forest cover types describe the dominant species in the stand. Long-lived seral species (western white pine, western larch and ponderosa pine) have declined within the Coeur d'Alene River Basin as a result of changes in the role of fire, white pine blister rust, and harvesting that tended to remove these species while leaving species such as grand fir, hemlock and Douglas-fir. Harvest of white pine was accelerated on the IPNF in the 1960's to early 1980's. At the entire Coeur d'Alene River Basin scale (all ownerships) the white pine cover type has substantially declined in the past 100 years (USDA, 1998, p. 36-37; PF Doc. CR-025), while grand fir and western hemlock cover types substantially increased (Geographic Assessment, pp. 31 and 36-37; PF Doc. CR-025). Larch forest types have also decreased, while the Douglas-fir type increased (USDA, 1998, p. 37; PF Doc. CR-025).

Figure VEG-4. Current and Historic Forest Cover Types on National Forest System lands <u>in the Coeur d'Alene River Basin</u> (PF Doc. VEG-10).



Jo-Cat Area

Within the Jo-Cat Resource Area, given the fire history, loss of the white pine (on moist sites) and decline of western larch over the last 25 years; the current forest cover types contain more Douglas-fir and grand fir than the previous century. Currently lodgepole pine and Douglas-fir dominate the landscapes on mid elevation habitats and subalpine fir/mountain hemlock dominate on the higher elevation habitats. White pine does not represent a forest cover type at the stand scale. Western larch at the stand scale dominates 6% of the Resource Area; however, at the finer scale it actually has higher representation (19%) in the resource area because it so often occurs in combination with other species and less often as a pure type.

Table VEG-3. Forest Cover Types in the Jo-Cat Resource Area *(PF Doc. VEG-15 and PF Doc. VEG-8).*

Forest Cover Type	% of total FS lands in the Resource Area	Desired Future Condition
white pine	**0**	20-30% for WP and WL together
western larch	**6** (19% of Jo-Cat stands have a WL component)	20-30% for WP and WL together
lodgepole pine	**19** (38% of Jo-Cat stands have a LP component)	15-25%
Douglas-fir and grand fir	**59**	30-40%
subalpine fir and mountain hemlock	**9**	<15%

Within the resource area, private lands make up 159 acres (about 7% of the resource area). Most of these areas are concentrated along riparian areas of Prichard Creek. The habitat types on private land are generally lower elevation than the FS lands, with a mixture of moist western hemlock/grand fir and a smaller amount of the drier Douglas-fir and grand fir series. Forest cover types on private lands within the resource area are generally Douglas-fir, grand fir and western hemlock. Structural stages on private lands within the resource area are dominated by small/medium timber sizes.

Direct and Indirect Effects to Forest Composition under the No-Action Alternative

At first glance, it would be expected that the No-Action Alternative would result in basically the same species compositions and structures as currently found in the Jo-Cat Resource Area. However, this is not the case in the natural ecosystem.

In the absence of fire, change will take place on more or less predictable successional pathways. Without wildfire, forest cover types will trend toward climax species (Hagle, 2000, p.2-244; PF Doc. VEG-R34). In subalpine habitats, stands transition to subalpine fir cover types and in mid elevation habitats this would be western hemlock, grand fir, and Douglas-fir cover types.

In areas with high components of lodgepole pine, as long as conditions are favorable and susceptible hosts remain, mountain pine beetle will continue this infestation until host depletion (PF Doc. VEG-54). It is projected that the dead sawtimber component in 10 years in proposed Jo-Cat units (without harvest) will be over 62 to 97%. In the absence of major disturbance, these stands will trend toward subalpine fir and Douglas-fir/grand fir (climax) cover types.

In areas with western larch component, stands will trend toward less western larch as western larch resilience declines due to competition and stands will trend toward subalpine fir, western hemlock, grand fir and Douglas fir.

Over time, shade tolerant tree species with limited disease, drought and fire resistance, will dominant the landscape (USDA, 1998, p.29; PF Doc. CR-025). In an ecosystem that is subject to periodic droughts (USDA, 1998, p.31; PF Doc. CR-25), the scale of area under climatic stress makes it very likely to see future large-scale insect and disease problems that are historically unprecedented (USDA, 1998, p.31; PF Doc. CR-025). The CDA River Basin showed the largest increase in forest fuels of any sampled in the Interior Columbia Basin Assessment Area. Wildfire risk appears to be growing (USDA, 1998, p.29; PF Doc. CR-025) in the Jo-Cat Resource Area as well as the CDA Basin. The most concise reference describing pathways is Byler and Hagle, 2000; PF Doc. VEG-R34--- FHP Report No. 00-09, 10 and 11). If there is no change in the seed source availability of long lived seral species from the current or the pathways discussed above, the forest cover types and related pathway development following wildfire (although dependent on fire severity and landscape arrangement) would be similar to without wildfire as discussed above. The exception to this would be a slow underburn in areas with western larch could improve the long term resilience of the larch. Under the No-Action Alternative, there would be no activities to restore forest vegetation toward increased resiliency. Forest cover types in the short term will remain the same, however in the longer term they will trend to increasing representation of Douglas-fir and grand fir.

Direct and Indirect Effects to Forest Composition under the Proposed Action

Because only a portion of the resource area has treatment, the untreated portions will likely follow the scenarios of no action (above).

Western larch is represented as a stand component on 399 acres (19% of the Jo-Cat Resource Area), of which 285 acres were recognized to have opportunities to improve western larch vigor and resiliency. The overall ecological value of this age class of western larch is very high. Western larch is very limited within the basin and over the next 20-50 years this resilient western larch will become mature. Mature long lived early serals are already very limited in the CDA Basin. Treatment of long lived early serals already close to maturity is an excellent investment in the near and distant future. The opportunity for biological and silvicultural success in the treatment of western larch to show improvement in resilience is limited to ages of 80 to almost 100 years. The proposed action treats approximately 119 acres with a silviculturally treatable western larch component; this represents 42% of the identified western larch improvement opportunities in Jo-Cat.

Figure VEG-5. Western Larch in the Jo-Cat Resource Area (2006)

Lodgepole pine is represented as a stand component on 804 acres (38% of the Jo-Cat Resource Area), of which 431 acres have observed mountain pine beetle mortality. Some lodgepole pine stands have smaller average diameters and are lower risk to beetle mortality, so they were not proposed for treatment. Also, a portion of the areas with lodgepole and mountain pine beetle mortality were retained for wildlife habitat and to maintain the integrity of the adjacent roadless area. The proposed action treats 146 of the lodgepole pine areas with observed mountain pine beetle mortality with salvage, lodgepole pine overstory removal and lodgepole pine removal treatments (modified regeneration harvests); this represents 34% of the identified mountain pine beetle mortality in Jo-Cat. The remainder of the 431 acres with observed mortality are either in the roadless area (which would not be treated), have mortality that is too scattered for treatment, or have a smaller size class that is not moderate to high risk of stand mortality even though some mortality is present. However, the largest areas of mortality, or projected mortality, outside of the roadless area would be treated. Lodgepole removal harvest followed by planting and/or interplanting of white pine would improve the species composition to long-lived serals on 63 acres of areas with the objective of mixed lodgepole pine/white pine stands; this represents about one third of the lodgepole pine treatment areas.

The key species composition issue from the Coeur d'Alene Basin Geographic Assessment and Upper Columbia River Basin was the need to increase areas of long lived early seral species of white pine, western larch and ponderosa pine and to decrease the areas of grand fir, Douglas-fir and western hemlock. The proposed action puts the Jo-Cat area on a positive trend as displayed in the table below. Overall, long-lived early seral species composition would increase by 7 percent within the resource area with improvement of western larch long term resiliency in commercial thin areas and interplanting white pine in some regeneration harvest areas. While this change is advantageous at the Jo-Cat Resource Area scale, the number of acres of change in this project is such a small percentage at the Coeur d'Alene River Basin scale. No change would be reflected at the overall river basin scale.

Table VEG-4. Comparison of Forest Cover Types on FS/ managed lands in the Jo-Cat Resource Area (PF Doc. VEG-15 and 23).

Forest Cover Type	% of total FS lands in the Resource Area	Desired Future Condition	Proposed Action
white pine	0	20-30% for WP and WL together	2
western larch	6 (19% of Jo-Cat stands have a WL component)	20-30% for WP and WL together	11
lodgepole pine	19 (38% of Jo-Cat stands have a LP component)	15-25%	18
Douglas-fir, grand fir and western hemlock	59	30-40%	53
subalpine fir and mountain hemlock	9	<15%	9

4.C. Forest Structure

Existing Structure in the Coeur d'Alene River Basin and Jo-Cat Resource Area

Coeur d'Alene Basin:

In terms of forest structure, the greatest difference in the Coeur d'Alene River Basin from historic or reference conditions has been in the amount of small- to medium-sized timber and mature/large sized timber structure found on the landscape. Because of the fires early in the 1900's the small/medium sized timber structure component is dominant in the Coeur d'Alene River Basin and is now slightly higher than the historic range. This is more prevalent in the Jo-Cat Resource Area since all of the area burned in 1910.

TABLE VEG-5. Percent current and historic ranges of structural stages in the Coeur d'Alene River Basin (PF Doc. VEG-10).

Structural Stage	% of NFS lands in the CDA River Basin	CDA River Basin Historic Ranges
Shrub/seedling/sapling	17	15-50%
Small/medium timber	51	18-50%
Mature/large timber	32	23-66%

Jo-Cat Area:

The interplay of fires and insect and disease mortality has dramatically shaped the structural stages found within the Jo-Cat Resource Area today. Current structural stage percentages in the resource area are displayed in Table VEG-6 (PF Doc. VEG-16). The Jo-Cat Resource Area is not even close to any of the desired structural stage amounts. It can be expected in the next 20 years that more than ½ of the small/medium stage (initiated by the 1910 fire) will grow into the mature large stage and 10-15% of the resource area will move to the young stage due to mountain pine beetle. These insect and disease changes along with growth/successional changes will bring the area closer to the desired structural ranges.

Table VEG-6. Percent current structural stages in the Jo-Cat Resource Area (PF Doc. VEG-16 and VEG-8).

NOTE: *currently 1.5% of Resource Area is allocated old growth*

Structural Stage	% of NFS lands in the Jo-Cat Resource Area	Jo-Cat Desired Future Condition
Shrub/seedling/sapling	2	10-30%
Small/medium timber	96	20-40%
Mature/large timber	2	30-45%

Shrub/seedling/sapling stage

Forest stands less than 35 years old, most often resulting from natural events (such as fire) or past regeneration harvests. Stands usually have average tree diameters less than 5 inches at breast height. Some stands may have a considerable number of overstory trees; others may have no large tree component. This stage may also include stands that are non-tree cover such as shrubs and sod.

Small to medium stage

Stands generally 36 to 100 years old. These stands may have resulted from fires or may represent natural or artificial regeneration following harvest. Most of these stands can be expected to be quite dense, with high stocking levels and closed canopies. Average tree diameters are greater than 5 inches at breast height.

Mature/large stage

Stands over 100 years old, generally resulting from fires prior to 1900 and presently quite varied in appearance. Stand conditions differ in species composition, structure, and canopy closure as a result of disturbances caused by insect mortality, root disease and other pathogens, fires, past harvest activity, or growth potential of the site including soil conditions. Stands unaffected by these will be dense and have fairly closed canopies for the site. Stands affected by these disturbances may have canopies ranging from open to dense. Average tree diameters are greater than 9 inches at breast height. *A subset of the mature, large timber structural stage is allocated old growth (PF Doc. VEG-27, 28, 29, 30, 31, 32, 33, 34 35, 37 and 38).*

Figure VEG-6. Two photos from Jo-Cat representing the stand understory or 'within stand'

Allocated old growth is a subset of the mature/large structural stage. A detailed review of the old growth in OGMU 113 took place with this analysis. Forest Plan old growth standards/definitions were used (PF Doc. VEG-27, 28, 29, 38) and validation (PF Doc. VEG-4) included recent field exams, field reviews and 2004 photo interpretation. This review found that all previously allocated stands met old growth definitions (PF Doc. VEG-31, 32 and 34). In addition, 2 stands (one of which is in the resource area) not previously allocated, met old growth definitions and are now allocated (PF Doc. VEG-31 and 34). The entire OGMU burned in 1910. The stands currently allocated as old growth likely underburned in this fire and previous fires as the old trees in these stands have multiple ages (some older than 250 years). Many stands originating

following the 1910 fire in the OGMU will qualify as old growth over the next 30-50 years (although this depends on future natural disturbances). The action alternative does not propose any harvest or prescribe burn treatments in allocated old growth. Additional information regarding Forest Plan Old Growth Standards discussed in the Consistency with Forest Policy and Legal Mandate Forest Plan Standards for Old Growth Standard 10d section of this specialist report.

Table VEG-7. Old Growth Allocation in Jo-Cat Resource Area and OGMU's 113 before/after the allocated old growth review (PF Doc. VEG-31, VEG-32 and VEG-34).

NOTE: currently 1.5% of Jo-Cat Resource Area is allocated old growth.

OGMU	Comp(s)	TOTAL number of acres in the OGMU	Allocated old growth in 1999 (acres)	% OGMU allocated old growth	Allocated old growth in 2007 after review (acres)	% OGMU allocated old growth
113	198	7,969	259	3.25%	342	4.3%

Landscape Arrangement: There have been changes over the last 100 years in the size and distribution (arrangement) of patches across the landscape of the Coeur d'Alene Basin (please refer to the Ecosystem Disturbances discussion above). The mean patch size has decreased since the early 1900's in the Coeur d'Alene Basin and patches have become more linear, with accompanying increases in edge and decreases in core/interior habitats (USDA, 1998, p. 42; PF Doc. CR-025).

In the Jo-Cat Resource Area, the extent and fire behavior of the 1910 fire created some very large size patches. Within the Coeur d'Alene Basin, stand-replacement fires, while infrequent and displaying large patch sizes (originating after more severe fires), would often be modified by the low and mixed severity fires that occurred later in stand development. In terms of human changes to the landscape, about 1% of Forest Service managed lands in the Jo-Cat Resource Area has had a change in structural stage since the 1910 fire. That area was an 18 acre wildfire.

While fire behavior is influenced by a number of weather and landscape conditions, fire behavior is strongly influenced by stand structure as it relates to live and dead fuel loadings and their configurations, such as ladder fuels. An individual stand treated to a given prescription will probably be irrelevant to fire behavior and effects at the landscape scale because wildfires are often larger than individual treatment units (Graham et al., 2004, P. 29: PF Doc. VEG-R38). The spatial arrangement of vegetation influences both the growth of large fires and the variability of fire as it moves across the landscape. This is a creation of a vegetation mosaic, by design, which allows the manager to control or at least ameliorate hazards of all kinds (Brackebusch, 1973; PF Doc. VEG-R23). Research shows the importance of changing the spatial pattern to the efficiency and effectiveness of treatment units in changing fire behavior at the landscape scale. Strategic area treatments create landscape fuel patterns that collectively slow fire growth and modify behavior while minimizing the amount of treated area required (Graham et al., 2004, p. 30; PF Doc. VEG-R13).

<u>Direct and Indirect Effects to Forest Structure Under the No-Action Alternative</u>

Structural stages: Reasonably over the next 20 years, about half of the areas currently in the small-medium size (areas burned in 1910 fire) could enter the mature/large stage and about 15% would enter the young stage. This is due to the extent of susceptible hosts and the current and expected mountain pine beetle mortality in lodgepole pine. This assumes there would be no other insect, disease or fire disturbances in the area. Fire risk can increase with fuel buildup. Historically, the fuel buildup associated with mountain pine beetle mortality often resulted in large fires. The structural stages resulting from taking no action at this time would in the next 20 years come into the desired future condition ranges. However, structural stage at the landscape scale is not the only forest structure attribute of importance.

Within stand structure would be characterized by the successional scenarios of their respective habitat types in the area. Jo-Cat habitat types are 52% moist, 25% dry, and 23% alpine. Historically, moist habitats were

dominated by closed canopies (about 70% and greater) of species mixtures dominated by white pine and western larch (moist habitats are 52% of the resource area). Dry habitat types (25% of the resource area) historically had more medium to open canopies of Douglas-fir mixed with western larch (ponderosa pine is usually not present in cool or subalpine habitat areas). Without disturbance, on both the dry and moist now dominated with Douglas-fir and grand fir, multi-storied and/or low canopy conditions are likely, with many areas of Douglas-fir and grand fir remaining stalled in small young stages. Without major disturbance, the climax species of the site will slowly become dominant. The most concise reference describing this expected development is Byler and Hagle (2000; PF Doc. VEG-R34—FHP Report No. 00-09, 10 and 11.

Many of these stands (both moist and dry) are not likely to provide the same mature canopies/structures as stands containing large white pine or larch that were once a major component of the Coeur d'Alene River Basin and Jo-Cat Resource Area. Subalpine fir habitat types (23% of the resource area) were historically characterized by closed canopies of lodgepole pine as well as later successional subalpine fir/mountain hemlock areas with more multi-layered canopies. Without disturbance, the subalpine areas will continue to become more multistoried as insects and disease work with succession. The Jo-Cat landscape conditions are now being dramatically impacted by mountain pine beetle mortality where the susceptible host is present (about 20% of the resource area). Without disturbance, these areas will likely become more dominated by multi-storied stands of lodgepole pine, subalpine fir and Douglas fir. There would be no change to the landscape patch size with no action. About 19% of the resource area currently has a component of western larch. This species is one of the most resilient in the Coeur d'Alene Basin. Without disturbance, much of this western larch would be replaced due to competition by Douglas-fir and subalpine fir. There would be no short-term change in allocated old growth under the No Action Alternative.

Table VEG-8. Comparison of the desired future condition, existing condition, and condition in 20 years under the No Action Alternative in the Jo-Cat Resource Area (PF Doc. VEG-8, 16 and 23).

structures stage	desired future condition	2007	no action 2027
Shrub/seedling/sapling	10-30%	2%	15%
Small/medium timber	20-40%	96%	34%
Mature/large timber	30-45%	2%	51%

<u>Direct and Indirect Effects to Forest Structure Under the Proposed Action</u>

Structural stages: At the Jo-Cat Resource Area scale, lodgepole removal harvest would change the structural stage on 5% of the resource area. This harvest is focused in areas that have or are projected to have high rates of mountain pine beetle mortality, in other words, these areas will change structural stage with or without the proposed lodgepole removal harvest. Areas proposed for lodgepole removal harvest are more likely to provide a long-term improvement in stand and landscape structure and increased resiliency to native change agents (such as insects, pathogens and fire) because areas would move toward increased long-lived serals with supplemental planting of white pine (about 42 acres); representing about 30% lodgepole removal harvests areas**.** The rest of the lodgepole removal harvest areas will be naturally regenerated to lodgepole pine. Other proposed lodgepole harvests include: 30 acres of salvage and a 13 acre lodgepole overstory removal. These areas will be fully stocked following harvest and no change in stand structural stage will result from harvest. Not all of the areas with mountain pine beetle morality are involved in harvest at this time. All harvest in lodgepole represents about 146 acres (34% of the areas in Jo-Cat identified with mountain pine beetle mortality). This activity is a main objective of the purpose and need. It can be assumed that over the next 20 years, almost 10% more of the area will have enough mountain pine beetle morality to naturally regenerate to young stands with scattered multistoried overstory (survivors) of lodgepole pine, Douglas-fir and/or subalpine fir (see table below).

The proposed action also changes the 'within stand structure' and overall resilience of the long lived seral western larch on 119 acres (6% of the resource area). This activity would increase the likelihood that these areas will reach the mature and old structural stage, with the western larch as a high component of the stands. Mature and old western larch and/or white pine are currently rare in the Coeur d'Alene basin and will continue to be rare in the future, until current young stands with white pine and western larch mature. Historically, 30-50% of the basin was mature and dominated by long lived early seral species of white pine and western larch. The window of opportunity to successfully improve resilience of immature western larch by adjusting growing space declines dramatically at about 100 years old. The proposed action would mechanically treat about 40% (119 acres of the 285 stand acres identified during diagnosis) with a viable opportunity to improve long-term western larch resiliency. Approximately 91% of the stands identified during diagnosis have some level of proposed treatment. This activity is a main objective of the purpose and need.

Future treatments over the next 20-40 years may include commercial thinning (in some cases this would be the second commercial thinning), or precommercial tending treatments such as thinning or release.

In the future, the proposed action would result in an improved representation of resilient long-lived serals species (white pine and western larch) in the young, mid and mature structural stages. These conditions will be more like the historic condition and the desired conditions than current or no action. Refer to the silvicultural diagnosis for further documentation and literature citations associated with the rationale for these treatments (PF Doc. VEG-3).

The Jo-Cat area currently has essentially one landscape patch (approximately 1800 acres) initiated by the 1910 fire. This patch is well within the desired landscape patch size of 200-700 acres. The limited change to this landscape patch, under the Proposed Action, has minor effect to the overall patch size.

Because the total number of acres proposed for change in structural stage in this project is such a small percentage of the Coeur d'Alene River Basin, the Proposed Action would not result in a change in structural stages at the overall basin scale.

Figure VEG-9. Comparison of the percent forest structure current condition, desired future condition, proposed action and proposed action in 2027 in the Jo-Cat Resource Area (PF Doc. VEG-8, 16 and 23).

Structural Stage	% of NFS lands in the Jo-Cat Resource Area	Jo-Cat Desired Future Condition	Proposed Action	in 2027 with proposed action
Shrub/seedling/sapling	2	10-30%	6	15
Small/medium timber	96	20-40%	91	34
Mature/large timber	2	30-45%	2	51

The amount of allocated old growth within the Jo-Cat resource area is 32 acres or 1.5% (PF Doc. VEG-34). The allocated old growth within the Jo-Cat resource area involves 1 patch of 32 acres (PF Doc. VEG-34 and 35). Allocated Old growth within OGMU 113 associated with the Jo-Cat Resource Area is 342 acres or 4.3% (PF Doc. VEG-34). This involves 4 patches with an average patch size of 84 acres (PF Doc. VEG-35). The patch size of future old growth would increase dramatically over the next 20-50 years from stands currently in the small/medium stage (96% of the resource area) that combine with current allocated old growth. Depending on disturbance, these areas have the potential of becoming large patches of old (well over 300 acres in size).

Forest Service policy FSM 2471.1 directs land managers to normally limit the size of harvest openings created by even-aged silvicultural methods to 40 acres or less. With some exceptions, creation of larger openings is allowable with Regional Forester approval. The Action Alternative does not include units that will exceed the 40-acre harvest created opening size.

4.D. Forest Vegetation Design Features

The following vegetation management ***Design features*** will be implemented with the proposed action. A silvicultural diagnosis has been completed and approved by a certified silviculturist at the time of this analysis. All vegetative treatments would have silvicultural prescriptions approved by a certified silviculturist before treatment. Silvicultural prescriptions would consider site-specific factors such as physical site, soils, climate, habitat type, current and future vegetative composition and conditions, as well as interdisciplinary team objectives, NEPA decisions, other regulatory guidance, and Forest Plan goals, objectives and standards. Region 1 Snag Management Protocols (USDA, 1994; PF Doc. VEG-R57) will be met (PF Doc. VEG-21). Woody debris guidelines (USDA, 1994; PF Doc. VEG-R61) following harvest will be met (PF Doc. VEG-21) with a combination of existing material and in some cases the trees to be retained following harvest. White pine retention guidelines (USDA, 1994; PF Doc. VEG-R58) will be met. Soil Nutrition Coop Guidelines will be met (PF Doc. VEG-41). All regeneration areas would be regenerated with site-adapted species/seed source. Sites will be prescribed burned (the preferred treatment), mechanically treated or a combination of both to reduce fuels and shrub competition sufficient to establish desired regeneration. Burning will take place only when soil moistures are above 25%. In areas treated with regeneration harvest, site preparation for regeneration, fuel treatments, and planting/regeneration would occur within five years of harvest completion. Harvest unit layout will consider suitability limitations on a site-by-site basis on the ground. Harvest and site preparation treatments will consider the short and long term potential negative effects (including blow down, fire mortality, etc) of proposed activities on adjacent trees and stands with site by site prescription modifications, such as change in unit boundary, modification of prescribe burning prescriptions, etc.

4.E. Cumulative Effects to Forest Vegetation

The cumulative effects analysis area is the Jo-Cat Resource Area. Cumulative effects are conditions that would result from the proposed action in addition to the incremental impacts of past, ongoing and reasonable foreseeable actions. The spatial scale of planned activities is important to consider in the discussion of effects. Scales and hypothetical scale sizes include: plant (the plant and close proximity), site (less than few acres in size), stand (2-50 acres in size), landscape (50 to 100's or 1000's of acres), watershed (such as the Prichard Creek) and basin (such as the Coeur d'Alene Basin). This vegetative effects analysis addresses the stand, the Jo-Cat Resource Area landscape, watershed and basin scales.

Forest vegetation in the majority of the Jo-Cat Resource Area will be dominated by the vegetative trends discussed under the No Action Alternative because less than 15% of the resource area is treated. Forests will tread to climax species with multi-storied structures, more open overstory canopy and multi-layered understories (see previous no action discussion). In terms of important management activities, fire suppression of areas developing along ecological successional pathways is the primary action to be considered when evaluating cumulative effects to vegetation. A full discussion of the cumulative effects of fire suppression is provided in the Specialist's Report on Fire/Fuels (PF Doc. SR-01). Discussion of successional development trends is found at CR-025.

The existing condition is a function of past natural disturbances and management activities combined with successional growth. This existing condition was used for analysis of the proposed action. All known past activities are listed in EA-Appendix A. The major past natural disturbance was the 1910 fire; all of the Jo-Cat Resource Area burned in 1910. Human disturbances within the Jo-Cat Resource Area include clearing for mineral testing (about 2.5 miles of road and scattered trails/excavations), FH 9 construction and reconstruction (about 24 acres), 30 acres of selective harvest on private land, and a 13 acre wildfire in 1969.

This environmental analysis includes all planned activities related to the proposed action. These activities include weed treatments, road ripping, upgrades or obliteration. These do not have cumulative effect to vegetative composition, structure, arrangement and disturbance types at the stand and landscape or larger scales. At the plant and site scales, with activities such as road permanent closure or decommissioning, the treatment sites and stands would eventually provide forest cover.

Vegetative recovery within road prisms depends on the long term use of the roads. Roads not maintained as open roads would eventually provide forest cover, although they would be likely to go through a prolonged period (about 20 years) of grass, forbs and/or shrub dominance. Roads maintained as open generally do not produce forest cover and may allow access for human uses including berry picking, salvage/firewood gathering, etc. on Forest Service managed lands as well as private lands. These uses do not change vegetative composition, structure or arrangement at the stand and landscape or larger scales because they are the activities are usually intermittent and dispersed as well as the activities usually represent small percentages of stands.

In addition, this environmental analysis includes analysis of activities related to fuel reduction and regeneration establishment. This includes site preparation, understory slashing, underburning, planting, weeding, and release. These activities will take place over the next 2-10 years.

Although not analyzed with this proposed action, tending treatments such as commercial thinning, pre-commercial thinning, and/or pruning are desirable in the next 15-25 years within areas treated by proposed action. Precommercial thinning and pruning will be analyzed and prioritized previous to implementation. All of these activities will maintain the positive trends of the proposed action at the stand, landscape and watershed scales. The overall objective of all of these activities is to allow the long-lived early seral species white pine and western larch to better compete with the more shade tolerant species on sites. These activities maintain the trend to desired forest composition and structure. The tending activities would also improve the growth and vigor of desired (naturally regenerated and/or planted) trees, and/or prepare for other activities that will improve the fuel configuration of stands. Pruning of white pine reduces the potential of infection by white pine blister rust and also improves the tree's ability to survive infection by removing infected branches. Pruned trees have a better chance of reaching maturity and contributing to the desired forest structure and composition (Schwandt et al., 1994; PF Doc. VEG-R19). Administrative access will be necessary to accomplish long-term tending activities, and will be vital to attain desired stand conditions economically. Because these activities often do not generate funding, monies are often not available to establish or reestablish some level of access to complete these tending activities. Future decisions concerning administrative access must consider that 'walk in only' access increases the cost (both contract and agency) of stand tending activities by 20-50% above the same activities with road access. This is due to the extra time required to access sites in addition to associated increased health risks related to the increased length of time to attain emergency medical treatment for workers.

The Plains Ranger District of the Lolo National Forest does not have any ongoing or reasonably foreseeable planned activities outside and adjacent the resource area to the east.

Future timber harvest on private lands within the resource area is reasonable, and becomes more likely as stands initiated following the 1910 fire mature. A 249-acre seed tree harvest on a Bear Gulch private parcel (outside the Jo-Cat Resource Area) is currently planned. This activity does not vegetatively affect the Jo-Cat Resource Area. Private land harvests in and around the resource area commonly have the objective of salvage and/or partial harvest to remove trees of high economic value. Regeneration in private harvested areas is usually natural and results from the seed source of trees remaining following harvest. This natural regeneration is most often dominated by Douglas-fir, grand fir and western hemlock. Regeneration limited to these species will not contribute to the trend toward desired species composition of the action alternatives and the landscape arrangements are determined by ownership patterns rather than a strategic fashion to change fire behavior.

5. Consistency with Forest Policy and Legal Mandates

Forest Plan direction provides that timber management activities will be the primary process used to minimize the hazards of insects and diseases and will be accomplished by maintaining stand vigor and diversity of plant communities and tree species (USDA, 1987, page II-8; PF Doc. CR-02). Direction regarding vegetation is also guided by the Forest Plan standards for old growth (USDA, 1987, page II-29; PF Doc. CR-02), timber (USDA, 1987, pages II-31 to 32; PF Doc. CR-02), forest protection (USDA, 1987,

pages II-38 to 39; PF Doc. CR-02) and individual management areas (USDA, 1987, pages III-1 to 87; PF Doc. CR-02).

Forest Plan Standards for Old Growth

Old Growth Standard 10a: A definition for old growth has been developed by a Regional Task Force and is being used by the Forest (Green et al., 1992; PF DOC VEG-R20).

This standard applies to two landscape scales; the old growth management unit (OGMU) scale (for this resource area OGMU 113) and the IPNF scale. Allocation of old growth within the Jo-Cat Resource Area and related old growth management units is based on current and widely accepted science and follows current old growth definitions from the Forest Plan (PF Doc. VEG-28), the Regional Task Force Report including "Old Growth Forest Types of the Northern Region" (Green and others, 1992, corrected 2/2005; PF Doc. VEG-R20) and Forest Supervisor letters of direction for implementing Forest Plan old growth standards (PF Doc. VEG-28). This standard is fully met under both alternatives.

Old Growth Standard 10b: Maintain at least 10 percent of the forested portion of the IPNF as old growth.

The 2004 Forest Plan Monitoring and Evaluation Report (USDA, 2004, PF Doc. CR-026) discloses that the IPNF total allocated old growth at the end of 2004 was 278,552 acres (12.1% of IPNF forested acres). The IPNF Forest Plan old growth allocation of 10% (231,000 acres) was distributed among the districts as documented in the Forest Supervisor's May 7, 1991 letter regarding the "Forest Plan Explanation: Implementing Old Growth Standards" (PF Doc. VEG-28). The Coeur d'Alene River Ranger District was responsible for allocating 56,000 acres for old growth management (with 18,000 acres on the former Fernan Ranger District and 38,000 on the former Wallace Ranger District). The Coeur d'Alene River Ranger District had a total of 65,260 acres (USDA, 2004, p. 71; PF Doc. CR-026).

The 2004 Forest Plan Monitoring and Evaluation Report also discuss the use of a multi-scale approach on the IPNF to monitor old growth based on two separate, independent tools:

1) Forest Inventory and Analysis (FIA) data is used to calculate forest-wide and mid-scale old growth percentages; and

2) an IPNF stand map displays all stands allocated for old growth management, with old growth data recorded in the TSMRS database.

Based on the FIA data summarized in the 2004 Forest Plan Monitoring and Evaluation Report, the IPNF proportion of old growth is 12.85% (with 90% confidence intervals of 10.55% to 15.27%). The FIA old growth estimate was revised in 2006 as part of the Draft Comprehensive Evaluation Report (CER) which is part of the set of documents for the IPNF Proposed Land Management Plan (see http://www.fs.fed.us/kipz/documents/plmp/index.php). The CER document 'Estimates of Old Growth Percentages and Snag Density on the Idaho Panhandle National Forest' (PF Doc VEG-R22) found 11.8% of the IPNF was old growth (with a 90% confidence interval of 9.5% to 14%). As discussed above, the amount of allocated old growth based on the IPNF stand map and recorded in TSMRS is 12.1%. Together, these two monitoring tools offer compelling evidence that the IPNF is meeting Forest Plan standards for the amount of old growth to be retained.

Full discussion of the multi-scale approach (including statistics) to assess old growth on the IPNF is found in the 2004 IPNF Forest Plan Monitoring and Evaluation Report, pages 66 through 74 (PF Doc. CR-026). In addition, the following items are included in the project file (PF Doc. VEG-28 and 29) to allow understanding of the assessments of old growth on the IPNF and the methodology and findings used for the FIA old growth findings: Review of Old Growth Assessments for the IPNF, Zack, 2006; Estimates of Old Growth Percentages and Snag Density on the IPNF, Bush and Lundberg, 2006; Calculating Years to Grow to Breast Height for Estimating Old Growth Percentages from FIA Data, Zack, Berglund and Bush, 2006; and 1/10/06 table of findings for IPNF FIA Summary Database Landscape Areas and map.

In 2006 several wildfires burned in areas of allocated old growth on the IPNF. These fires burned in mosaics which resulted in areas of total overstory/understory mortality, as well as areas of underburning with variable amounts of overstory/understory mortality. The effects of these fires to allocated old growth cannot yet be fully assessed. Field observations of areas burned in 2006 indicate significant areas of the allocated old growth within fire perimeters likely will still meet old growth definitions. However, given the worst case scenario that all areas of old growth within the fire perimeters could no longer be allocated as old growth, the 2004 Forest Plan Monitoring and Evaluation Report level of IPNF allocated old growth of 12.1% would drop to 11.9% (see PF Doc. VEG-33). Even given this worst case scenario, this Forest Plan standard would still be fully met.

The proposed action **DOES NOT** propose activities in allocated old growth. Both alternatives are consistent with this Forest Plan standard.

Old Growth Standard 10c): Select and maintain at least five percent of the forested portion of those old growth units that have five percent or more of existing old growth.

and

Old Growth Standard 10d: Existing old growth stands may be harvested when there is more than 5% in an old growth unit, and the Forest total is more than 10%.

These standards apply at the Old Growth Management Unit (OGMU) scale only. The Jo-Cat Resource Area is within a portion of OGMU 113 (PF Doc. VEG-30). As displayed in Table VEG-7, OGMU 113 only has 4.3% of the OGMU allocated because only 2 stands (83 acres) of additional old growth were found that met minimum old growth definitions/criteria in the OGMU. Sufficient areas to meet the 5% level could not be found. This is because so much of the OGMU burned in 1910 and likely it does not exist in the OGMU at this time. In this OGMU, the five percent, where it exists, standard would is fully met. The proposed action does propose activities in allocated old growth. Consistency with the 10 percent standard is addressed under standard 10b.

Old Growth Standard 10e: Old growth stands should reflect approximately the same habitat types series distribution as found on the IPNF.

This standard applies at the IPNF scale. A demonstration of compliance with this standard is found in the 2004 Forest Plan Monitoring and Evaluation Report (USDA, 2004; page 92, PF Doc. CR-026). The proposed action **does not** propose activities in allocated old growth. The proposed action does propose activities that will increase the resiliency of western larch in some stands. This increase in resiliency may allow future allocation of these stands as they age. Both alternatives would be consistent with this Forest Plan standard.

Old Growth Standard 10f: One or more old growth stands per old growth unit should be 300 acres or larger. Preferences should be given to a contiguous stand; however the stand may be subdivided into stands of 100 acres or larger if the stands are within one mile. The remaining old growth management stands should be at least 25 acres in size. Preferred size is 80 plus acres.

This standard applies at the OGMU scale. The Jo-Cat Resource Area is within OGMU 113. Supporting documentation for the following discussion is found in PF Doc. VEG-35. A summary of compliance to this standard is found below. Additional old growth is not known to exist to meet the 300 acre block portion of this standard. Since most of the OGMU originated following the 1910 fire and the area has had very minimal human activities that change size class or removes large trees since 1910, most of the OGMU will meet the minimum age for old growth allocation in the next 50 years. The Jo-Cat proposed action would increase the potential that stands involved in commercial thinning to maintain the western larch component would have increased resiliency and likely would become some of the stands that in 50 years would function as old growth. They would be unique in the Coeur d'Alene basin as they will have a high component of long lived serals. This old growth standard 10e is met.

Figure VEG-10. Old Growth Standard 10f Patch Analysis (PF Doc. VEG-35).

OG Standard 10f- Patch Analysis	
OGMU	**113**
smallest patch	146
largest patch	32
total # patches	4
# contiguous patches >/=300 acres	0
if no 300 acre patch- # patches, although not contiguous, have stands >/=100 acres with total of >300 acres within 1 mile	**0
# of patches >/=25 acres	4
# of patches >/=80 acres	2
*** 2 patches that meet these criteria equal 260 acres*	

Old Growth Standard 10g: Roads should be planned to avoid old growth management stands to maintain unit size criteria.

This standard applies at the OGMU scale and for this analysis includes OGMU 113. No permanent road construction or temporary road construction is proposed in allocated old growth under the proposed action. This standard would be met under either alternative.

Old Growth Standard 10h: A long-term objective should be to minimize or exclude domestic grazing within old growth stands.

This standard applies at the OGMU scale and for this analysis includes OGMU 113. The proposed activities would not include any new domestic grazing allotments in the Jo-Cat Resource Area nor in allocated old growth. There are currently no grazing allotments in the area. It is unlikely that grazing would occur within mature or allocated old growth structures in the Jo-Cat Resource Area in the future since mature and old growth structures do not normally provide sufficient forage for these animals. This standard is met under either alternative.

Old Growth Standard 10i: Goals for lands to be managed as old growth within those lands suitable for timber production are identified in the management area prescriptions.

This standard applies at the IPNF spatial scale. A demonstration of compliance with this standard is found in the 2004 Forest Plan Monitoring and Evaluation Report (USDA, 2004, pages 91-92; PF Doc. CR-026) where a table displaying both the goals by management area and current allocation of old growth in these management areas on the IPNF. "Only the four …management areas have specific Forest Plan old growth goals...Current old growth allocations meet and far exceed these Forest Plan goals." The proposed action **does not** propose activities in allocated old growth. Old growth standard 10i is met under either alternative.

Forest Plan Standards for Timber

Timber Standard 1. Both even aged and uneven aged silvicultural systems will be employed on the IPNF and will meet resource and vegetation management objectives identified in the Forest Plan.

Treatments associated with the action alternatives are fully described above (Direct and Indirect Effects to Forest Vegetation under the Proposed Action). Treatments would include salvage, lodgepole removal (modified regeneration harvest), commercial thinning, pruning (limbing, piling in fuelbreaks), and prescribed burning. The lodgepole removals, are modified regeneration harvests that will resemble irregular group seed trees and/or an irregular group shelterwood are considered even aged. These lodgepole removals maximize

retention of the natural mosaic both in terms of species composition and structure. Commercial thinning, salvage, the proposed overstory removal, pruning and prescribed burning can be intermediate treatments for both even and uneven aged silvicultural systems. This standard is met under the action alternative. Utilization of these treatment methods complies with Forest Plan standards (USDA, 1987, pages III-3; PF Doc. CR-002 and VEG-26) and Forest Plan Vegetation Management Silvicultural Practices (USDA, 1987, pages A-2 to 10; PF Doc. CR-002 and VEG-26). In addition, these actions are consistent with the Forest Plan which states that prescribed fire be used to meet silvicultural objectives (USDA, 1987, page III-4; PF Doc. CR-002 and VEG-26). Blister rust resistant white pine would be planted. This complies with Forest Plan direction that reforestation will normally feature seral tree species utilizing a mixture of species (USDA, 1987, p. II-32; PF Doc. CR-002 and VEG-26). These actions would promote stand structures and compositions, which reduce susceptibility in the present and future to insects, diseases, and wildfire.

Uneven-aged management was considered as a treatment method in the Jo-Cat Resource Area. To be successful, uneven aged management (or individual tree selection/group selection) requires healthy stands with a high percentage of long-lived seral trees to manage. Most stands in the Jo-Cat resource area do not meet these criteria (see PF Docs. VEG-8, VEG-3, VEG-9 and VEG-15). In addition, the uneven aged stand structure involves development of stand structures that have substantial amounts of ladder fuels within the stand over the long term, which can be a concern when addressing a stand's potential fire behavior.

Timber Standard 2. Timber stands that are substantially damaged by fire, wind throw, insect or disease attack, or other catastrophe may be harvested where this salvage is consistent with silvicultural and environmental standards. All management areas are open to this potential salvage activity except Management Areas 11 and 14.

One of the three purpose and needs for the proposed action was salvage of current and expected lodgepole pine mortality due to mountain pine beetle infestation. It is projected that without harvest the dead sawtimber component in 10 years in proposed Jo-Cat salvage and lodgepole removal units will be 62 to 97% with an average of 82% of the sawtimber lodgepole pine (PF Doc. VEG-56). The EA documents the analysis that proposed action is consistent with silvicultural and environmental standards. The proposed action would take place in Management Areas 1 and 9. This standard is met under both alternatives.

Post harvest salvage of trees damaged by prescribed burning would only occur with appropriate NEPA analysis; however, such salvage is not planned to occur in the Jo-Cat Resource Area.

Timber Standard 3. Recommended changes in timber resource land suitability from the approved Forest Plan will be based upon the criteria contained in 36 CFR 219.14(a) and the rationale displayed in environmental assessments. Changes from suitability classification will be done in accordance with the procedures outlined in Appendix M (PF Doc. VEG-17 and 18).

An analysis of suitability related to concerns for potential regeneration success for resource management was completed for the Jo-Cat Resource Area (PF Docs.VEG-17). This analysis found that 25 percent of the resource area lands are not suitable for timber management because of potential regeneration concerns. Most of these areas are portions of stands rather than entire stands (PF Docs.VEG-17). Suitability and limitations due to regeneration concerns within harvest units were further assessed on a site-by-site basis during unit layout. Regeneration harvest will not take place on sites with potential regeneration success concerns.

Appendix M of the Forest Plan indicates that on-site inspection may be used to revise timberland suitability. Forest Plan suitability was often based on broad-scale inventory data without the benefit of field verification. In the Jo-Cat area, suitability decisions seem to have been made based on general elevation breaks. The Jo-Cat analysis included a detailed 'stand by stand' review (using field data, field reconnaissance, photo interpretation, and professional experience) for treatment units (PF Doc. VEG-17 and 18). This review changed 588 acres from unsuitable (MA9 emphasis is to maintain and protect areas unsuited for timber production) to suitable (MA1 has timber production emphasis). This standard is met under both alternatives.

Figure VEG-11. Proposed Adjustments to Forest Plan Timberland Suitability in the Jo-Cat Resource Area (PF Doc. VEG-17 and 18).

Forest Plan Suitability Changes in the Jo-Cat Resource Area	% of Jo-Cat Resource Area	Proposed Adjustment to MA Designation in Jo-Cat Resource Area (% of resource area)
suitable	51	79
not suitable	48	20

The Proposed Action only proposed regeneration harvest in areas capable of regeneration success and timber production based on a on the ground site-by-site assessment as part of the unit layout process based on the Forest Plan (USDA, 1987; PF Doc. CR-002, and FSH 2409.13 (PF Doc. VEG-17) and 36 CFR 219.28 (PF Doc. VEG-17).

Timber Standard 4. Reforestation will normally feature seral tree species, with a mixture of species usually present. Silvicultural practices will promote stand structure and species mix that reduce susceptibility to insect and disease damage.

All lodgepole removal (modified regeneration) harvests would be regenerated with site-adapted species/seed source. A mix of natural and supplemental planting of white pine would trend stands toward increased representation of long lived early seral species. All treatments would retain (to the extent possible) and promote resilient long-lived seral species and structures. The No Action Alternative would not follow this trend. This standard is met under the Proposed Action.

Timber Standard 5. Project design will provide for site preparation and slash hazard reduction practices that meet reforestation needs of the area.

Site preparation and/or fuel treatment may include a combination of prescribed underburning, and hand slashing depending on post harvest conditions and silvicultural treatment needs; therefore this standard is met under either alternative.

Timber Standard 6. Timber harvest schedules and access will be coordinated with intermingled landowners where applicable.

Access to private property in the Jo-Cat Resource Area would not change under either alternative (PF Doc. TRAN-01); therefore this standard is met under both alternatives.

Timber Standard 7. Openings created by even-aged silviculture will be shaped and blended to forms of the natural terrain to the extent practicable; in most situations they will be limited to 40 acres. Creation of larger openings must conform to current Regional guidelines regarding public notification, environmental analysis and approval.

and

Timber Standard 8. An area of National Forest land will no longer be considered an opening when vegetation meets management goals established for the management area in accordance with the Regional Guide. Lands in other ownership within or adjacent to National Forest land will be included in the analysis when planning openings.

The 2003 Forest Plan Monitoring Report item reviews the maximum size for harvest areas at the IPNF scale (PF Doc. CR-022). Proposed openings will follow the natural mosaic pattern created by the existing lodgepole component and mountain pine beetle mortality/susceptibility, except along the roadless area boundary). No openings larger than 40 acres are proposed in Jo-Cat. Areas proposed for salvage, commercial thinning and overstory removal will be fully stocked after harvest. This standard is met under either alternative.

Timber Standard 9. The silvicultural prescription for each stand will establish the level of management intensity compatible with the management area goals. Preferred species management as identified in the silvicultural prescription will consider both biological and economic criteria.

All vegetative treatments have silvicultural diagnosis (PF Doc. VEG-3) and prescriptions approved by a certified silviculturist prior to project implementation. The silvicultural diagnosis and prescriptions integrate site-specific factors (such as physical site, soils, climate, habitat type, fuels and current vegetative composition and conditions) as well as interdisciplinary objectives (including fuels management, wildlife habitat and visual quality) and Forest Plan goals, objectives and standards. This standard would be met under the Proposed Action. The No Action Alternative does not propose timber management activities, therefore this standard does not apply.

Forest Plan Standards for Forest Protection

Forest Protection Standard 1. Use integrated pest management methods that provide protection of forest resources with the least hazard to humans, wildlife and the environment.

and

Forest Protection Standard 2. Use silvicultural methods and schedule practices that reduce the development and/or perpetuation of pest problems.

As described earlier in this section, loss of the long-lived early seral components (western larch, white pine and ponderosa pine) in the Coeur d'Alene basin ecosystem is a major reason for the lack of vegetative resiliency. The purpose and need for work in Jo-Cat include: treatment of areas of lodgepole impacted by a mountain pine beetle infestation (along with related fuel buildup issues) and treatment of the current long lived seral western larch to maintain long-term resilience. Treatments of the areas with current and expected high mortality of lodgepole include salvage and removal (modified regeneration) harvests. The lodgepole removal areas will have increase representation of white pine in the future with white pine planting to supplement natural regeneration of lodgepole. While the endemic level of mountain pine beetle in lodgepole is a periodic epidemic (PF Doc. VEG-53), some levels of all structural stages of lodgepole pole will remain within the resource are after treatment because this cover type is important as a component to wildlife habitat. Use of various regeneration and intermediate treatments to trend toward species compositions with increased resilience is implemented and is a major objective of the Proposed Action. In combination with alternative design features (Chapter 2, Features Designed to Improve Vegetation Management or Chapter 2 Forest Vegetation section B. Direct and Indirect Effects to Forest Vegetation Under the Proposed Action), these treatments would minimize adverse effects associated with pests. The Proposed Action will meet these two Forest Plan standards. The No-Action Alternative would not use integrated pest management methods or reduce the perpetuation of pest problems; therefore it would not meet Forest Protection Standards 1 and 2.

Forest Protection Standard 3. Vegetation management will favor the use of fire, hand treatment, natural control, or mechanical methods wherever feasible and cost effective. Direct control methods, such as chemical or mechanical, may be used when other methods are inadequate to achieve control.

Proposed vegetative treatments would utilize a combination of fire, hand treatment and natural and mechanical methods. Forest vegetative treatment using chemicals (excluding weed treatments) is not proposed, therefore this standard is met under the proposed action.

Consistency with Rangeland Renewable Resource Planning Act (RPA)/NFMA

1. **Assure that technology and knowledge exists to adequately restock lands within five years after final harvest.** An analysis of potential regeneration success concerns for resource management was completed for the Jo-Cat Resource Area (PF Doc. VEG-17). This analysis screened for concerns that likely would result in not being able to regenerate a harvest area within 5 years from final harvest. This analysis found 25 percent of federally managed lands overall in the Jo-Cat Resource Area are not suitable for resource management because of potential regeneration concerns. In addition, all harvest units were screened for the same regeneration concerns. It was found that all the proposed harvest units

are suitable (PF Doc. VEG-17 and VEG-18). Limitations due to regeneration concerns within harvest units were further assessed on a on the ground site-by-site basis during unit layout. Regeneration harvest would not take place on sites with potential regeneration success concerns. Overall regeneration success on the Coeur d'Alene River Ranger District is 96 percent for the period 1976 to 1999, with 79 percent success within 5 years of regeneration harvest (PF Doc. VEG-19). The IPNF Forest Plan Monitoring and Evaluation Report (USDA, 2003, page 10; PF Doc. CR-022) states, "over the last 11 years (1983-1993) of monitoring, our reforestation success rate has averaged 88 percent."

2. **Be chosen after considering potential effects on residual trees and adjacent stands.** The diagnosis and analysis considered the effects on residual trees and adjacent stands; therefore this requirement is met (PF Doc. VEG-3). Under the action alternatives, harvest and site preparation treatments will consider the short and long term potential negative effects (including blow down, fire mortality, etc) of proposed activities on adjacent trees and stands with site by site prescription modifications, such as change in unit boundary, modification of prescribe burning prescriptions, etc.

3. No timber harvest, other than salvage sales or sales to protect other multiple-use values, shall occur on lands not suitable for timber production.

Guidelines for determining suitability are found in the Forest Plan (USDA, 1987; PF Doc. CR-002, and CFR 219.28, FSM 1921.17 and FSH 2409.13 (PF Doc. VEG-17). The 2003 Forest Plan Monitoring Report addresses changes to timberland suitability at the IPNF scale (USDA, 2003, page 11; PF Doc. CR-022). The proposed harvest units are within the productive habitat types as described by the Forest Plan. An analysis of suitability for resource management was completed for the resource area (PF Doc. VEG-17). This analysis will only propose regeneration harvest in areas capable of regeneration success and timber production based on the ground site-by-site assessment as part of the unit layout process based on the Forest Plan and FSH 2409.13 (PF Doc. CR-022 and VEG-19).

The arrangement of the unsuitable areas is scattered across the resource area. Harvest unit layout would consider suitability limitations on a site-by-site on the ground basis. Timber harvest would not occur in unsuitable sites; therefore this requirement is met.

4. Even-aged Management. When timber is to be harvested using an even-aged management system, a determination that the system is appropriate to meet the objectives and requirements of the Forest Plan must be made. Where clearcutting is to be used, it must be determined to be the optimum harvest method.

Under the action alternative, there is the potential for both future use of both even- and uneven-aged silvicultural treatments in areas now proposed for lodgepole removal, salvage, overstory removal, and commercial thinning harvests. While a lodgepole removal harvest tends to develop an even-aged stand, the irregular arrangement of retention trees (of lodgepole pine and other species) along with the presence and/or some development of more than one age classes (2 aged and/or uneven-aged) is possible and desirable as stand resiliency increases in the future on these sites. The overstory removal harvest tends to develop a 2 or more age class structure and may be managed for either even or uneven aged systems. Commercial thinning is neither even nor uneven aged by definition but intermediate treatments for both systems. All treatments of the proposed action are silviculturally appropriate (PF Doc. VEG-3) and are within the timber and vegetation management practices outlined in the Forest Plan goals, objectives, management area direction and practices (USDA, 1987. Appendix A; PF Doc. CR-002). Silvicultural diagnosis and target stand descriptions have been completed (PF Doc. VEG-3 and VEG-9); no clearcutting is proposed. This requirement is met.

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Report on TES Plants Related to the Proposed Jo-Cat Resource Area Project

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SPECIALIST'S REPORT ON THREATENED, ENDANGERED AND SENSITIVE PLANTS IN THE JO-CAT RESOURCE AREA

Regulatory Framework

Federal legislation, regulations, policy and direction that require protection of species and population viability, evaluation and planning process consideration of threatened, endangered and other rare (Forest Service "sensitive") plants species include the Endangered Species Act (1973) as amended; the National Forest Management Act (1976); the National Environmental Policy Act (1969); Forest Service manual 2670.1-2673.4 (PF Doc. TES-1); Forest Plan, 1987 (PF Doc. TES-2, pp. II-1, 5, 6, and 27); and direction from the Regional Watershed, Wildlife, Fisheries and Rare Plants program and Washington Office.

Methodology

Assessment of Existing Conditions

The term "rare plants" is used in this document to describe all plant species that are listed by the US Fish and Wildlife Service for the Idaho Panhandle National Forests (IPNF). Also included are species designated by the Forest Service as "Sensitive" or "Forest Species of Concern". Complete lists of rare plant species are included in the Project File.

The geographic scope of the analysis for sensitive plants is the Jo-Cat Resource Area boundary. A pre-field review was conducted of aerial photos, topographical maps, Idaho Department of Fish and Game Conservation Data Center (ICDC, 2003; PF Doc. TES-3) element occurrence records, Timber Stand Management Records System (TSMRS), U.S. Fish and Wildlife Service National Wetlands Inventory Maps (USDI, 1987; PF Doc. TES-4) and recent literature.

This assessment describes the extent of all rare plant guilds in the Resource Area. The potential for the occurrence of Forest Service Threatened, Sensitive, and Forest Species of Concern (FSOC) plants was based on an assessment of potential habitat for rare plants. The Coeur d'Alene Threatened and Sensitive plant species list may be broken into eight general habitat guilds; moist forest, wet forest, dry forest, grassland, alpine/subalpine, alluvial/deciduous shrub, aquatic, and peatland (Mousseaux, 1998; PF Doc. TES-5). TSMRS queries were used to identify high potential Sensitive plant habitat by habitat guild in the Resource Area (PF Doc. TES-6). Photo interpretation, USFWS Wetland Maps, and personal knowledge of similar habitats were used to refine data derived from TSMRS. Lists of stands that may be potential rare plant habitat are contained in the project file (PF Doc. TES-34). High potential habitats where project work is proposed would be field surveyed prior to project implementation.

Assessment of Environmental Consequences

Analysis was conducted using results of past sensitive plant surveys, current distribution and condition of sensitive plant populations in habitats similar to those found in the proposed treatment sites, types of proposed treatments and the likely effects to existing populations and habitat from the proposed activity based on current knowledge and professional judgment. It included a broad-scale assessment of the distribution and suitability of rare plant habitat in relation to proposed activities and a detailed analysis of each proposed activity and the need for mitigation, including field surveys. Discussion of effects will focus on the alpine/subalpine, and wet, moist, and dry forest guilds, as these are the habitats most likely to be affected by proposed activities. The Project Files include lists of stands where activities are proposed under each alternative, including potentially affected plant guilds and acreage (PF Doc. TES-34). The cumulative effects analysis area for TES plants is the Jo-Cat Resource Area.

Effects to sensitive plant species or suitable habitat from proposed activities are generally described as very low, low, moderate or high, with the following definitions:

very low *= no measurable effect on individuals, populations or habitat*

low *= individuals, populations and/or habitat not likely affected*

moderate *= individuals and/or habitat may be affected, but populations would not be affected, and habitat capability would not over the long term be reduced below a level which could support sensitive plant species*

high *= populations may be affected and/or habitat capability may over the long term be reduced below a level which could support sensitive plant species*

Indicators used to measure effects on Sensitive plants and suitable habitat include: the type of activity, the amount of each proposed activity, the extent of ground disturbance resulting from activities, and the proximity of known sensitive plant occurrences and suitable habitat to proposed activities. The following table displays the risk of effects to rare plants from various types of disturbance and activities. The level of risk to Sensitive plants from various types of disturbance was used in the evaluation of environmental consequences.

Table TES-1. Summary of risk to rare plants from proposed activities in highly suitable habitat, by plant guild.

Proposed Activity or Event	Rare Plant Guild potentially affected	Risk of Adverse Impacts to Sensitive Plant Occurrences (without mitigation)
Loss of < 50% canopy due to insects or disease	Wet Forest/ Moist Forest / Dry Forest Forest Guild	Low to Moderate
Loss of > 50% canopy due to insects or disease	Wet Forest/ Moist Forest / Dry Forest Guild	Moderate to High
Regeneration harvest, including site prep.	Moist Forest / Dry Forest Guild	High
Commercial thinning and selective harvest using ground based equipment	Moist Forest / Dry Forest Guild	High
Helicopter and Roadside Selection harvest	Moist Forest/ Dry Forest	Low
Full Road Obliteration	Wet Forest/ Moist Forest / Dry Forest Guild	High
New road construction	Wet Forest / Moist Forest / Dry Forest/Peatland	High
Road reconstruction/reconditioning	Wet Forest / Moist Forest / Dry Forest	Low
Channel crossing removal (culverts)	Wet Forest / Moist Forest	Low to Moderate
Road closure, ripping, seeding	All	Low
In-stream fisheries/watershed restoration (structure placement w/equipment)	Deciduous Riparian/Wet Forest/Peatland	High
Fuel reduction by underburning	Wet Forest/ Moist Forest / Dry Forest	Moderate to High
Fuels reduction - mechanical	Moist Forest / Dry Forest	Moderate to High
Fuel break construction	Wet Forest / Moist Forest / Dry Forest	Moderate to High
Noxious weed prevention and treatment	Dry Forest / Moist Forest	Low to Moderate
Stand replacing wildfire	Wet Forest / Moist Forest / Dry Forest	Moderate to High

****** *Some Dry Forest sensitive plant species may be dependent on periodic low levels of disturbance from fire, such as that which occurred historically in some dry forest habitats. The timing of an underburn relative to soil moisture in suitable habitat and the flowering and fruiting of the plant species of concern also influences potential effects.*

For unsurveyed habitat that is highly suitable to support sensitive plants, presence is assumed. Protection of large occurrences and contiguous, unoccupied highly suitable habitat is an effective conservation strategy (Burgman, et al 2001, PF Doc. TES 36). Examples of conservation strategies that have been prepared for Forest Service Region 1 TES species include Lichthardt, 1995 (PF Doc. TES-37), Lichthardt 2003 (PF Doc.

TES-8), and Lorain, 1991 (PF Doc. TES-38). As described in Features Designed to Protect Rare Plants (Chapter 2), populations would be protected, while some isolated individuals may be impacted by activities. For occurrences that may be discovered during field surveys prior to project implementation, mitigation measures would be designed by the project botanist to ensure populations are protected (also refer to Chapter 2, Mitigation to Reduce Effects to Threatened, Endangered, and Sensitive Plants).

Existing Conditions

Threatened and Endangered Plant Species

There are no federally listed Endangered plants for the Idaho Panhandle National Forests .

A Threatened species, as determined by the US Fish and Wildlife Service, is any species that is likely to become an Endangered species within the foreseeable future throughout all or a significant portion of its range. Currently, the US Fish and Wildlife Service (USDI 2004, PF Doc. TES-11) list two species as Threatened for the Idaho Panhandle National Forests, water howellia (*Howellia aquatilis* and Spalding's catchfly (*Silene spaldingii*).

Candidate Plant Species

Candidate species are plants for which the US Fish and Wildlife Service has sufficient information on biological vulnerability and threats to support proposals to list them as Endangered or Threatened. Slender moonwort (*Botrychium lineare*) was listed as a Candidate species by the U.S. Fish and Wildlife Service on June 6, 2001 (USDI 2001; PF Doc. TES-12). Candidate species are not addressed in Biological Assessments. According to Forest Service Manual direction, the Forest Plan and NFMA, potential effects of Forest Service projects on Candidate species will be considered in environmental planning. Slender moonwort is listed as Sensitive in Forest Service Region 1 in Idaho.

Forest Service Rare Plant Species

The sub-basins of northern Idaho contain a wide array and diversity of habitats and plant communities, many of which contain plant species that are known or thought to be rare. Of the estimated 1,200 to 1,500 plant species known or thought to occur here, about 10% are considered rare or uncommon. Sensitive species are determined by the Regional Forester as those species for which population viability is a concern, as indicated by a current or predicted downward trend in population numbers, or in habitat capability which would reduce the species' existing distribution.

Twenty-eight species of Sensitive plants are known or suspected to occur within the Coeur d'Alene sub-basin. Plant species identified as "Forest Species of Concern", or FSOC, are species that may not be at risk on a rangewide, regional or state scale, but may be imperiled within a planning area, such as a National Forest (USDA 1997, PF Doc. TES-14, p. 5). FSOC are addressed in effects analyses to provide for population viability as directed in NFMA. Biological Evaluations are not required to address FSOC. A discussion of habitats for FSOC is included within the discussion of rare plant guilds.

Threatened and Sensitive plants and Forest Species of Concern can be assigned to one or more rare plant guilds. These guilds are artificial assemblages based on similar habitat requirements used for the purpose of analysis. For the Coeur d'Alene River Ranger District, the rare plant guilds are aquatic, deciduous riparian, peatland, wet forest, moist forest, dry forest, grassland, and subalpine. Rock seeps and springs are microsites that can support certain sensitive plants, however, these can occur across all guilds and are not identifiable at a coarse scale. Refer to the Project Files (PF Doc. TES-5) for specific plant guild descriptions. Rock seep habitats will be detected through field surveys. The following table lists Region 1 Sensitive and Threatened plant species by habitat guild that are known or suspected to occur in the Coeur d'Alene sub-basin.

Extent and Type of Suitable Habitat in the Resource Area

Suitable habitat for four of the eight Rare Plant Guilds is present in the Resource Area. Two of the guilds (wet and moist) have been grouped together for the purpose of this analysis. The extent of the habitats is displayed in Table-TES-2, below. There is no suitable habitat present for the Grassland, Aquatic, Deciduous Riparian, and Peatland Guilds. The project files contain descriptions of Rare Plant Guilds and listed species with potential for effects from proposed activities in the Jo-Cat Resource Area (PF Doc. TES-5).

Table-TES-2. Rare plant guilds in the Jo-Cat Resource Area.

Rare Plant Guild	Acres of Habitat in Resource Area*	Percentage of Resource Area in Habitat Guild
Wet and Moist Forest	2	<1
Dry Forest	205	10
Subalpine	388	18
Deciduous Riparian	0	0
Peatland	0	0
Grassland	0	0
Aquatic	0	0
Total	595	28

** Table acreage pertains to National Forest System lands only.*

Plant Surveys and Documented Occurrences

Implementation Features for TES Plants (Chapter 2) provide for botanical field surveys to be completed in all previously unsurveyed areas of highly suitable habitat where activities would take place. Field surveys were conducted in the Resource Area during 2006. The intensity of field surveys was based on habitat suitability and the risk of effects to Sensitive plants and habitat due to project activities. Table 3-TES-1 illustrates the risk to Sensitive plants and Forest Species of Concern from various types of disturbance. Regional direction (Leonard 1992; PF Doc. TES-15) states that the need for and extent of field reconnaissance should be commensurate with the risk associated with the project, the species involved, and the level of knowledge already in hand. Copies of field surveys are contained in the project files (PF Doc. TES-16). One new occurrence of a Sensitive plant, naked Mnium moss (*Rhizomnium nudum*), was discovered during field surveys, There are no known occurrences of Threatened and Endangered plants in the Resource Area.

Rare Plant Species with Potential for Effects from Project-Related Activities

Analysis and field surveys indicate that the Alpine/Subalpine, Wet and Moist Forest Guilds occur in the Jo-Cat Resource Area, and may be affected by project-related activities. Species of these guilds were analyzed in detail, and are discussed below. Suitable Dry Forest Guild habitat, though present in the Resource Area, would not be directly affected by any project-related activities, so this guild was not analyzed in detail. Effects to this guild are expected to be very low to non-existent. Suitable habitat for Grassland, Deciduous Riparian, Aquatic and Peatland Guild species does not exist in the Resource Area, therefore these species were not further analyzed.

<u>Alpine/Subalpine Guild</u>

A Forest Service Sensitive plant species in the Alpine/subalpine Guild is leafless bug-on -a-stick moss (*Buxbaumia aphylla*). There are also several FSOC plants that may occur in subalpine habitats. Alpine/subalpine habitat occupies approximately 18 percent of Forest Service lands in the Resource Area.

Leafless bug-on-a-stick moss (*Buxbaumia aphylla*) is a circumboreal species that is documented from one location in Idaho on the Nez Perce national Forest. This occurrence is at an elevation of 5,500 feet on mineral soil. There is a chance that it may exist in the Resource Area.

Iceland-moss lichen (*Cetraria subalpina*) is a rare lichen that grows on menziesia and other ericaceous shrubs in cool, subalpine habitats. The nearest occurrence is in the Selkirk Mountains on the Sandpoint Ranger District. This species has been observed in previously burned areas in some large, localized occurrences.

Bourgov's astragalus *(Atragalus bourgovii)* and **California sedge *(Carex californica)*** are IPNF Forest Species of Concern that occur on the Coeur d'Alene River Ranger District in subalpine bald habitats. There are no activities planned in these habitats with this project.

Moist and Wet Forest Plant Guilds

Moist and Wet Forest Plant Guilds were grouped for this analysis. Moist Forest Guild plant habitat occurs mainly on northeast to northwest slopes, and in drainage bottoms. Of the Moist and Wet Forest Guild plants, deerfern (*Blechnum spicant*), moonworts (*Botrychium spp.*), Henderson's sedge (*Carex hendersonii*), and naked Mnium moss (*Rhizomnium nudum*) were determined to have the highest potential to occur in the Jo-Cat area from pre-field review. Only one Sensitive or FSOC plant species was found to occur in the Jo-Cat Resource Area. One Naked *Mnium* moss (*Rhizomnium nudum*) population was located on Road #6006 and in a sub-drainage of Cat Gulch during field surveys. Moonworts (*Botrychium spp.*), may occur in moist to wet habitats in the Resource Area primarily in riparian zones and near seeps or springs if present. Henderson's sedge (*Carex hendersonii*), a FSOC, may be found in similar habitats. The Wet Forest Sensitive Plant Guild occupies a trace amount of acreage in the Resource Area, and is mainly restricted to stream bottoms. Springs associated with Road #6006 have created wet habitat on the road prism and along the roadside. Wet Forest Guild habitats would be protected by riparian buffers from timber harvesting, as described in Section 3. C. (3.), Features Designed to Protect Aquatic Resources. Portions of non-optimal habitat, such as the road prism, would be affected by project –related activities.

Deerfern (*Blechnum spicant*) is a long-lived, evergreen, perennial fern favoring moist forest and riparian areas in cedar/hemlock forest. The distribution of deerfern is interruptedly circumboreal. It is found chiefly in the Cascade Mountains but has disjunct populations in Idaho and British Columbia. There are 27 occurrences of deerfern documented from the IPNF. Seven are known to occur on the Coeur d'Alene River Ranger District. An occurrence of deerfern is located approximately seven miles northwest of the Resource Area near Fancy Gulch.

Henderson's sedge (*Carex hendersonii*) is a perennial forb of low elevation (less than 3,500 feet), moist forest habitats. The principal range of this species is west of the Cascade Mountains from southwestern British Columbia to northwestern California. It has a disjunctive distribution in northern Idaho, extending from the Selway River, north to the Coeur d'Alene sub-basin. It is most often found on the IPNF in western redcedar/hemlock and grand fir forests, often near streams or seeps, and on moist benches upslope from streams. There are 38 documented occurrences of Henderson's sedge on the IPNF and 32 in the Coeur d'Alene subbasin (ICDC 2002, PF Doc. TES-3). The nearest occurrence to the Jo-Cat Resource Area is located approximately seven miles southwest in Beaver Creek.

Moonworts (*Botrychium ascendens, B. crenulatum, B. lanceolatum, B. lineare, B. minganense, B. montanum, B. paradoxum, B. pedunculosum, B. pinnatum, and B. simplex*) are fern-like plants that are found in a variety of habitats ranging from damp meadows and boggy areas to moist coniferous western hemlock and cedar forest (Lorain 1990, PF Doc. TES-21, p. 7). On the IPNF they occur most often on shallow sloped sites in densely shaded moist to wet forest habitats. There are approximately 75 occurrences of moonworts on the IPNF, and 28 on the Coeur d'Alene River Ranger District. No moonwort occurrences are documented from the Jo-Cat Resource Area, but they may occur there based on potential habitat. A documented occurrence of Mingan moonwort (*Botrychium minganense*) is approximately three miles west in the Vendetta Creek drainage.

Naked Mnium moss (*Rhizomnium nudum*) is a moss of cool, moist to wet places in mid to higher elevation coniferous forests. This species is often found to inhabit seepages and moist areas adjacent to streams. There are four occurrences documented from the IPNF and two from the Coeur d'Alene River Ranger District. This species is documented to occur on road #6006 in the Resource Area, and in a small tributary of Cat Gulch. The portion of the occurrence in Cat Gulch is outside of planned activity areas.

Slender moonwort (*Botrychium lineare)*, a Candidate species for Federal listing, and IPNF Sensitive species, is one of the more distinctive moonworts. The habitat has been described as "deep grass and forbs of meadows, under trees in woods, and on shelves on limestone cliffs, mainly at higher elevations" (Wagner and Wagner 1994, PF Doc. TES-35). However, a specific habitat description for this species is problematic because of its formerly widespread distribution ranging from sea level in Quebec to nearly 3,000 meters, 9.840 feet in Boulder, Colorado (USDI 2000, PF Doc. TES-22, p. 2). Although slender moonwort was previously documented from Oregon, Colorado, Idaho, Montana and California, only two populations in two states (Montana and Colorado) are thought to exist currently. The Idaho population, documented from Upper Priest River on the Idaho Panhandle National Forests was last observed in 1925, and has not been relocated. Suitable habitat for slender moonwort was not found in the Resource Area, it is not likely to occur there.

Environmental Consequences

The following table summarizes the acres of potential rare plant habitat affected in each alternative. A complete list of Rare Plant Guild stands and units, by alternative, is located in the Project File (PF Doc. TES-34).

Table 3-TES-3. Summary acres of potential rare plant habitat affected by proposed activities by alternative*.

Rare Plant Guild	Alt. 1	Alt. 2
Moist/Wet Forest	0	0
Dry Forest	0	0
Alpine/Subalpine	0	84
Deciduous Riparian	0	0
Peatland	0	0
Grassland	0	0
Aquatic	0	0
Total Guild Acres	**0**	**84**

**Acreage figures were derived from Timber Stand Management Records System data and Satellite Imagery (SILC).*

Alternative 1 (No Action)

Direct and Indirect Effects

Alternative 1 (No Action) would have no direct effect on any Threatened, Sensitive, Forest Species of Concern (FSOC) or Special Status Plant Species (SSPS). While there would be no direct impacts to these species with this alternative, there would also be no improvement made to vegetative and watershed conditions, which could in the long term provide suitable sensitive plant habitat.

In the future, with no action wildfires in the Resource area would likely be more widespread and of higher intensity. While there would be no direct effects to Threatened, Sensitive, SSPS, and FSOC occurrences and habitat with Alternative 1, there would be a complex variety of indirect effects.

Indirect effects to Threatened, Sensitive, FSOC, and SSPS plant habitat and populations under Alternative 1 are likely for certain guilds and species. In stands with declining canopy cover due to mortality from insects and diseases, the likely effects to certain sensitive plant guilds and species present could range from a beneficial response, due to factors like increased levels of light and available moisture, a neutral response,

species persist but there is no evident change in population levels, to an intolerant response because of factors like loss of shade and decrease in relative humidity.

Indirectly, there would be an increased risk to sensitive plants and habitat due to the increase in fuel loads from insect mortality and through time with continuing fire suppression. The greater the fuel loading, the greater the risk of a high intensity burn and stand replacing fire, with possible loss of rare plants and habitat. The increase in ignition risk and a resulting fire would also have an array of likely effects for sensitive plant species, ranging from beneficial to intolerant, depending on factors like the intensity of the fire, the species ability to survive the event, and compete in early successional habitat. The ability to analyze these effects for all sensitive plant species is limited given our current level of knowledge. The following section provides general information on how herbaceous plants respond to fire.

There is little specific information for the Coeur d'Alene basin on rare plant occurrence in pre-settlement times. Available information on shifts in forest stand structure and composition and disturbance patterns suggests that many changes have also taken place in understory shrub and forb communities and grasslands. Photo-comparison and fire history studies suggest that fire exclusion has allowed a greater portion of inland forests on the landscape to develop as dense stands (USDA 2000, PF Doc. TES-29, p. 116). The spatial arrangement of these stands may allow insects and disease epidemics and stand replacement fires to become larger than in the past. At the same time seral grassland species (shrubs, aspen, and seral conifers) are being replaced by thickets of shade-tolerant conifers. Due to excessive fuel loadings and fire suppression in much of the forest, when fires occur, they are likely to burn more intensely.

Fire behavior, duration, fuel consumption pattern, and the amount of subsurface heating all influence injury and mortality of plants, and their subsequent recovery. Post-fire responses also depend on the characteristics of the plant species on site, their susceptibility to fire and, and the means by which they recover after fire (USDA 2000, PF Doc. TES-29, p. 9).

A low severity fire (moderately burned, moderate duration, moderate ground char) that only consumes some of the surface fuels may kill laterally growing rhizomes or roots near the surface, or stem buds that are not well protected. It has little effect on buried plant parts and can stimulate significant amounts of post-fire sprouting. In contrast, a high severity fire (heavily burned, long duration, deep ground char) removes the duff layer and most of the woody debris, particularly rotten material. It can eliminate species with regenerative structures in the duff layer, or at the duff-mineral soil interface, and may lethally heat some plant parts in the upper soil layers, particularly where concentrations of heavy fuels or thick duff layers are consumed (PF Doc. TES-29, p. 20).

Whether herbaceous plants recover after fire depends largely on whether their regenerative structures are exposed to lethal temperature. Similar to woody plants, their survival depends on depth below the surface, whether they are located in combustible material, and the subsurface moisture regime at the time of the fire (USDA 2000, PF Doc. TES-29, p. 21). In addition, plants regenerate by a variety of means including vegetatively by means of resprouting or spreading with rhizomes, or by seed. Some plants have seed accumulate in the soil for long periods of time in the form of a "seed bank", which only germinates after a disturbance such as fire.

Cumulative Effects

Cumulative effects for individual species and guilds under Alternative 1 are described below. Refer to Appendix A for a list of past, present, and reasonably foreseeable future actions that were considered in this analysis.

Wet and Moist Forest Guilds

Cumulative impacts to wet and moist forest habitat would be low. The amount of wet and moist forest guild habitat is low in the Resource Area. Wet Forest Guild Habitat would be less prone to a stand replacing wildfire than drier habitat guilds. Impacts to moist forest habitat would be low where canopy cover has not been reduced. More open stands, with higher fuel loads, that may have been affected by insect and disease mortality would be predicted to be low to moderate in relation to risk of stand replacement wildfire. Some small loss of

Moist Forest Guild Habitat likely occurred with the reconstruction of Forest Highway 9. While there were past and possible future activities that affect wet and moist habitats on private lands, the Forest Service has no authority over these activities.

Alpine/Subalpine Forest Guild

Cumulative effects to alpine/subalpine forest would be low to moderate. Impacts resulting from recent insect activity could include high-intensity, duff-replacing wildfires from predicted high fuel loadings in untreated areas. Some disturbance to rare plant species in this guild may be beneficial as they tend to favor more open disturbed sites. However, populations could be destroyed if such a fire were intense enough. The prospect of recolonization of affected habitat would depend on the extent and duration of habitat alteration and the availability of an adjacent seed source.

Dry Forest Guild

Cumulative effects to dry forest guild species and habitat with Alternative 1 are expected to be low. Dry forest habitats would be inherently more at risk of stand replacing wildfire with continual fire suppression. Since dry forest species are adapted to habitats, which, historically, experienced a greater fire frequency, some would likely survive a stand replacing fire in scattered microsites. Successful recolonization for species after such disturbance events would likely be more difficult than it was historically due to fragmentation and overall habitat reduction.

Effects of the Alternative 2 (Proposed Action)

Direct and Indirect Effects

Activities proposed under Alternative 2 would directly affect Moist Forest, Wet Forest, and Alpine/Subalpine Guild habitat. Effects to plant guilds due to specific treatments are described below under effects of project-related activities. Species for which information is available on response to management activities are displayed in the following section.

Cumulative Effects

The cumulative effects of the Proposed Action for Alpine/Subalpine, Moist/Wet, and Dry Forest Plant Guilds and species are discussed below.

Effects of the Action Alternative

Effects to Threatened and Endangered Plants

There would be No Effect to any Endangered plant with implementation of Alternative 2.

No suitable habitat exists in the Resource Area for the Threatened, aquatic species water howellia (*Howellia aquatilis*) or the grassland species Spalding's catchfly (*Silene spaldingii*). There would be No Effect to these species or guilds as a result of activities proposed in the action alternative. For further information on effects to Threatened plants, refer to the Biological Assessment in the Project Files.

Effects to Sensitive Plants, Special Status Plants, and Forest Species of Concern

There would be no impact to rare plants of the Dry Forest, Peatland, and Deciduous Riparian Guilds from implementation of the action alternative. There would be direct, indirect and cumulative effects to habitat of the Wet and Moist Guilds, and the Alpine/Subalpine Guild with project implementation. Alternative 2 would directly impact individual Naked Mnium moss (*Rhizomnium nudum*) plants that occur on road #6006, but the portion of the population in Cat Gulch, and associated habitat, would not be affected. The ample amount of suitable habitat in the drainage would provide for the continued existence of this species.

Effects of Project-Related Activities

Timber Harvesting: Direct impacts of timber harvest can include elimination of individual plants through ground disturbance. Indirect impacts to sensitive plants can include changes in fuel loading, duff levels, moisture regime, and light levels. Effects to plant habitat can result in decreased suitability for colonization

and spread of plant populations. The effects to sensitive plants would vary according to species and harvest prescription. Most timber harvest would take place in moist forest habitats, so most of the effects would be confined to moist forest guild species. Fewer acres of dry and wet, in comparison to alpine/subalpine and moist forest guild habitat, would be potentially impacted by harvest in Alternative 2. Since Riparian Habitat Conservation Area guidelines would be followed for all action alternatives, most wet forest habitat would be excluded from harvest activities. Road reconstruction activities could potentially impact wet forest habitat. The Table 3-TES-4 displays the acres of suitable sensitive plant habitat potentially affected by timber harvest.

Lodgepole harvest and Commercial Thinning: Selective harvesting would take place in Alternative 2. The effects of selective harvest would be similar to the effects of mortality induced by insect and disease agents, as in Alternative 1, No Action. The main difference would be the change in fuel loadings in untreated stands and resulting increased risk to sensitive plants from future stand-replacing wildfires. There would be some direct effects from selective harvest in suitable habitats for sensitive plants of the alpine/subalpine, moist, dry, and wet guilds, especially those that are intolerant of changes in the moisture and light regime (i.e. mycotrophic species, moonworts and orchids). The other species are not likely to be adversely affected by selective harvest treatment. Commercial thinning of larch would take place in the action alternative. Commercial thinning, as an intermediate harvest method, is similar to selective harvest in the amount of tree canopy cover removed, but it differs in that it would result in a more uniform spacing of trees than with selective harvest. The effects of commercial thinning on sensitive plants would generally be the same as selective harvest.

Yarding System Methods: The yarding methods proposed for the action alternative consist of helicopter, skyline, and tractor or forwarder yarding. Helicopter yarding would have an insignificant effect on sensitive plants and habitat because there would be little or no ground disturbance. Some damage to the live crowns of leave trees would be expected, but it would be minimal. The effects of skyline yarding would be intermediate between helicopter and tractor yarding. Skyline would necessitate construction of corridors for yarding purposes in which long narrow canopy openings would be created. Some ground disturbance would result from the yarding process. Mechanized felling, if utilized in some skyline units would increase the amount of ground disturbance, although most of this would be associated with corridor locations. Tractor yarding would cause the most detrimental and long lasting impacts to the sensitive plant habitat, but it would be confined to designated skid trails. Here, compaction and soil displacement would be the primary negative effects. The effects of forwarder yarding would be similar, but somewhat less than those of tractor. Under the action alternative, Forest Plan Standards and Guidelines would be met for woody debris retention on site and minimizing soil displacement and compaction.

New Road Construction, Road Reconstruction, and Reconditioning: New road construction, road reconstruction, and reconditioning would take place in the action alternative. These activities vary in the potential for effects to plant guild habitats and species. New road construction is a high ground disturbance activity, constituting a high risk to sensitive species in these guilds. Prior to new road construction, previously unsurveyed, highly suitable habitat in the activity area would be surveyed and any new occurrences deemed critical to species/population viability would be protected. The new construction identified under the proposed action is not located in rare plant guilds. In contrast, road reconstruction and reconditioning are low risk activities in terms of direct or indirect effects to sensitive plants and habitat. For these activities, existing road prisms would be treated which are already disturbed and of very low habitat suitability. While there are a few sensitive plant occurrences on the IPNF on old roads or cutbanks, they are, in general, individuals isolated from the main occurrence. This is the case on the #6006 road that is scheduled for reconstruction.

Fuels Treatment: Various methods of fuels reduction are proposed under the action alternative, all having the potential to directly and indirectly impact sensitive plants and habitat. Slashing and lop and scatter fuels treatments would have a negligible effect on sensitive plant species. Underburning for fuels reduction would be done within harvest unit boundaries only. Spring burning has the potential to impact rare plant individuals, particularly mycorrhizal species such as moonworts. Specific mitigation measures in section 3. C. (3.) would protect populations and highly suitable habitat that may be discovered during field surveys prior to project implementation. There would be a slight risk of increasing certain noxious weed species with burning, depending on the proximity to existing infestations and the cover type of the area treated (refer to Project Files,

Noxious Weeds). There would be no direct ignition, although some backing may occur, within designated Riparian Habitat Conservation Areas. This would buffer riparian wet forest habitats from this type of activity. Fire line construction has the potential to impact sensitive plants and habitat through vegetation and ground disturbance. The only planned fireline construction would be between units 5 and 6. Elsewhere, fire is planned to be introduced without control lines. This may introduce some fire into otherwise untreated areas. However, fire intensity is expected to be low and only extend a short distance. Burning in units 13 and 14 could potentially affect adjacent dry guild habitats outside treatment units for a short distance. As a heavily ground disturbing activity, grapple piling would detrimentally impact sensitive plant habitat. Specific features of all action alternatives (described in Chapter 2) would protect documented populations and mitigate for new ones discovered prior to implementation.

Watershed Rehabilitation, Including In-stream Work, Road Decommisioning, and Replacement of Road Channel Crossings: Watershed rehabilitation activities have the potential to directly and indirectly impact moist, wet and dry forest guild habitats. Road channel crossing removal would have effects mainly to moist and wet forest habitat and is considered to be a low to moderate risk activity for sensitive plants, depending on the amount of ground disturbance. Road channel crossing upgrades that would be done during reconstruction are considered to be lower risk activities to sensitive plants. In-stream channel work would constitute a short term risk to sensitive plant habitat, but would have long term benefits because channel stability and riparian community habitat would be improved. Moist and wet forest guild species would be protected according to the features for TES plants outlined in Chapter II.

Weed Treatment and Prevention: Noxious weed treatment and prevention would be performed according to guidelines outlined in the Coeur d'Alene River Ranger District Noxious Weed Final Environmental Impact Statement and Record of Decision (USDA Forest Service, 2000, PF Doc. TES-33). As described in this document, integrated weed control methods would be used, including herbicide spraying, manual, cultural (seeding/fertilizing) and biological. Weed treatment and prevention measures would reduce, but not eliminate the risk of weed spread in the project area. Effects to Threatened, Sensitive plants and Forest Species of Concern (FSOC) would be very low because of mitigation measures to protect these species as outlined in the Noxious Weeds FEIS and due to forest habitats and elevational zones in the Resource Area. Additional information on the noxious weed treatment is contained in the Project File.

Cumulative Effects

Refer to the Jo-Cat Environmental Assessment, Appendix A, for a list of past, present, and reasonably foreseeable future actions that were considered in this analysis.

There is little existing information regarding documented rare plant occurrence or habitats in the Jo-Cat Resource Area. Prior to 1988 the USFS did not conduct rare plant surveys, and occurrence reports to the Idaho Conservation Data Center were incidental (IPNF 2003; TES-17). Past activities on Federal lands prior to policies affording protection of rare plants, have affected populations and habitat of sensitive plant species. Current activities proposed on Federal lands are required by law and policy to address sensitive plant species. Populations, when found, are managed for. Activities on State and private lands are not required to protect these species, therefore, loss of populations and modification of habitat is likely occurring.

In the long term, project activities would trend vegetative conditions toward the desired future condition. While there would be direct and indirect effects to rare plant habitat, potentially suitable habitat for rare plants would gradually be improved. Considering these factors and the design features to protect TES plants outlined in Chapter 2, the Cumulative effects of the proposed action on rare plant guild species and habitats, overall, would be low.

Reasonably Foreseeable Future Actions and Ongoing Activities

Reasonably foreseeable and ongoing projects in the cumulative effects analysis area are identified in Appendix A. No ongoing or reasonably foreseeable projects were identified in the Jo-Cat Resource Area.

Weed control is a reasonably foreseeable future action. Guidelines for weed treatment would be consistent with those contained in the Coeur d'Alene River Ranger District Noxious Weeds FEIS, 2000. There is a risk of

weed spread with the action alternative where prescribed fire is proposed. Weed increase may indirectly impact sensitive plants and highly suitable habitat where present in proposed treatment areas. Features Designed to Reduce the spread of Noxious Weeds, Section 3, would reduce the risk of weed spread.

Outside of the Resource Area, implementation of projects on National Forest System lands would contribute insignificant impacts to sensitive plants or suitable habitat, since Federal lands are managed to maintain sensitive plant populations. Sensitive plant and habitat assessment are conducted for all ground and/or vegetation disturbing on in the District. While individuals of some sensitive plants may occasionally be impacted, cumulative impacts to species and habitats are expected to be low.

Determination of Effects for Rare Plant Species

Based on the above analysis, and with the provisions for surveys and protection of rare plant populations (Features Designed to Protect Rare Plants, Section 3. C. (3.) the following table represents the determination of effects to plants for each alternative. A description of habitat guilds and list of rare plant species is included in the Project Files (PF Doc. TES 5).

Table 3-TES-4. Summary of determination of effects on rare plant species, by guild, for each alternative.

Species Guild	Alt. 1	Alt. 2
Moist/Wet Forest	NI	MIIH
Dry Forest	NI	MIIH
Alpine/Subalpine	NI	MIIH
Deciduous Riparian	NI	NI
Peatland	NI	NI
Grassland	NE	NE
Aquatic	NE	NE

NI = No Impact
MIIH = May Impact Individuals or Habitat with no trend to federal listing or loss of species or population viability
WIIH = Will Impact Individuals or Habitat with a likely trend to federal listing and/or loss of population or species viability
BI = Beneficial Impact
NE = No Effect

Consistency with Forest Policy and Legal Mandates

All of the proposed activities with the requirements for surveys and implementation of mitigation measures would meet the intent of the Forest Plan. The No Action Alternative would also meet the intent of the Forest Plan.

A Forest Plan management goal is to "manage habitat to maintain populations of identified sensitive species of animals and plants" (Forest Plan, II-1, TES-2).

A Forest Plan standard for sensitive species is to "manage the habitat of species listed in the Regional Sensitive Species List to prevent further declines in populations which could lead to Federal listing under the Endangered Species Act" (Forest Plan, II-28, PF Doc. TES-2).

Alternatives in the EA have analyzed the distribution of habitat for rare plants, including Region 1 Forest Service Sensitive plants, Forest Species of Concern, and Threatened plants. The Idaho Conservation Data Center was consulted for information on rare plant occurrence in the State. Alternative design considered the documented occurrence of rare plant species in the Resource Area, and the potential effects of proposed activities. Features Designed to Protect Rare Plants (EA, Ch 2) provide for rare plant surveys to be conducted in all areas of suitable habitat where activities would occur prior to project implementation. Mitigation measures for rare plants would protect occurrences that may be discovered during surveys. Documentation of field surveys for rare plants are included in the Project File in TES-16.

The Forest Plan also identifies the need to "Determine the status and distribution of Threatened, Endangered and Rare (sensitive) plants on the IPNF" (Forest Plan, II-18, PF Doc. TES-2).

Two species of Threatened plants are listed by the USFWS for the Coeur d'Alene River Ranger District (USDI 2003; PF Doc. TES-11). Although there is potentially suitable habitat, no Threatened species have been discovered on Forest Service lands. There are no Endangered plant species currently listed for the IPNF or Coeur d'Alene River Ranger District. All projects on the Coeur d'Alene River Ranger District are analyzed for effects to Threatened plant species. Potentially suitable habitat is surveyed prior to project implementation. Projects that may have effects to Threatened plants are consulted on with the U.S. Fish and Wildlife Service according to Section 7 Guidelines under the Endangered Species Act, 1999.

Specialist's Report on Aquatic Resources in the Jo-Cat Resource Area

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March 2007

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SPECIALIST'S REPORT ON AQUATIC RESOURCES IN THE JO-CAT RESOURCE AREA

1. Regulatory Framework for Aquatic Resources

The regulatory framework governing management of watershed and fisheries for the analysis is based on:

- *Forest Plan – Idaho Panhandle National Forest (IPNF)*
- *National Forest Management Act (NFMA)*
- *Endangered Species Act (ESA)*
- *Clean Water Act (CWA) and amendments.*
- *Idaho Department of Environmental Quality (IDEQ) implementation of the Clean Water Act*
- *Rules Pertaining to the Idaho Forest Practices Act (Title 38, Chapter 13, Idaho Code, 2000)*
- *Executive Order 12962 (Recreational Fishing)*
- *U.S. Fish and Wildlife Final Rule – Designation of Critical Habitat for the Bull Trout (CFR 50 Part 17)*
- *State of Idaho Governor's Bull Trout Plan*

The National Forest Management Act (NFMA 1976) requires that the Forest Service manage for a diversity of fish habitat to support viable fish populations (36 CFR 219.19). Regulations further state that the effects on these species and the reason for their choice as management indicator species (MIS) be documented (36 CFR 219.19(a)(1)). Direction is also included in the Idaho Panhandle National Forests Forest Plan (USDA 1987). The Inland Native Fish Strategy (INFS; USDA 1995; PF CR-003) amended some Forest Plan direction regarding stream and fish habitat protection measures (see Appendix B).

Section 7 of the 1973 Endangered Species Act (ESA) includes direction that Federal agencies, in consultation with the U.S. Fish and Wildlife Service, will not authorize, fund, or conduct actions that are likely to jeopardize the continued existence of any threatened or endangered species or result in the destruction or adverse modification of their critical habitat. Currently, individual bull trout have been documented within some portions of the North Fork Coeur d'Alene and its tributaries (i.e. Eagle Creek), but no populations have been reported to persist in the Coeur d'Alene River system. However, private land along the North Fork Coeur d'Alene River and Prichard Creek are designated as critical habitat by the U.S. Fish & Wildlife Service (Federal Register, October 6, 2004, 50 CFR Part 17; http://www.fws.gov/pacific/bulltrout/).

Under authority of the Clean Water Act, the Environmental Protection Agency (EPA) and the states must develop plans and objectives that will eventually restore identified water bodies that are not meeting State water quality standards. Stream segments of concern are identified under the antidegradation policy of the State's water quality standards as meeting or exceeding standards. The North Fork of the Coeur d'Alene River, Prichard Creek, and the East Fork of Eagle Creek are all listed on the 2002/2003 303(d) list for water quality impairment (DEQ, 2003). The pollutants of concern are metals and sediment. There is a Total Maximum Daily Load (TMDL) for sediment in the North Fork of the Coeur d'Alene River Subbasin that was approved in November 2001 (PF Doc. AQ-116). The completion of the implementation plan is pending. Under this status, there should be no net increase in the pollutant of concern with management actions and an overall trend in pollution reduction over time. The TMDL for the North Fork of the Coeur d'Alene River would include the main stem river and any tributary that influences water quality to the main river such as Prichard Creek.

The Forest Service is working with DEQ and EPA to develop an implementation plan for its portion of the TMDL in the North Fork Coeur d'Alene River in cooperation with other Federal, State and local Governments, and interested local parties. In the interim, any activities we undertake or permit on National Forest System lands will be designed to reduce pollutants of concern, where feasible. The timeframe for completion of the implementation plan has not yet been determined.

The Forest Service has agreements with the State of Idaho to implement Best Management Practices (BMPs) or Soil and Water Conservation Practices for all management activities. Proposed activities will be in compliance with the guidelines in the Soil and Water Conservation Handbook (Forest Service Manual 2509.22), which outlines BMPs (Appendix A). These practices and guidelines are designed to meet the intent of the water quality protection elements of the Idaho Forest Practices Act.

Executive Order 12962 (June 7, 1995) states objectives "to improve the quantity, function, sustainable productivity, and distribution of U.S. aquatic resources for increased recreational fishing opportunities by: (h) evaluating the effects of Federally funded, permitted, or authorized actions on aquatic systems and recreational fisheries and document those effects relative to the purpose of this order."

The mission of the Governor's Bull Trout Plan is to "…maintain and or restore complex interacting groups of bull trout populations throughout their native range in Idaho" (State of Idaho 1996; PF Doc. AQ-11). The Governor's Bull trout plan incorporates the entire Coeur d'Alene River drainage and its tributaries, which in this project would include the N.F. Coeur d'Alene River and its tributaries.

2. Affected Aquatic Environment

A. Methodology Used in the Assessment and Description of the Affected Aquatic Environment

Geographic Scale of the Analyses

The resource area was subdivided into manageable units that make sense when addressing cumulative watershed effects. Two scales of analysis were selected (Figure AQ-1). The larger watershed scale is the area above Eagle Creek which is 49.6 sq miles. This larger watershed is the appropriate size area to model cumulative effects using the predictive model called WATSED, (Appendix H). This scale is also consistent with the analysis in the Coeur d'Alene River Geographic Assessment (PF Doc. CR-025). The smaller sub-watershed scale was delineated as the area upstream of Bear Gulch. This smaller scale analysis can be used to local impacts that potentially could be measurable near the proposed activity. The discussions in this analysis are organized by these two watersheds of the Jo-Cat Resource Area.

1) *Upper Prichard Creek Watershed (above Eagle Creek)*
2) *Upper Prichard Creek Sub-Watershed (above Bear Gulch)*

Aerial photographs from 2004 were used to estimate location and types of vegetative management on non-federally managed lands and Bureau of Land Management (BLM) records were used on BLM managed land so that all land management activities could be accounted for in each of the cumulative effects analysis areas.

Water quality in the North Fork Coeur d'Alene River, at the confluence with Prichard Creek, is qualitatively addressed in this Environmental Assessment based on changes in contribution of pollutants. The Geographic Assessment recommends one integrated strategy that will help respond to issues and process of the terrestrial, aquatic and recreation components of the ecosystem (Geographic Assessment, page 59; PF Doc. CR-025. This strategy identified different implementation strategies for different areas, so native aquatic resources can be conserved and protected.

The aquatic ecosystems of the Jo-Cat Resource Area fall into one of three condition classes, as defined in the Geographic Assessment (USDA Forest Service, 1998, pages 59-61; PF Doc. CR-025):

- *<u>Properly functioning</u>: Within the scope of this assessment, a properly functioning watershed system is one that is exhibiting dynamic equilibrium characteristics and whose streams are operating and responding appropriately under their current environment. These systems can absorb and respond to disturbances that they have evolved under their historic range. Typically, parts of these systems, or the system as a whole, can move toward a more stable condition over time following a disturbance (or a series of disturbances) within a certain time period. As a system, these watersheds will not benefit from large-scale watershed restoration actions (although local, site-specific improvements may be productive.)*

- *Functioning at risk: A watershed system that is functioning-at-risk is one that is essentially still properly functioning. However, it may be exhibiting trends or it may contain known risks that are likely to compromise that status and the ability to fully support beneficial uses in the future. This status may be assigned where the apparent watershed status is uncertain because the complexity of the system and disturbances. These systems are the first priority for large-scale watershed system restoration and improvement programs. Such programs will often produce effective and timely responses in the near future.*
- *Not properly functioning: Watershed systems that are not properly functioning often exhibit rapid adverse trends and may not fully support beneficial uses. These systems may appear to be responding to their own last adjustment, rather than toward stabilizing the last disturbance. They are "out-of-balance" with their environment and may not be in dynamic equilibrium, in periods of at least several decades. These systems are in need of large-scale restoration. These watersheds are usually second priority due to limited availability of resources, uncertain technology, and the long time period expected for positive responses.*

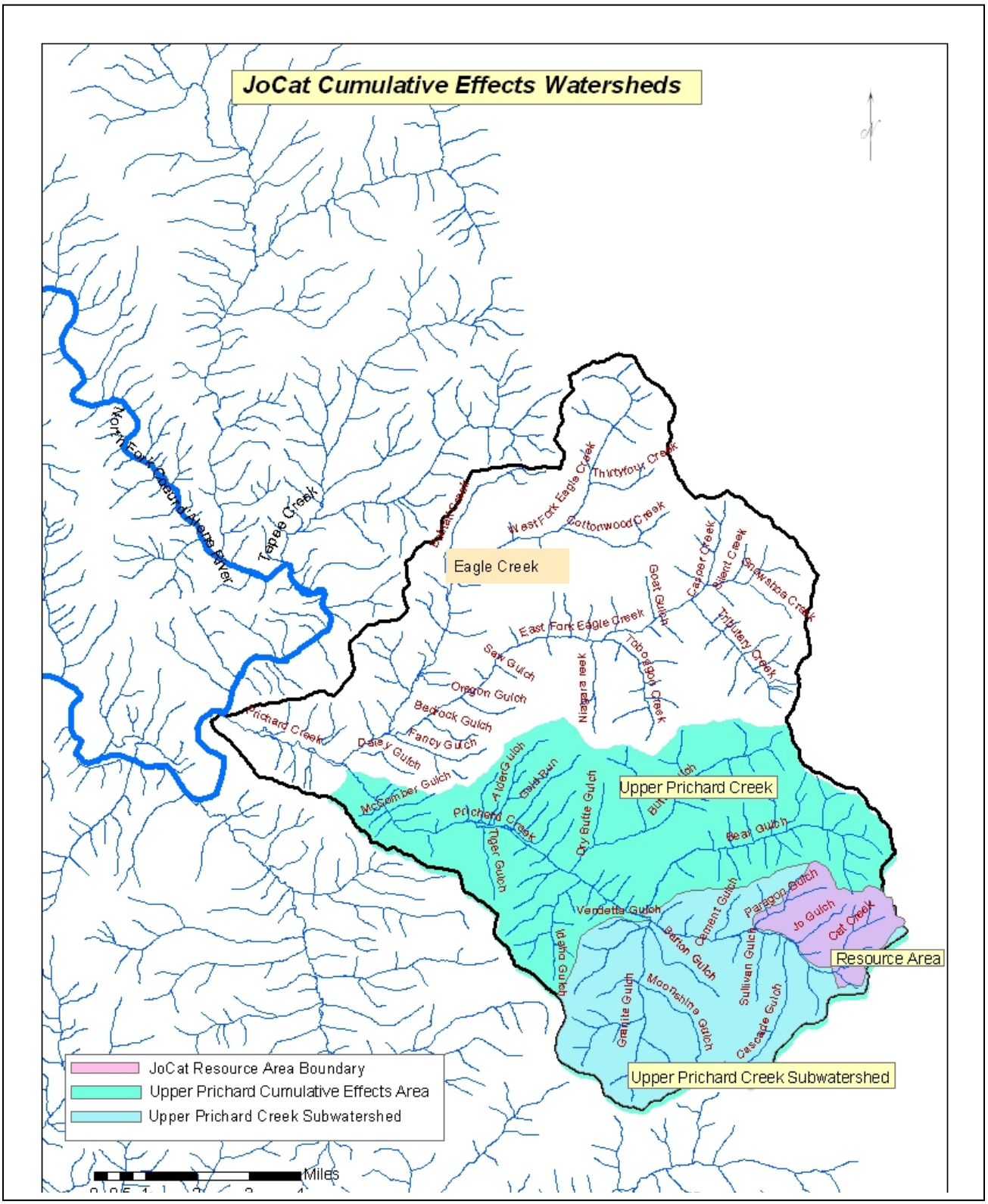
Watersheds of the Jo-Cat Resource Area have been identified by the Geographic Assessment as being in the following condition classes:

Upper Prichard Creek Watershed……Not Properly Functioning
Upper Prichard Creek Sub-watershed……..Functioning at Risk

Literature and Office Review

The assessment of existing conditions is critical to an environmental analysis because it describes the current condition of the Jo-Cat Resource Area and provides a basis for comparing the effects of management alternatives. Information for the watershed and fisheries analysis was compiled using data from the field observations and measurements made in 2003. Additional information was gathered from district files, historical records, aerial photographs, and published scientific literature. Also, discussions with the Idaho Department of Fish and Game (IDFG) provided electrofishing and stocking data and comprehensive knowledge of the fisheries resources in the North Fork Coeur d'Alene River Watershed. Data was obtained from the Idaho Department of Environmental Quality (DEQ) beneficial use reconnaissance program (BURP). The Roads Analysis Process (USDA 1999c; PF Doc. AQ-13) was also completed, which established recommendations for long-term road management objectives within the Jo-Cat Resource Area.

Figure AQ-1. The Cumulative Effects Area for Aquatic Resources in the Jo-Cat Resource Area. *Watersheds of the appropriate size and watersheds at different scales were chosen for use in WATSED cumulative effects modeling 1) Upper Prichard Watershed 2) Upper Prichard Creek Sub-watershed*



The WATSED Model

Anticipated water yield, peak flow, and sediment yield for the Jo-Cat Resource Area watersheds was estimated from the methods documented in the R1/R4 Sediment Guides (USDA 1981; PF Doc. AQ-14), (Appendix H, WATSED Model Limitations), and the WATBAL Technical User Guide (Patten 1989; PF Doc. AQ-15). The version calibrated for the Idaho Panhandle National Forests, known as WATSED, is an analysis tool that spatially and temporally organizes typical watershed response relationships as a result of forest practices. The estimated responses are combined with other sources of information and analyses to help determine the findings of probable effects.

WATSED estimates a series of anticipated annual values over a period of years. The model predicts an estimate of most likely mean annual sediment loads (reported as tons per square mile per year, or as routed tons per year), and the expected sediment load modifications over time. The estimate of additional loading is expressed as a percent of the "natural" (i.e., historic mean load prior to significant development activities) sediment load, which is based on the history of disturbances and average climate patterns in the watershed. In this analysis, the existing condition represents the year 2006, which is prior to any anticipated disturbances related to the proposed activities.

The estimates of sediment and peak flow reflect how watersheds with similar conditions and landtypes have responded over time to a similar history of disturbance. WATSED is neither intended nor designed to model event-based processes and functions, or specific in-channel responses. It does, however, incorporate the results of those processes in the calibration of its driving coefficients. WATSED does not evaluate increases in sediment and peak flows specifically resulting from "rain-on-snow" events or other stochastic events, nor does it attempt to estimate in-channel and stream-bank erosion. The Idaho Panhandle National Forests (IPNF) frequently validates the WATSED coefficients and estimates using long-term water quality monitoring networks on the IPNF (USDA 1998b, 1999, and 2000; PF Doc. CR-014-016).

The forest management activities used to calibrate the model include standard BMPs and Soil and Water Conservation Practices; therefore, standard BMPs and Soil and Water Conservation Practices are necessary requirements for maintaining an effective confidence level in the model's use. Non-standard BMPs, management or natural disturbances not related to forest practices, and site-specific non-standard BMPs must be integrated into the final analysis to fully determine watershed response.

WATSED was designed to address a complex array of landtypes and disturbances within the context of a watershed, and organize the evaluation according to rule sets established by the author and cooperators. In the case of WATSED, the rule sets reflect watershed processes and functions based on research, data, and analyses collected locally and regionally. Forest Plan monitoring reports (USDA 1998b, 1999, and 2000; PF Doc. CR-014-015) describe how the calibration and validation of WATSED has been an annual process on the forest and where changes have been made. The model, however, also includes simplifying assumptions, and does not include all possible controlling factors. Therefore, the use of models only provides one set of information to the technical user, who, along with knowledge of the model and its limitations, other models, data, analysis, experience and judgment must integrate all those sources to make the appropriate findings and conclusions.

Field Review

Streams and watershed conditions within the Jo-Cat Resource Area were reviewed during the 2006 field season. More detailed stream information was collected downstream of the Jo-Cat Resource Area in 2003 and 2005 with the Prichard Murray Project. Representative segments within the lower reaches of Prichard Creek that are most sensitive to watershed disturbance were selected for collecting information to determine stream channel types, cross sectional profiles, longitudinal profiles, woody debris composition, bank erosion, and stream temperature. A modified version of the R1/R4 fish and fish habitat inventory (Overton et al. 1997; PF Doc. AQ-16) was conducted along these same index reaches. These sites are mapped, documented, and marked on the ground so that repeat measurements can be accomplished to track changes in stream conditions (see monitoring, Appendix C, and Aquatics Project File records AQ - 110).

GIS Technology

Geographical Information System (GIS) technology was used to combine existing databases, proposed activities and data taken from aerial photos to create maps and summary tables of existing conditions. Landtype maps and descriptions were input into GIS layers to evaluate the existing condition and for the effects analysis.

B. How Past Actions Influenced Existing Conditions of the Affected Watershed/Subwatersheds

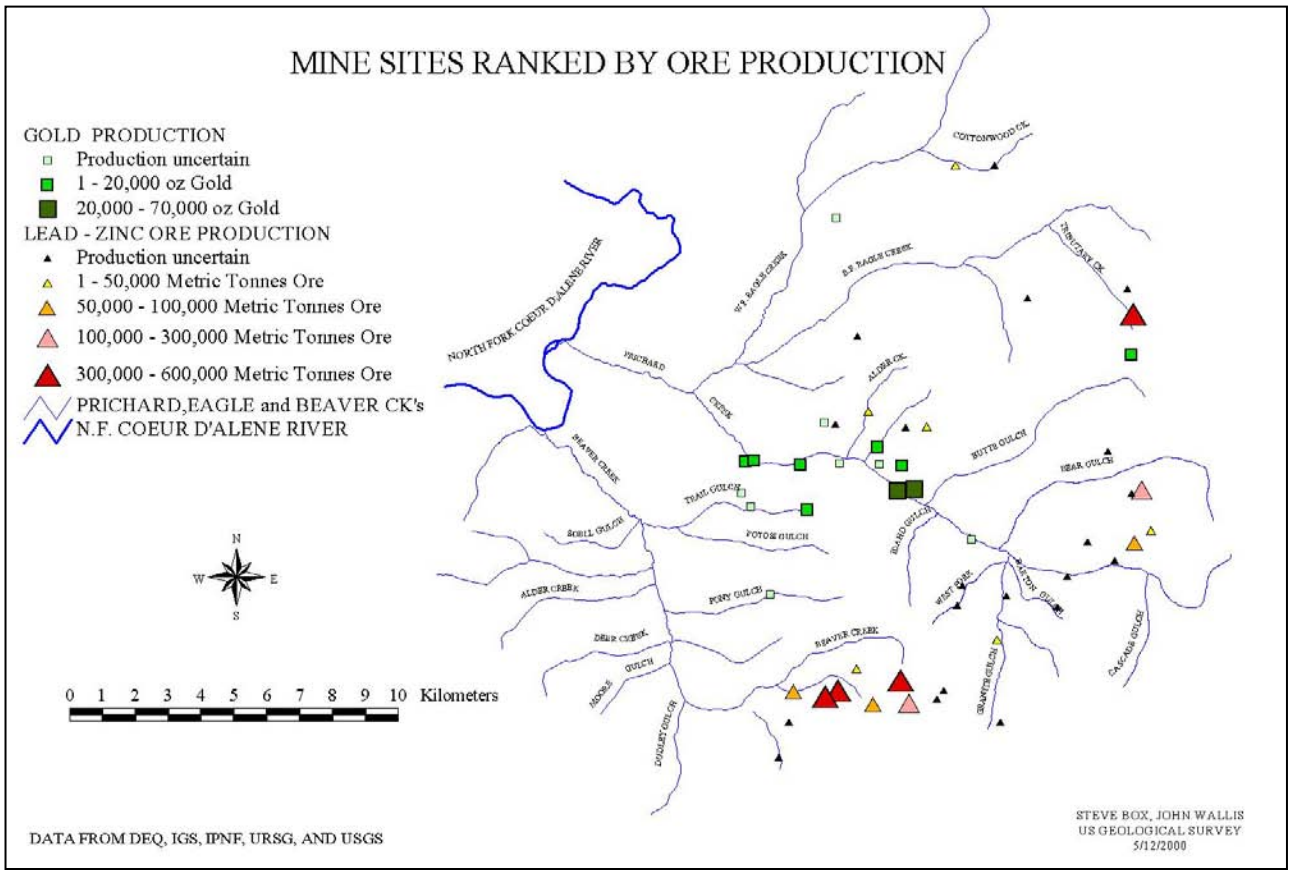
The following is a description of past actions, to establish the appropriate geographic and time boundaries for the cumulative effects analysis. Activities identified below were ones that are relevant to the watershed and fisheries cumulative effects analysis. Other activities identified in the Jo-Cat Environmental Assessment (Appendix A) are not discussed here because there was no soil or watershed disturbance created by these activities. These include tree planting, firewood gathering and hunting.

Effects of Past Wildfires: Historically, the greatest natural agent of disturbance in the Prichard Creek watershed near Jo-Cat Resource Area was wildfire. Fire history throughout most of the area has an average historic fire return interval of 35 to 100+ years. The very moist riparian stands likely burned less often and less severely, due to their topographic position and fuel moisture conditions during most fire seasons. This has led the condition where stream bottoms historically would have a good supply of large woody debris and excellent aquatic habitat. Salvage logging, road building, and other human development in the riparian areas have occurred in areas mostly outside the resource area but within the Prichard Creek Watershed. These activities have altered the historic natural condition. Past fire suppression has occurred in recent years near the Joe-Cat Resource Area. This has contributed to the continual increase in fuel-loading on both dry and moist sites.

Effects of Roads: Road construction within the Jo-Cat Resource Area has been limited compared to other parts of the Prichard Creek Watershed. Access to Montana over Thompson Pass, extensive mining and other forest management activities such as past fire and timber projects (predominately salvage logging since the turn of the century), have driven the need for the existing road networks. The roads in the Watershed cumulative effects area were built in the early 1900s for mining purposes. The Forest Service required access to parts of the watershed for vegetation management and some exploratory mining then built more roads in the 1950's to the 1980's. There are 3.0 miles per sq mile in the Prichard Creek Watershed above Eagle Creek and 3.0 miles per square mile in Upper Prichard sub-watershed above Bear Gulch.

Effects of Mining: Mineral exploration work in the Jo-Cat Resource Area began shortly after the gold rush to Murray in 1885. Extensive dredge mining for placer gold occurred in main Prichard Creek and its tributaries, which produced instability within the areas of placer mining. Soon after the discovery of gold significant zones of mineralization were discovered in the Silver valley with smaller sites in the resource area. A number of these sites were large enough to establish ore milling sites (Figure AQ-2), which produced both jig and flotation tailings which have elevated levels of dissolved metals in both Eagle and Prichard Creek (Box 2004 et al , PF.DOC. AQ-150). At this time there are 180 known active claims within the Prichard / Beaver Creek Area on National Forest System land. Extensive work has been conducted by the Forest Service and State of Idaho on mine cleanup within both Prichard and Eagle Creek watershed. Cleanup projects have occurred on the Paragon site and Monarch site in upper Prichard Creek and clean up on the Jack Waite site is just beginning.

Figure AQ-2. Mine sites within the Prichard, Creek Area.



Effects of Fish Barriers: Waterfalls, channel flow intermittency, and some debris jams are part of the reference conditions that naturally and continually fragment aquatic habitats for various periods of time. In the Jo-Cat Resource Area, high gradient stream reaches in headwater locations are the predominant form of natural barriers. Human-caused fish barriers in the Jo-Cat Project Area are few and exist on private lands. In the cumulative effects area one prominent barrier to fish migration occurs in lower Prichard where sections of the stream go subsurface and block movement of fish during this low water period. It is thought that these subsurface flows were caused by excess sediment movement due to historic placer dredging. Access through this reach does occur during periods of higher flow (late winter, spring and early summer). It is believed that the culvert on Alder Gulch may not provide access for fish and another barrier may exist on Hopkins Creek at Forest Highway 9; this culvert will be surveyed in summer 2008. A westslope cutthroat study conducted in 2003-04 and fisheries surveys conducted in 2005 have found that westslope cutthroat trout and sculpin are present in the cumulative effects area. It was determined that a portion of the population is fluvial in nature and that there is likely a resident population in smaller tributaries.

Effects of Sediment Production and Delivery: Surface erosion is part of the natural reference conditions for sediment production and delivery of the streams within the Jo-Cat Resource Area. No known landslides exist in the Jo-Cat Resource Area. Prior to fire suppression, wildfire frequently altered the structure and composition of forest stands within the assessment area. At times site conditions following fires would coincide with wet climatic conditions in a season, year, or period of years that would trigger landslides or surface erosion. Other than topographic characteristics such as slope shape and drainage networks, there were no features such as roads on the landscape that would increase the potential for slope failures or surface erosion by intercepting, re-routing, and concentrating water. Other than hillslope rejuvenation caused by streams reaching a lower base elevation or channel migration, there was no major mechanism such as roads that could cause slope instabilities by undercutting or overburdening slopes.

Effects of Water Yield Increases: Rain-on-snow events occur throughout much of northern Idaho when strong warm moist weather fronts from the Pacific Coast invade during the winter months. These relatively warm and moisture-laden air masses cause mid-winter snowmelt, thaws and rainfall. Snow packs generally between 3,000 to 4,500 feet in elevation accumulate substantial snow in the winter and are often found to achieve isothermal conditions following prolonged warm, moist storm periods. In the Jo-Cat Resource Area, approximately 10% of the drainages are within the elevation range that is most prone to rain-on-snow events (3,000 to 4,500 feet) (PF Docs. AQ-59, AQ-72, AQ-94, AQ-107). Peak flows and water yield effects from the past timber harvest activities for the watersheds in the Jo-Cat Resource area have almost completely recovered. There currently is an increase of 2% over baseline conditions in Upper Prichard Creek watershed and in upper Prichard Creek sub-watershed. Vegetative growth of young trees and brush in past harvest units older than 25 years have a significant effect on water yield response. Those specific areas with harvest greater than 25 years ago are near pre-activity levels of water runoff. Activities prior to about 1980 would have very little water yield effects as seen in WATSED outputs (PF Doc. AQ-76-80) or observed in the field in terms of measurable effects to stream health. Roads near streams and road/stream crossings have a more lasting and chronic effect on channeling water to stream courses and altering water yield than past harvest units older than 25 years. The only place this occurs is at several road stream crossings and very isolated locations along FH-9 which parallels upper Prichard Creek and lower Cat Creek, within the resource area.

Effects of BLM Land Development and Timber Management: These types of activities have been principally located within a small portion of the Prichard watershed area but outside Jo-Cat Resource area. Effects from these actions are similar to the effects described above in "water yield increases" and are also described in the cumulative effects section.

Effects of Private Land Development and Timber Management: The private lands along Upper Prichard Creek (along the south portion of the Resource Area) have experienced some timber harvest and roading. Portions of this private ownership have been partial cut while other portions were clearcut. Effects from these actions are similar to the effects described above in "water yield increases" and are accounted for in WATSED modeling and are also described in the cumulative effects section.

Effects of Forest Highway 9 Reconstruction: Much of the upper portion of Forest Highway 9 runs parallel to Prichard and Cat Creeks within the riparian influence zone. The road edge and fillslopes seem to be far enough away to not be a continual source of sediment during high water events. Steep cutbanks through the area may be providing some amount of sediment into the system. The reconstruction resulted in a loss of riparian vegetation. Efforts appeared to be made to retain a small vegetation buffer where feasible. Some shading and future wood recruitment to the stream channels has been removed. Fish passage was provided during reconstruction as evidenced by the large structures with gradient controls in the upper Prichard and Cat Creek crossings.

C. Characterization of the Affected Watershed and Subwatershed

Designated Beneficial Uses in the Jo-Cat Resource Area

The status of Beneficial Uses comes from Idaho Department of Health and Welfare, 1992 (PF Doc. AQ-17). Beneficial uses in streams of the project area include:

- *salmonid spawning and rearing habitat*
- *cold water biota*
- *primary contact recreation*
- *secondary contact recreation*
- *drinking water*

Impaired Waters

One water body within the Jo-Cat Resource Area is water quality impaired (2002 Integrated Report AQ-117). Prichard Creek is identified as impaired from its mouth to its headwaters for sediment, metals, and temperature. Prichard Creek is under an approved Total Maximum Daily Load (TMDL) for sediment (as part of the North Fork TMDL, February 2002). The TMDL identifies coarse sediment as the pollutant of concern

and identifies failure of riparian roads and sediment delivered at road crossings over streams as the primary sources of sediment (AQ-116 North Fork CDA – TMDL, 2001)

Watersheds

The Coeur d'Alene Basin Geographic Assessment characterizes watersheds by the following characteristics.

- *Stream Flow Regime (water yield, peak flows, and rain-on-snow sensitivity)*
- *Stream Channel Morphology - narrative results from stream surveys, 2003*
- *Water Quality - number of inventoried road channel crossings*

Table AQ-1. Summary of existing conditions by subwatershed in the watershed cumulative effects area.

Subwatershed Name	Acres (NFS + Private)	% NFS lands	Percent of Watershed in Rain on Snow zone	Ave. Road Density on NFS (mi/mi2)	Water Quality Impaired?
Upper Prichard Creek (above Eagle Creek)	31,743	78	49%	3.03	**Yes** sediment, metals, and temperature
Upper Prichard Creek Sub-watershed (above Bear Gulch)	11,584	81	10%	3.01	**Yes** sediment, metals, and temperature

Upper Prichard Watershed Conditions

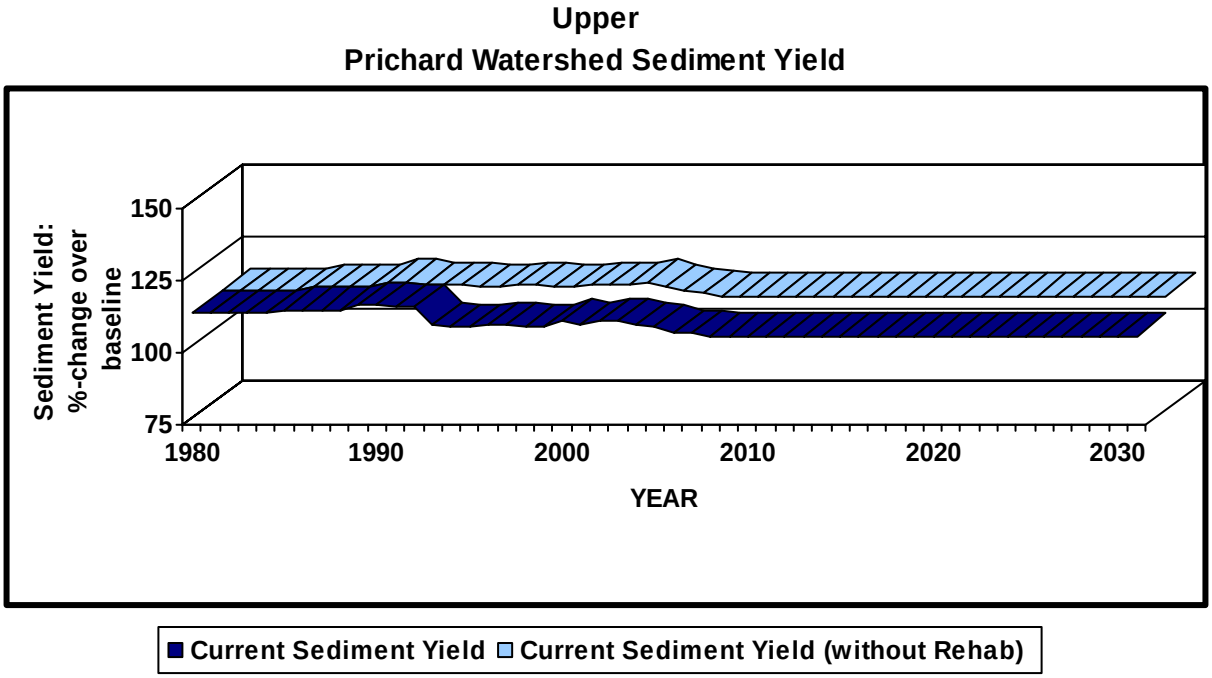
Overview: Upper Prichard Creek watershed encompasses the headwaters to the confluence of Eagle Creek. This watershed was delineated and analyzed to assess the past, current and future activities in this upper watershed and compare them to activities in the Jo-Cat vegetation treatments within the Prichard drainage that are proposed. Little land management activity has occurred in Upper Prichard watershed since 1980.

Stream Flow Regime: The channel is formed primarily by storm events that occur from rain-on-snow events and spring run-off during years when snow-pack is above normal. In general, hydrologic changes are caused by many factors including canopy removal, increased drainage efficiency due to the road network, and the increased gradient from stream straightening (Thomas and Megahan 1998, PF Doc. AQ-18; Jones and Grant 1996, PF Doc. AQ-19; Brooks 1991, PF Doc. AQ-20; Harr 1986, PF Doc. AQ-21; Troendle and King 1983, PF Doc. AQ-22). WATSED model results estimate that average peak month flows in Upper Prichard Creek watershed are currently modified to approximately 2% above baseline conditions. This level of modification is not measurable in the field. For a more detailed discussion of processes and the interpretation of WATSED, refer to the WATSED project file reports (PF Doc. AQ-80).

Stream Channel Morphology: The Upper Prichard watershed contains some Rosgen C channel types in the lower half, upstream of the Eagle Creek confluence (PF Doc. AQ–33). This reach has lower energy flow regimes and is more depositional than other reaches. The lower reach is more responsive to disturbance compared to other reaches in the Prichard Creek Watershed because of it is highly disturbed and altered nature. This reach may show channel adjustments if upstream impacts were to occur. For example, if large watershed areas of forest vegetation were removed, either by mining activities or natural wildfire, the stream reaches in Middle Prichard Creek subwatershed would show channel adjustment through aggradation, movement, and deposition of gravels and cobbles.

Water Quality: There are approximately 3.0 miles of road per square mile of land within the Upper Prichard watershed (PF Doc. AQ–84). This is a moderate road density compared to other areas of the Basin. Moderate road density does account for the elevated sediment yield but the primary source of sediment in the watershed are the spoil piles left in the floodplain from historic placer mining in the reaches above Eagle Creek. These piles in some sections erode as observed in the field but are not predicted by WATSED.

Figure AQ-3. Existing Sediment Yield in Prichard Creek. *Sediment modeling has accounted for watershed restoration (road decommissioning). If no restoration had occurred then sediment yield would be greater.*



Ground based logging in the 1980's on Forest Service, Bureau of Land Management, and private lands have most likely slowed sediment yield recovery. The existing sediment modification is 10 percent over baseline and is accounted for by some recent timber harvest on private land and the existing roads still on the landscape. The reduction in sediment in 1993 displayed in the WATSED output graph above is a result of road decommissioning that occurred after the Idaho Gulch Timber Sale. The total percent reduction over baseline in the Upper Prichard Creek watershed is 6%.

Table AQ-2 Sediment reduction from watershed restoration work in the Upper Prichard Creek Watershed since 1993 (project files; AQ –80)

Year	Activity	% decrease in Sediment Yield
1993	Road Decommissioning	6%
	Total Reduction	**6%**

Upper Prichard Subwatershed Conditions

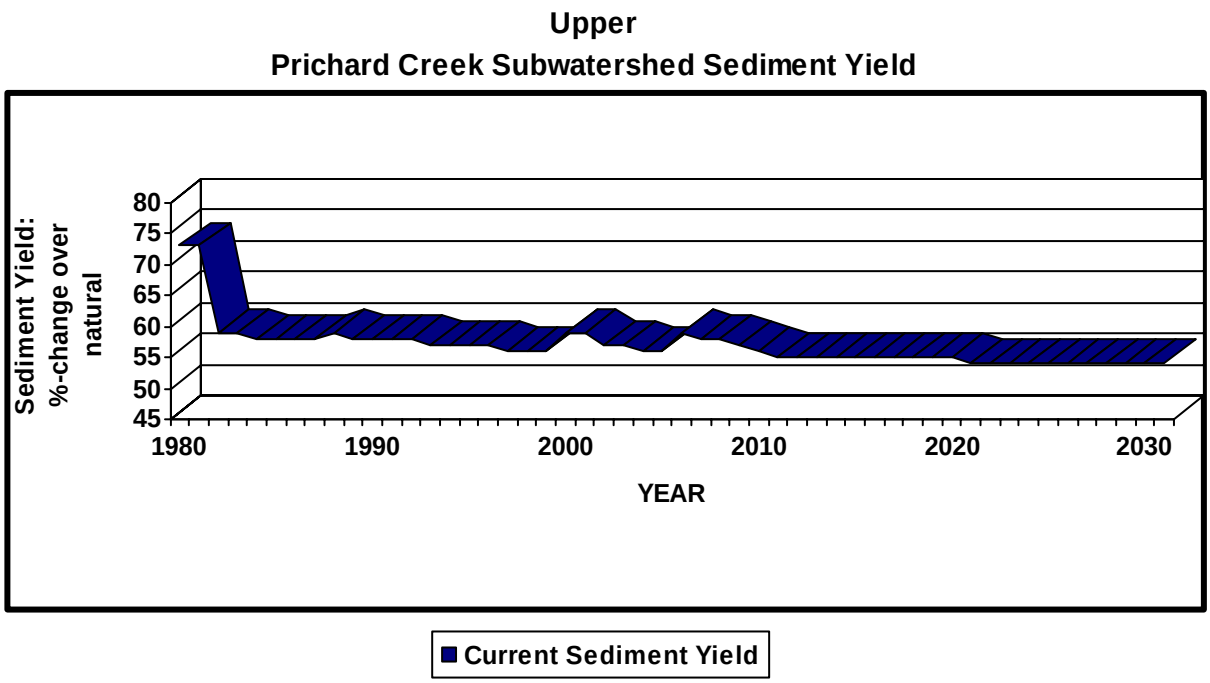
Overview: The very upper portion of Prichard Creek subwatershed, above Bear Gulch was delineated and analyzed to assess the past, current and future activities at a smaller or local scale to compare to activities at the larger scale. Little land management activity has occurred in Upper Prichard subwatershed since 1980.

Stream Flow Regime: The channel is formed primarily by storm events that occur from rain-on-snow events and spring run-off during years when snow-pack is above normal. In general, hydrologic changes are caused by many factors including canopy removal, increased drainage efficiency due to the road network, and the increased gradient from stream straightening (Thomas and Megahan 1998, PF Doc. AQ-18; Jones and Grant 1996, PF Doc. AQ-19; Brooks 1991, PF Doc. AQ-20; Harr 1986, PF Doc. AQ-21; Troendle and King 1983, PF Doc. AQ-22). WATSED model results estimate that average peak month flows in Upper Prichard Creek watershed are currently modified to approximately 2% above baseline conditions. This level of modification is not measurable in the field. For a more detailed discussion of processes and the interpretation of WATSED, refer to the WATSED project file reports (PF Doc. AQ-80).

Stream Channel Morphology: The Upper Prichard subwatershed contains mostly smaller tributaries that are Rosgen B channel types (PF Doc. AQ–33). These reaches have high energy flow regimes, transport sediment easily, and are generally more stable than lower reaches downstream in Prichard Creek. The lower reaches are more responsive to disturbance compared to most stream channels in the upper subwatershed of Prichard Creek. The reaches in this upper subwatershed are resilient and not likely show channel adjustments if upstream increases in sediment or water were to occur. For example, if large watershed areas of forest vegetation were removed, either by mining activities or natural wildfire, the stream reaches in Middle Prichard Creek subwatershed would not show channel adjustment through aggradation or deposition of gravels and cobbles, but they may efficiently transport large quantities of these materials.

Water Quality: There are approximately 3.0 miles of road per square mile of land within the Upper Prichard sub watershed (PF Doc. AQ–84). This is a moderate road density compared to other areas of the Basin. Moderate road density does account for a slightly elevated sediment yield but the primary source of sediment in the watershed are the spoil piles left in the floodplain from historic placer mining in the lower reaches downstream of Bear Gulch.

Figure AQ-4. Existing Sediment Yield in Upper Prichard Creek Subwatershed.



Increases in sediment reflect harvest on private ownership in the subwatershed. No restoration at this subwatershed scale has occurred. WATSED shows logging activity occurring during the period of 1997 through 2005.

Rain-on-snow Events and Watershed Responses

Northern Idaho experiences a strong maritime influence with warm moist weather fronts invading in the winter from the Pacific Coast. These relatively warm and moisture-laden air masses are frequent and have a profound effect on the climate and hydrology of the Coeur d'Alene Mountains. As a result, midwinter snowmelt, thaws, and rainfall are common in the region. The snow pack within the 3,000 to 4,500 foot-elevation range is most susceptible to rain-on-snow events. The upper subwatershed analyzed for cumulative effects in the Jo-Cat analysis area contain rain on snow prone areas that occupy 10% of the subwatershed area

(Table AQ-1). Below 3,000 feet, the snow pack often may accumulate and abate several times during the season, and would therefore not be a substantial contributor to overall basin runoff. Most all years, the snow pack above about 4,500 feet is "cold" and less susceptible to rain-on-snow events.

Rain-on-snow is a natural process under which the streams of the basin developed. Historically, streams of the basin were very stable and resilient because they developed in response to the variability of the climatic processes and the dominant geology of the basin. Changes in vegetation resulting from management or natural events can affect the frequency and magnitude of rain-on-snow events. Before human disturbance, rain-on-snow events have always occurred and probably did not have the same affect on stream channel equilibrium as it did during the 1950's through the 1980's when clearcutting was a predominant activity in this area. Clearcutting opened up stands, and effected wind and micro-climates that increased the melting effects from rain-on-snow (PF Doc. AQ-59, AQ-72, AQ-94, and AQ-107). Today rain-on-snow events have a detrimental effect on aquatic health not from clearcuts on the landscape but from roads that increased water runoff and sediment. Road-stream crossings, channel more water into stream networks and more sediment gets introduced into the streams from road and culvert failures during a rain-on-snow event.

D. Fisheries Existing Condition

Overview

The cumulative effects areas contain approximately 26.0-miles of a fish-bearing stream, from the mouth of Prichard Creek to its headwaters including all fish-bearing tributaries. Fish species that inhabit or potentially inhabit streams in the Jo-Cat Resource Area include native populations of westslope cutthroat (*Oncorhynchus clarki lewisi*) sculpin (*Cottus spp*.). Introduced fish species include populations of unspecified rainbow trout (*O. mykiss*) and eastern brook trout (*Salvelinus fontinalis*). The creation of hybrid fish between native westslope cutthroat trout and exotic rainbow trout may be present. Distributions of these fish are identified in the following table.

Table AQ-3. Stocking records (Idaho Fish & Game) snorkel and electrofishing records (Idaho Fish & Game and USDA Forest Service) for watersheds in the Jo-Cat Resource Area analysis. *IDF&G stocking data was gathered using a search engine located on the website: http://www2.state.id.us/fishgame/. (PF Doc. AQ-23).*

Stream	Species	Information Source	Date of Samples	Species/Year Stocked by IDF&G
(Upper) Prichard Creek	Eastern brook trout/westslope cutthroat trout/rainbow trout/sculpin spp./and WCTxRBT hybrids	IDF&G USFS	2003, 2006	Unspecified rainbow (1968-72); Hayspur Rainbow (1986-87)
Revett Lake (Cascade Gulch a tributary to Upper Prichard Creek)	**Bull Trout and Kamloop	IDF&G		**Bull Trout stocked in 1993 (N=309); Kamloop (1978-79)
Jo Gulch	Westslope cutthroat trout/brook trout/sculpin spp.	USFS	2006	
Cat Creek	Westslope cutthroat trout/eastern brook trout/sculpin spp.	USFS	2006	

Streams listed in the above table flow into other fish-bearing waterways, specifically the upper Prichard Creek watershed. Non-fish bearing perennial and intermittent streams occur within the Jo-Cat Resource Area, but most are unnamed on Forest Service topographic maps.

The analysis of direct, indirect, and cumulative effects to fish is based on effects to sensitive and management indicator fish species (MIS). Under this concept, larger groups of organisms or communities are believed to be adequately represented by a subset of the group. The Forest Plan (IPNF 1987) identifies westslope cutthroat trout, bull trout, and rainbow trout as potential Management Indicator Species (MIS) for fisheries

(Forest Plan Appendix L, PF Doc. CR-002). Current MIS, westslope cutthroat and rainbow trout are known to utilize streams within the cumulative effects area for spawning, rearing, and over-wintering. They have nearly similar habitat needs. Consequently, westslope cutthroat and rainbow have been selected as appropriate MIS for the fisheries analysis of this project.

The life history of the bull trout is included because it is listed as threatened under the Endangered Species Act (1973). However, there is no set or sub-set of data that has identified bull trout populations in Eagle Creek, Prichard Creek, or N.F. Coeur d'Alene River. Confirmed and some unconfirmed reports of individual bull trout in Eagle Creek, the lowest reaches of Prichard Creek, and sections of the N.F. Coeur d'Alene River have been reported. The lower most (approximately 6-stream miles) of privately owned stream in Prichard Creek has been designated as critical habitat (Federal Register, October 6, 2004, 50 CFR Part 17; http://www.fws.gov/pacific/bulltrout). Also, viable populations are currently not present within the cumulative effects area.

White sturgeon, burbot, and interior redband are found to occur only in the Kootenai River system, and possibly the Kootenai River larger (e.g., Yaak River for sturgeon and burbot) and smaller tributaries (e.g. Long Canyon - interior redband trout). Therefore, these fishes will be given no further analysis within the context of this document since they do not naturally inhabit the Prichard Creek drainage or its tributaries.

Bull Trout (Threatened)

The North Fork of the Coeur d'Alene River supported a viable resident, fluvial and/or adfluvial bull trout populations in the past (Maclay 1940 PF Doc. AQ-152), however these populations were eradicated due to over fishing and decline in habitat conditions associated with stream cleaning, and sediment/bedload movement from past mining, timber harvest and road building. In addition, the adfluvial bull trout populations from Lake Coeur d'Alene were eliminated with the decline in water quality associated with hard rock mining in the South Fork Coeur d'Alene drainage. The current presence of bull trout in the North Fork is restricted to the occasional sighting of single, transient individuals by local fisherman or professional biologists.

Historically bull trout (*Salvenlinus confluentus*) were documented in the West Fork of Eagle and the North Fork Coeur d'Alene River (Maclay 1940 PF Doc. AQ-152). Electrofishing surveys and habitat surveys conducted in 2002 in both the West Fork and East Fork of Eagle Creek documented no bull trout (Table AQ-4; USGS, unpublished report PF Doc. AQ-151). Westslope cutthroat trout, rainbow trout, brook trout and sculpin are present within the cumulative effects watersheds. Westslope cutthroat trout are known to be utilizing streams within the analysis area for migration, spawning, rearing, and possibly over-wintering. Bull trout (*Salvenlinus confluentus*) have been found in the Coeur d'Alene River and Lake (IDF&G, 1985 PF Doc. AQ-153) but recent surveys (Dunnigan, 1997 PF Doc. AQ-154 and Abbott, 2000 PF Doc. AQ-155); U.S.F.S. – fish survey data and IDFG, 2005 PF Doc. AQ-111) show no indication of their presence in tributary streams through out the Coeur d'Alene basin. Individual fish, however, have been reported within the mainstem Coeur d'Alene River, Prichard Creek and the Little North Fork Coeur d'Alene River (1990- 2000), however those reports have not been verified by fisheries biologists. Also, bull trout were stocked in Revett Lake in 1993 by Idaho Department of Fish and Game (**http://www2.state.id.us/fishgame/**; (PF Doc. AQ-23). and the likelihood of survival and/or escapement has not been fully assessed, however a few years after initial stocking subsequent net sampling did not find their existence (pers. comm.. Jim Davis - IDF&G).

Table AQ-4. Bull trout distribution within streams in the cumulative effects area.

Stream Name	HUC Number	Bull Trout Presence
Prichard Creek	170103010502	surveyed/unlikely

Westslope Cutthroat Trout (Sensitive)

Westslope cutthroat trout are listed as "sensitive" by Region 1 of the USDA Forest Service and are listed as a "species of special concern" by the State of Idaho. In addition, the U.S. Fish and Wildlife Service (USFWS) list westslope cutthroat trout as a "species of concern" with respect to section 7(c) of the 1973 Endangered Species Act (ESA; USDI 2002; PF Doc. AQ-26). The USFWS lists westslope cutthroat trout as to occur, potentially occur, and/or its habitat exists within the portion of the Idaho Panhandle National Forests where activities could be implemented in the Jo-Cat Resource Area. But first, a brief history is necessary to ascertain the background of status reviews on westslope cutthroat:

> *On two separate occasions (1997 and 1998) petitioners petitioned to list westslope cutthroat trout as threatened. On June 10, 1998, the USFWS published a Federal Register notice announcing a 90-day finding that an amended petition to list the westslope cutthroat trout as threatened under the Endangered Species Act, where substantial information was provided to indicate that such a listing may be warranted. After review, the USFWS concluded in April 2000 that listing westslope cutthroat trout as a threatened or endangered species under the act was not warranted at that time.*
>
> *However, in 2001 the court ordered USFWS to review the status of westslope cutthroat trout based on three key points. In response, on September 3, 2002 in the Federal Register (vol. 67, #170: 50 CFR Part 17), the USFWS set forward a notice of intent to prepare a status review for the westslope cutthroat trout. In summary, the USFWS announced the initiation of a new status review for the westslope cutthroat trout in the U.S. pursuant to a recent court order and the Endangered Species Act of 1973, as amended.*
>
> *After a thorough review of all the available scientific information (Shepard et al 2003* PF Doc. AQ-156*), the USFWS reaffirmed their previous decision that the westslope cutthroat trout did not warrant listing as a threatened species because abundant, stable, and reproducing populations remain well distributed throughout its historic range.*

Westslope cutthroat trout have been identified in nearly all perennial fish-bearing streams in the Jo-Cat Resource Area. Unknown variations of cutthroat trout and other salmonids have been previously stocked in the North Fork Coeur d'Alene River basin from 1968-1999 by Idaho Department of Fish and Game (Table AQ-3). However, the populations that resided there prior to the introductions were likely native westslope cutthroat trout.

There are three possible life-history forms that westslope cutthroat trout could exhibit within the Coeur d'Alene River system. These are adfluvial, fluvial, and resident forms (see Aquatics Appendix F – Glossary). The two most likely life forms within the Jo-Cat Resource Area are resident and fluvial fish. The resident forms are most likely present in the smaller headwater streams (e.g. Jo Gulch and Cat Creek). Fluvial fish are present within the Prichard Creek watershed, using the habitat for spawning and rearing. Westslope cutthroat trout are spring spawners (April – June). There is a possibility that they can utilize more habitat than fall spawning salmonids, principally due to higher water conditions creating more habitat and greater access.

The preferred habitat of westslope cutthroat trout is cold, clear streams with rocky, silt-free riffles for spawning and slow, deep pools for feeding, resting, and over-wintering (Reel et al. 1989; PF Doc. AQ-27). Pools are a particularly important habitat component as cutthroat trout occupy pool habitat more than 70 percent of the time (Mesa 1991; PF Doc. AQ-28). Other key features of westslope cutthroat habitat are large woody debris (LWD) for persistent cover and habitat diversity as well as small headwater streams for spawning and early rearing.

A population status review of westslope cutthroat trout in Idaho has determined that populations in northern Idaho have declined over their historic distribution with viable populations existing in only 36 percent of the original Idaho range. The primary cause of the decline was found to be habitat degradation (Rieman and Apperson 1989; PF Doc. AQ-29). The most recent status review in 2002 for westslope cutthroat trout (WCT) in the United States indicated they currently occupy 59% of historical habitat (Shepard et al 2003; PF Doc. AQ-156). They found that within Idaho, WCT currently occupy 95% of historical habitat. Of the total miles

of occupied habitat, 29% support populations that are believed to be at or near the habitat's potential capacity and 28% support populations below capacity. Many of these populations have genetic introgression with rainbow trout. This status review indicated that currently 10% of the occupied habitats are not introgressed (Shepard et al 2003; PF Doc. AQ-156). Currently within the scientific community there are ongoing discussions as to the levels of introgression and how this relates to the status of westslope cutthroat trout and management of the species and habitats.

Reference Condition for Fisheries

The reference condition for fish habitat is based on reference reaches in the Prichard Creek watershed, habitat surveys in the drainage (see "Watershed Reference Condition"), historic information, electrofishing data, knowledge of basic ecological processes, and professional judgment. Physical attributes of fish habitat are mainly defined by stream channel condition.

Salmonids generally require cool, clear water, clean gravel substrates; well-vegetated banks for shading and bank stability; abundant instream cover such as boulders, logs, and undercut banks; and unobstructed migratory corridors (Bjornn and Rieser 1991; PF Doc. AQ-31).

The historic distribution of westslope cutthroat in the tributaries within the Jo-Cat Resource Area is speculated, but no known 'natural' mainstem barriers would have limited access (except headwater stream gradient). If adfluvial stocks of westslope cutthroat trout were present they would utilize main channel and headwater habitat with fluvial and resident forms, however this form is absent due to many conditional factors in the system (i.e. years of mining, man-caused barriers, etc). Data collected around and within the cumulative effects and Jo-Cat Resource Area has identified westslope cutthroat trout (Table AQ-3). Historical plantings of specified and unspecified fingerling rainbow trout are known (Table AQ-3); eastern brook trout are not known to be stocked (post-1967), but occur in Prichard Creek and several of its tributaries and are likely present as a result of past legal and/or illegal stocking.

Existing Condition for Fisheries

Stream Channel Characteristics

Stream habitats are influenced by woody debris constrictions and local confinement, which typically produce scour pools and riffles. Stream bank conditions and degradation rates are quite variable in the watershed cumulative effects area. For a complete review of each watersheds condition see "Conditions of each respective Subwatershed in Watershed Section".

Stream temperature data from 1999 - 2005 (PF Doc. AQ-32) have shown that temperature requirements for spawning and egg incubation are not being met in some streams. Cold-water aquatic life (i.e. salmonids) are being met in all tributaries.

Habitat

Fisheries habitat data was collected in the Upper Prichard Creek (Paragon Gulch-upstream) and walk-through surveys in lower reaches of Jo Gulch and Cat Creek in 2006 (PF Doc. AQ-43). In addition, water temperature and large woody debris was collected at the same points as fish habitat collection efforts in 2003 and 2005. All data and summaries are located in the project file; the following is a summary of this data collection effort:

Jo-Cat Resource Area encompasses an area of approximately 3.6 mi^2, with a road density of 2.1 mi/mi^2. The Jo-Cat Resource Area has experienced past mining in Paragon Gulch and timber harvest activities, primarily on private ownership, including direct impacts to stream channels and riparian areas. Several small, unnamed intermittent and perennial non-fish bearing tributaries feed the streams in the Jo-Cat Project Area.

Stream channel habitat and morphology were evaluated using modified R1/R4 (Overton et al. 1997; PF Doc. AQ-16) stream survey methodologies; Stream Channel Reference Sites (Harrelson et al. 1994; PF Doc. AQ-56c) guide and large woody debris (LWD) collections. A modified R1/R4 stream survey (Overton et al. 1997; PF Doc. AQ-16), protocol was used to sub-sample an identified monitoring reach and collect important

variables (e.g. LWD information; pool, riffle, and run habitat information; pool volume, etc.). In 2006 general habitat information was collected in upper Prichard Creek and survey reviews conducted in Jo Gulch and Cat Creeks.

U.S. Forest Service crews conducted electrofishing efforts in 2006 in upper Prichard Creek (above Paragon Gulch confluence) to determine fish density and presence and absence data. The electrofishing surveys found westslope cutthroat trout with a mean density of 4.0 fish/100m^2; eastern brook trout with a mean density of 1.0 fish/100m^2, and sculpin *sp*. with a mean density of 7.0 fish/100m^2. Salmonids and sculpin were identified in Jo Gulch and Cat Creek during field reviews.

The life histories of westslope cutthroat trout in the Jo-Cat Resource Area are likely both resident and fluvial fish. Historical stocking of rainbow trout and legal/illegal introductions of eastern brook trout in streams in the project area (Table AQ-3) may have altered fish populations and/or spawning and rearing habitat for westslope cutthroat trout.

Primary Tributaries in the Jo-Cat Resource Area

Key points for selected subwatersheds

The Upper Prichard Creek (e.g. in this case above Eagle Creek confluence) has a history of mining, which have affected native fishes in two ways: 1) Hard rock mining has elevated metals within the water column and bed sediments that have affected the fisheries; and 2) placer mining has created disturbance to the channel which has affected fish habitat. Also, Upper Prichard Creek has experienced extensive timber harvest in the past which has negatively affected fish habitat and population due to excessive sediment loads. This watershed is 303(d) listed for pollutants of concern, specifically metals and sediment and currently has an approved TMDL in place for sediment. Restoration and FH9 road improvements in the Upper Prichard Creek watershed has removed or replaced fish migration barriers with crossings which allow year around access by aquatic species. Significant restoration work to reduce sediment risk, heavy metals and to improve fish habitat have occurred in the Prichard Creek watershed.

Key points for selected Jo-Cat Project Area subwatersheds

A habitat survey was conducted (see fisheries project files PF Doc. AQ-43) that indicated that the area of Upper Prichard Creek (above Paragon Gulch) had moderate pool to riffle ratios (less than 1:4); greater than 80% of LWD in a size class greater than three feet in length and 10 inches in diameter (small diameter wood). The Forest Highway-9 crossings on Jo Gulch and Cat Creek were not identified as barriers to aquatic life, as they were updated to allow for this type of passage.

3. Environmental Consequences to Aquatic Resources

The following discussion discloses the direct, indirect, and cumulative effects of the proposed and reasonably foreseeable activities on the aquatic resources. The discussion of effects is based on the key indicators identified in Methodology for Aquatics. The reasonably foreseeable activities are also listed in Appendix A (Jo-Cat EA) and those relevant to the aquatics analysis are discussed later in this section.

A. Methodology Used in the Assessment and Description of Environmental Consequences to Aquatic Resources

The proposed activities and their potential effects to water quality or changes to stream channels, and fish habitat, are the main concerns related to watershed and fisheries resources. Hill-slope conditions are reflected in stream channels, which in turn are the formative features of aquatic habitat. The analysis of direct and indirect effects is based on how the various components of the project (*e.g.*, location, size of cutting units, methods of logging systems, road construction and reconstruction, and reasonably foreseeable actions) are expected to affect each subwatershed within the Jo-Cat Resource Area.

For this environmental analysis, the WATSED model was used to compare the cumulative effects of the No-Action Alternative (Alternative 1) to effects of the Proposed Action.

Methodology Used in Estimating Effects to Water Yield and Peak Flow (Flow Regime)

Peak flows represent the change in runoff and is expressed as the percent change from the estimated "natural" peak month discharge. The WATSED model was used for this analysis to estimate the effects of the proposed timber harvest, construction, reconstruction and decommissioning of temporary roads, and site preparation treatments. Reasonably foreseeable actions are included in this analysis. Changes in peak flows are compared to the existing peak flows discussed in the affected environment section. The timeframes for the estimated direct and indirect effects, for all alternatives is 2007 (estimated start of activity) through 2031.

Guidelines for Changes to Water Yield and Peak Flow

Zero	If the increase over the existing level is zero, there is no potential for an increase in water yield and peak flow or delay of watershed recovery.
0 to 5%	No potential exists for measurable increases in water yield and peak flow or delay of watershed recovery. For example, if you dumped a cup of water into a stream, you know the flow has increased; yet it would not be measurable with modern flow gauging equipment.
5 to 10%	There would be a slight potential of a measurable increase in water yield and peak flow or delay of watershed recovery.
10% or more	A potential exists for measurable increases and recovery delay.

Methodology Used in Estimating Effects to Channel Morphology

Morphology is the shape of the stream channel – such as bank height, bank slope, channel width, and pool size. The stability of a stream channel and morphology is dependent on variations of the stream channel type. Stream channels that are primarily alluvial systems (sediment deposited and formed) are the most susceptible to stream bank erosion, changes in sediment supplies, and large woody debris removal (Chamberlin et al. 1991, PF Doc. AQ-34; Rosgen 1996, PF Doc. AQ-33). Stream channels are more stable with respect to fluctuations in flow and sediment yields when the substrate is composed of bedrock and boulders that have a good portion of large woody debris jams and are more confined within the valley bottom (Chamberlin et al 1991, PF Doc. AQ-34; Rosgen 1996, PF Doc. AQ-33). This analysis compares effects of proposed activities under the Proposed Action in regard to changes in channel morphology (such as bank erosion, downcutting, and deposition of bedload sediment). The analysis stems from interpretation of WATSED's sediment and water flow changes and where (or if) any changes may be occurring in the more sensitive reaches of the streams. The analysis is based on judgment supported by WATSED modeling by subwatershed.

Methodology Used in Estimating Effects to Water Quality

Water quality is analyzed from two different aspects: 1) changes in sediment yield from proposed vegetation activities, burning, road construction and road reconstruction; and 2) in respect to aquatic restoration activities such as road decommissioning and treatment of road crossings.

Methodology Used to Estimate Effects to Sediment Yield: Percent increase in sediment yield is estimated as the annual sediment above existing levels loading into each of the subwatersheds. This percent is compared to the current sediment load discussed in the existing conditions section. Sediment yield percent is calculated for each alternative using the WATSED model. The proposed timber harvest units, construction, reconstruction, and decommissioning of temporary roads, and site preparation treatments are included in the analysis. Some of the reasonably foreseeable actions discussed below are also calculated in the analysis. The estimated short-term or direct and indirect effects analysis timeframe for sediment yields is through 2009, the latest year that sediment yield would recover to baseline.

Guidelines for changes to Sediment Yield

Zero	If the increase over the existing level is zero, there is no potential for an increase in sediment or delay of watershed recovery.
0 to 10%	No potential exists for measurable increases in sediment or delay of watershed recovery. For example, if you dumped a cup of dirt into a stream, you know the sediment has increased; yet it would not be measurable at a gauging station or with modern sediment sampling equipment.
10 to 20%	There would be a slight potential of a measurable increase in sediment or delay of watershed recovery.
20% or more	A potential exists for measurable increases and recovery delay.

Methodology Used to Estimate Effects on Rain-on-Snow

There is a potential for localized effects at the subwatershed scale. It is difficult to predict large-scale, catastrophic effects at the larger watershed scale and the effects to the North Fork of the Coeur d'Alene River downstream of Jo-Cat Resource Area. The analysis is based on change of canopy openings, the size of those openings, and conclusions drawn from studies specific to the Pacific and Inland Northwest including Rothacher (1973; PF Doc. AQ-35), Harr and McCorison (1979; PF Doc. AQ-36), Harr (1981; PF Doc. AQ-37), Christner and Harr (1982; PF Doc. AQ-38), Harr (1986; PF Doc. AQ-21), Berris and Harr (1987; PF Doc. AQ-39), King (1993; PF Doc. AQ-40), and Coffin and Harr (1991; PF Doc. AQ-41).

Direct effects: *those immediately detected in time or space as a result of activities. Example: an immediate delivery of sediment to a Creek.*

Indirect effects: *those that are detected at a later time or place and occurring separate from actual activities. Example: an increase in water yield as a result of removing canopy closure.*

Disclosure of the direct and indirect effects analyses are combined in this report.

Cumulative effects: *based on the existing condition, the direct and indirect effects of proposed activities and any ongoing or reasonably foreseeable actions. The reference condition of the cumulative effects analysis is presented in the Existing Condition section of this report. Reasonably foreseeable activities in the Jo-Cat Resource Area include ongoing road maintenance and noxious weed treatments on National Forest System lands, fuel break creation, watershed restoration such as road decommissioning, road building, mining and timber harvest on private lands.*

The issue is whether the management activities proposed with this project will affect the hydrologic response to rain-on-snow events at a scale beyond that disclosed in this analysis. The rationale used for this analysis was based on these two questions:

1) *Is the* **scale** *of the management activities with this project sufficient to affect the hydrologic response of large watersheds to rain-on-snow events (i.e. will openings created from the proposed vegetation treatments effect flows in the lower Coeur d'Alene River.*

2) *Is the* **magnitude** *of the management activities proposed with this project sufficient to affect the hydrologic response of large watersheds to rain-on-snow events.*

B. Direct and Indirect Effects to Aquatic Resources

Direct and Indirect Effects to Aquatic Resources - No-Action Alternative (Alternative 1)

Since no management activities would be implemented with this alternative, there would be no direct effects associated with this project. Sediment yield values and trends as discussed in the existing conditions would not change from existing predicted trends. Water yield and peak flow values would continue to decrease very slowly by an average of approximately 1% for the next 25 years in each of the subwatersheds as vegetation recovers from past harvest. This 1% water yield and peak flow over the next 25 years would be too small to measure in the streams because of the detection limits of water flow recording instruments. The interpretation of the existing model outputs show that the recovery trend is still positive. There has been vegetative recovery sufficient enough to not create adverse effects from rain-on-snow events, and/or unpredictable flood events. Sediment yield would continue to recover by 1% to 2 % over the next 25 years according to WATSED outputs. In terms of observing true change in the streams, the recovery or change would be too small to measure and would have very little consequence above natural influences on fish and fish habitat. The baseline conditions as shown in figure AQ-3 at the watershed scale have been reduced from recent watershed restoration in Prichard Creek. The sediment reduction from restoration has been significant in that it could be measured, and contributes far greater to sediment yield recovery compared to the minor recovery (1% to 2%) from no action alternative as modeled in WATSED. Also, these restoration measures have been instrumental in shaping the current baseline fish habitat in the watershed. The baseline conditions as shown in figure AQ-4 at the subwatershed scale show a delay in recovery from recent harvest activities on private ownership.

Direct and Indirect Effects to Aquatic Resources under the Proposed Action

Descriptions of effects are documented together because the difference between them is very small. At both the watershed and subwatershed scale in Upper Prichard Creek there is little difference in WATSED outputs and interpretation of effects are described below.

Direct and Indirect Effects to Water Yield and Peak Flow (Flow Regime) Under the Action Alternatives

Table AQ-5. Comparison of Changes to Peak Flow and Water Yield in the Jo-Cat Resource Area, by alternative.

Indicator	Alternative 1 (No Action) Includes activities on private	Alternative 2 Includes activities on private
WATER YIELD Effects of commercial harvest and resulting canopy openings on % increase in water yield. **(percent increase over existing)**	Upper Prichard Creek above Eagle **1%** Upper Prichard subwatershed above Bear Gulch **1%**	Upper Prichard Creek above Eagle **1%** Upper Prichard subwatershed above Bear Gulch **1%**
PEAK FLOW Effects of commercial harvest and resulting canopy openings on % increases in peak flows. **(percent increase over existing**)	Upper Prichard Creek above Eagle **0%** Upper Prichard subwatershed above Bear Gulch **0%**	Upper Prichard Creek above Eagle **1%** Upper Prichard subwatershed above Bear Gulch **0%**

The Upper Prichard watershed and sub watershed would have almost no peak flow or water yield increases from the proposed action. This constitutes a very low risk of measurable increases in water yield and peak flow or delay of watershed recovery (Table AQ-6). Typically the smaller scale subwatershed would show

greater increases in water yield as a result of harvest treatment compared to the larger size watershed. Upper Prichard watershed showed a 1% greater peak from the proposed action while the smaller subwatershed showed no changes in peak flow. This is the result of some recent tractor based logging within the larger watershed scale, but downstream and outside of the smaller subwatershed. There would be very little difference overall in peak flow changes between the No-Action Alternative and the Proposed Action. No risk of measurable changes in water yield, or peak flow would be expected from the proposed harvest.

The proposed burning activities would be low intensity understory burns when soils are cool and moist with no expected impacts to soil production. The prescribed burning would cause very little over-story mortality. With overstory mortality ranging from 5% to 10 %, there would not be enough heat to damage soils or kill trees that provide canopy and there would be no change in water yield or peak flows.

Fisheries - Direct and Indirect Effects of Water Yield and Peak Flow Increases (Proposed Action)

There is no percent increase in water yield over existing between the No Action and Proposed Action based on WATSED modeling (Table AQ-5) in the Jo-Cat Resource Area. Consequently there would be no direct or indirect effects to fish habitat or populations based on water yield interpretation, because as previously stated it would not be measurable with current flow instrumentation at a 1% increase. Increases in peak flow under the action alternative would not be measurable (see guidelines above) in the Upper Prichard Creek mainstem of Jo-Cat Resource Area and would not change existing fisheries habitat conditions in any of the fish-bearing stream segments. Since any change in water yield associated with this project probably would not be differentiated from normal climatic fluctuations in the Jo-Cat Resource Area watersheds any additional bedload scour during high flows would not be expected. Salmonid redds, aquatic life, and their associated habitat existing in the cumulative effects area would not be directly or indirectly affected by the none and minimally expected increases in water yield and peak flow.

Direct and Indirect Effects to Channel Morphology under the Proposed Action

Changes in the magnitude, intensity or duration of peak flows and sediment yields have the potential to change stream channel characteristics. Stream channels that are primarily alluvial systems (sediment deposited and formed) are the most susceptible to stream bank erosion, changes in sediment supplies, and large woody debris removal (Chamberlin et al. 1991; PF Doc. AQ-34; Rosgen 1996; PF Doc. AQ-33). Stream channels where the substrate is composed of bedrock and boulders that have a good portion of large woody debris jams and are more confined within the valley bottom are more stable with respect to fluctuations in flow and sediment yields (Chamberlin et al 1991; PF Doc. AQ-34; Rosgen 1996; PF Doc. AQ-33). Opening canopy up too much in one subwatershed with one management project could potentially modify the magnitude, intensity and duration of peak flows and sediment yields and have the potential to change stream channel characteristics. The most sensitive stream segments prone to channel morphology changes from management activities are located in Lower Prichard Creek. These larger C type channel reaches have dominant stream bed material composed of cobbles, (particle sizes ranging from 31 mm to 256 mm (approximately 1 to 10 inches), and are scoured, transported and deposited with high stream flows.

With no water yield increase over existing baseline and a maximum increase in of 1% in peak flow (Table AQ-5), the Proposed Action would not result in any measurable changes to channel morphology or stream flow in any stream reaches of in the Jo-Cat Resource Area. The channel types (Rosgen B) in the project area and downstream of the harvest units are resilient and would not show changes or destabilization even if the water yield and peak flow were predicted much higher than they are (0% to 1% increase over baseline).

Effects to fisheries and aquatic habitat from the estimated changes in peak flow, sediment yields and the rain-on-snow events would not affect stream channel morphology from the action alternative. The dominant stream bank material ranges from small to large cobbles within the sensitive reaches of project area streams. This material is easily scoured, transported, and deposited with high flows. The other channel types upstream of sensitive reaches of project area streams are well confined and entrenched, which allow sediment and debris to be easily transported, without effecting channel morphology. Based on the minimal, modeled changes in peak flows, water yield, and sediment yields and the potential increases in flows from a rain-on-

snow event as described above, would not affect the stream channel morphology in each of the subwatersheds from the proposed action.

Direct and Indirect Effects to Water Quality (Sediment Yield) Under the Proposed Action

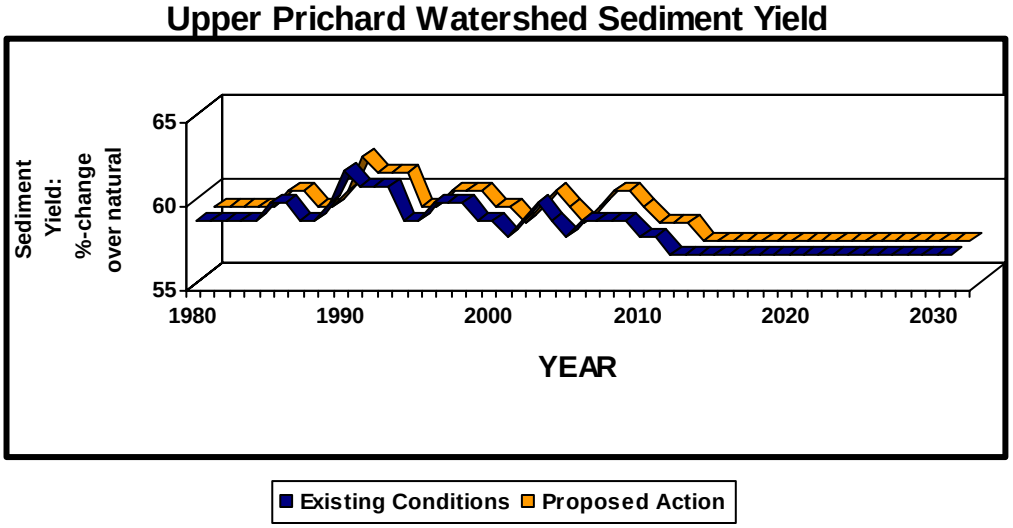
Sediment yield is variable by subwatershed as modeled with WATSED. Figures AQ-5 and AQ-6 display the differences in sediment yield increases resulting only from vegetative treatments and associated road construction/reconstruction. All results assume that treatments would be implemented in 2007.

Table AQ-6. Comparison of Sediment Yield changes by alternative for the Jo-Cat Resource Area.

Indicator	Alternative 1 (No Action) Includes activities on private	Alternative 2 Includes activities on private
SEDIMENT YIELD Effects of commercial harvest and resulting canopy openings on % increase in sediment yield. **(percent increase over existing)**	Upper Prichard Creek above Eagle **0%** Upper Prichard subwatershed above Bear Gulch **0%**	Upper Prichard Creek above Eagle **1%** Upper Prichard subwatershed above Bear Gulch **1%**

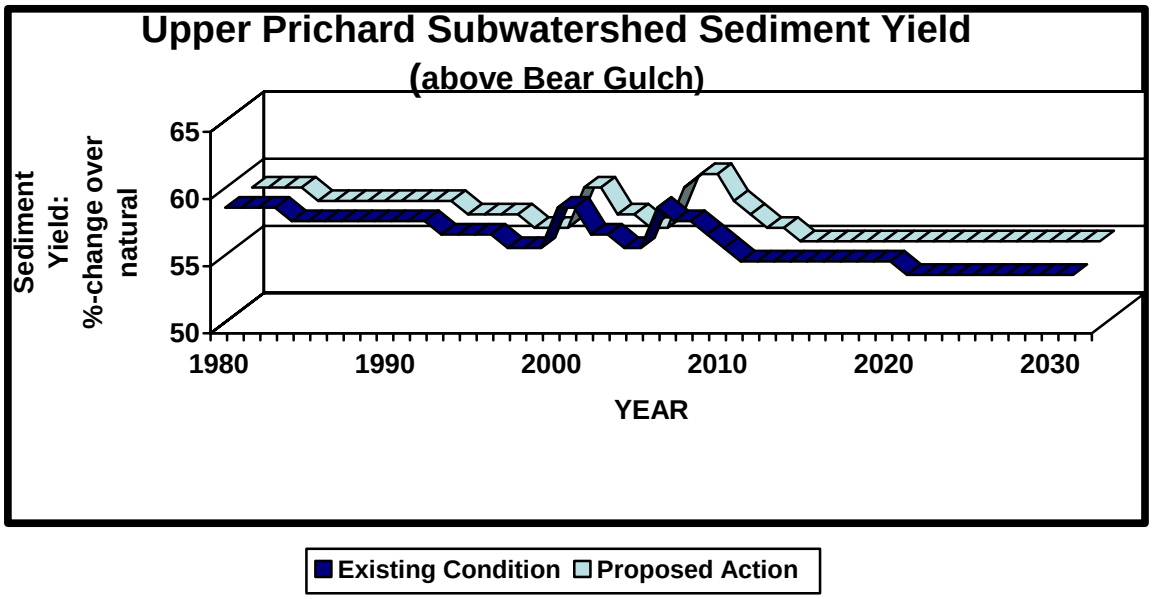
Alternative 2 shows a maximum predicted sediment yield increase of 1% above existing in Upper Prichard Creek watershed and Upper Prichard Creek subwatershed. The increase in sediment as modeled would not show any measurable effects of sediment in these subwatersheds. There is 1.2 miles of new road associated with the proposed action. This road construction could potentially have a greater influence on the results of predicted sediment increases from WATSED compared to the harvest or burning of the units. The 1.2 miles of new road construction is far from any stream channel and even though sediment could be eroded and transported down-slope it would be filtered and deposited on the forest floor before reaching the nearest stream channel (Cat Creek approximately 1400 feet away). Rolling dips would be constructed as prevention of rutting and a maintenance–free method of providing adequate drainage. The model predicts surface erosion from both roads and harvest activities but the road construction is near a ridge top far from any stream course and would have no new stream crossings. Application of BMPs (Aquatics Appendix A) and no harvest, or new road building activities within INFS (1995; PF-CR-003) buffers are expected to prevent sediment levels from increasing. There would be road reconstruction along Road 6006, consisting of blading, water-barring, and construction of armored fords at 8 small headwaters stream crossings. Short term sediment delivery would likely occur at the crossings during construction. If a large precipitation event were to occur during or shortly after the reconstruction phase, additional sediment could be routed and delivered to the stream system. Over the long term, improved drainage features along the road surface would slightly reduce sediment and reduce chronic background sediment at the local subwatershed scale. The benefits would be less likely realized or measured from these improvements at the larger watershed scale in Prichard Creek just above Eagle Creek. No long term impacts to beneficial uses would occur because sediment yield increases would be too small to measure.

Figure AQ-5. Sediment Yield in Upper Prichard Creek under the Proposed Action.



Alternative 2 would have a slight increase in sediment yield compared to the existing condition as model output showed from WATSED. The difference is too small to see in Figure AQ-5 and would not be detectable if attempts were made to measure sediment change in the Upper Prichard Creek subwatershed.

Figure AQ-6. Sediment Yield in Upper Prichard Creek Subwatershed under the Proposed Action.



A one percent increase in sediment yield would have a slight potential for increased sediment yield but it would not be measurable and there would be no direct effect in this subwatershed. This indirect effect of delaying recovery is observed from WATSED model outputs but would not be detectable in the streams because the location of tractor units are greater than 300 feet from riparian areas and occur over a small area compared the subwatershed scale. There would be no detectable increases in sediment with the Proposed Action in Upper Prichard subwatershed.

Effects Analysis Conclusions

In summary, there would be only a slight difference in sediment yield increases between the no action and the proposed action. The risk of measurable sediment under the Proposed Action would be very low for both the larger watershed scale and the smaller subwatershed scale. If sediment increases were to occur, it would be localized only near treatment units and landings locations on or near road #6006 with reconstruction activities. This relatively low level of treatment at the subwatershed scale, application of BMP's, and location of treatments far away from streams as buffered (INFS 1995, PF Doc CR-003) would prevent sediment from being routed down slope to stream channels or into the Prichard Creek. Sediment yield increases under the proposed action would not be great enough to cause measurable effects to water quality or impair beneficial uses. In the short term, reconstruction may generate some measurable sediment dependent of flow levels and high precipitation during the activity. In the long term the proposed activities would have no measurable effects to water yield, sediment yield, and overall aquatic health.

Fisheries: Direct and Indirect Effects of Sediment Yield – Proposed Action

Increases in sediment delivery can affect fish habitat by filling in the interstitial spaces in spawning gravels. This results in decreased water flow through the gravels necessary for oxygen delivery and waste removal for incubating eggs. Filling of interstitial spaces can also displace macroinvertebrates, thereby reducing an important food source for fish and other aquatic life. High amounts of sediment can fill in pools and reduce rearing habitat for juvenile fish. Since all logging activities (e.g. roading, skyline and helicopter logging; etc) would occur outside of RHCAs, the risk of any sediment generated by these activities actually reaching a live channel is very low (Belt et al. 1992; PF Doc. AQ-42). By using onsite direction and BMPs (Aquatics Report – Appendix A), sediment delivery to occupied fish habitat associated with road construction, reconstruction, and road attributes (e.g. stream fords) would be minimized.

Sediment yield into stream courses, during road construction, reconstruction, and temporary construction, would likely be immeasurable (see WATSED Guidelines for changes to Sediment Yield) based on the 1% increase modeled of the existing baseline. The 1% increase in sediment yield as modeled (Table AQ-6) poses no measurable risk to fish habitat in the Upper Prichard Creek subwatershed (i.e. above Bear Gulch confluence) and the application of BMPs (Aquatic Report - Appendix A) and INFS (1995; PF Doc. CR-003) standards and guidelines would prevent direct and indirect of sediment routing during harvest activities.

The higher-gradient channel types present Jo-Cat Resource Area, specifically at road/stream crossings in the headwaters would likely route any sediment to the nearest low gradient stream reaches where it would be stored, given the amount of large woody debris component found in the project watersheds (USFS-Stream Surveys 2002, 2006; PF Doc. AQ-43). The predicted minimal and immeasurable increase (1%) in sediment would likely be transported or stored on the forest floor or within the drainage system. During high flows, silts would likely stay suspended, be carried through the system and be re-deposited in large woody debris sites or off-channel microsites (i.e. depositional zones) influenced by high flows. Salmonid redds, aquatic life, and their associated habitat existing in the cumulative effects area would not be directly or indirectly affected by the expected 1% increase in sediment yield.

Cumulative Effects of Ongoing and Reasonably Foreseeable Activities on Existing Aquatic Resources

The following is a description of Ongoing and Reasonably Foreseeable Activities, to establish the appropriate geographic and time boundaries for the cumulative effects analysis. Activities identified below were ones that are relevant to the watershed and fisheries cumulative effects analysis. Other activities listed in Appendix A are not discussed here because there is no soil or watershed disturbance created by these activities. These include tree planting, firewood gathering, and hunting.

Cumulative Effects of Fire suppression activities: Over the last century, stands within the Jo-Cat Resource Area have been allowed to progress towards climax vegetative condition. The current trend is toward more shade tolerant species that are not as long-lived and are more susceptible to insects and disease (Specialist Report on Forest Vegetation). Since changes in water yield are associated with vegetation conditions, the existing and future trends would have an effect on water yield. The ongoing and foreseeable fire suppression techniques, if areas in Jo-Cat Analysis area watersheds are not allowed to be treated (i.e. dead and dying insect infected lodgepole stands) will continue fuel load, the result, should an ignition occur, would likely be a severe and intense stand replacing fire. Should a large scale fire of high intensity occur, Aquatic Resources would be measurably impacted by increases in sediment, flow and possible flooding.

Cumulative Effects of Road Maintenance Activities: Forest Highway 9 is a paved road. Sediment generating activities would be limited to ditch and culvert cleaning. On other forest roads, these activities occur annually to some degree within the watershed area, and include (but are not limited to) blading, brushing, and culvert cleaning. Maintenance activities typically improve drainage and decrease erosion from water channeling down the road surface. Culvert cleaning and associated maintenance lowers the associated risk of failure. The long term sediment reduction is achieved from road maintenance by reduced rutting and road surface erosion on this heavily travel road during the summer and fall months.

Cumulative Effects of Activities on Private Lands within the Watershed Scale: Private land consists of approximately 14% of the watershed analysis areas. The private lands in the watershed area consist of homes, developed acreage, mining operations, and timber management lands. Some of the private roads accessing these homes and within riparian development have delivered sediment to streams in the resource area from road fill failures, road surface runoff, and immediate riparian activities. Sediment delivery levels from these private roads are based on the level of road maintenance activities. The effects from private land activities are mostly derived from roads constructed for timber harvest, harvest intensity, mining, and/or access. These roads will continue to route water and sediment and create a risk of chronic sediment sources into stream courses that are near the private roads.

The 249 acres of seed tree harvest, associated with a Bear Gulch private parcel, is currently planned for helicopter yarding. Helicopter yarding methods would lessen potential sediment risk to the watershed in terms of roading and yarding methods. The size of opening and the elevational zone may pose some rain on snow concerns. The Bear Gulch drainage is a large watershed, much of which is within the Maple Peak Roadless Area. The large scale of the watershed, with little in the way of harvest activity, will help to lessen the risk of the proposed activity.

The Bear Top Mine Reclaimation project will provide disturbance further up the Bear Gulch drainage. The removal of waste material and the reclaimation of the site will be a benefit to the Prichard Creek watershed in reducing metal contaminates in the drainage.

Cumulative Effects of Noxious Weeds Monitoring and Treatment: This activity would follow guidelines established in the Coeur d'Alene Noxious Weeds FEIS (USDA 2000; see TES Plants-Specialists Report). Effects to aquatic resources were analyzed in that document and its adaptive strategy. No additional effects to watershed or fisheries are expected to occur.

Cumulative Effects of Timber Stand Improvement: This activity would occur outside Riparian Habitat Conservation Areas (RHCAs) except potentially where it would improve riparian habitat from a non-commercial thinning associated activity. No ground disturbance would occur and timing restrictions would be enacted as prescribed through either contract clauses based on BMPs, INFS standards and guidelines, and the Fisheries BA/BE.

Cumulative Effects of Butte Gulch Placer project: Butte Gulch Placer would involve the re-routing and placer mining of approximately 2000 feet of stream channel in the middle reaches of Butte Gulch. Cutting of riparian vegetation will occur. Sediment would be measurable in the short term from this activity. Proposal will be analyzed under its own environmental assessment. Appropriate features and mitigation measures will need to be incorporated to reduce impacts of activity. Proposal is in its early stages of development, so exact mitigation measures and features to reduce long term sediment production are not known. Impact to individual fish and lost of short term habitat would occur.

Cumulative Effects of Ongoing, Reasonably Foreseeable, and Proposed Activities on Aquatic Resources

Cumulative Effects in regards to changes in Sediment Yield: Studies have revealed that disturbance patterns created by timber harvesting, when used to achieve some of the benefits of natural disturbances, cause less disturbance to aquatic resources if concentrated in a smaller drainage rather than dispersed throughout the whole drainage, assuming riparian areas are protected, and harvest rotations occur over longer intervals (Reeves et al 1995; PF Doc. AQ-46). The No Action and Proposed Action, would have very little difference if implemented.

There are no ongoing or reasonably foreseeable projects within the Jo-Cat Resource Area. The Proposed Action would not have any measurable effect to sediment yield. The estimated sediment increases from the proposed activities would result in no risk of measurable sediment at the subwatershed or watershed scale. This project would not further degrade impaired conditions of Prichard Creek downstream of the Jo-Cat Resource Area or downstream in the middle or lower reaches of Prichard Creek. Short term impacts could involve sediment delivery to non-fish bearing tributaries to Cat Creek at a very local scale, where eight

headwater tributary crossings intersect with road #6006. The long term benefit from sediment reduction with the proposed armored fords would only be realized at the local scale. The past decade or so of road decommissioning in the Prichard Creek watershed has resulted in a reduction of sediment (Figure AQ-4). This overall reduction is sediment is described as part of the goal in the North Fork of the Coeur d'Alene River TMDL (PF Doc AQ- 16). The beneficial uses in Prichard Creek may not be fully met at this time, not as result of the Proposed Action of this project, but from past forest management, mining, and roading. However, specific recent road decommissioning has moved conditions closer to that goal. The proposed action, in conjunction with past, ongoing, and reasonably foreseeable activities would not create measurable sediment increases at local and larger watershed scales. Road reconstruction would reduce sediment over the long term at the local scale, in small headwater tributaries of Cat Creek.

Cumulative Effects in regards to changes in Water Yield and Peak Flows: The direct and indirect effects of the Proposed Action on increased peak flow, combined with the effects from past, present and reasonably foreseeable activities would not result in any cumulative effects at the subwatershed scale in the Jo-Cat Resource Area. Estimated water yield increases are within the historic range of variability for magnitude, intensity and duration when compared with estimates for past natural events. The effects of the Proposed Action are more consistent with what likely occurred with natural events (Table AQ-6) where water yield increases are at a low risk of being great enough to be measurable. The proposed activities would not increase peak flows in any Watershed by more than 1% above existing conditions. The proposed treatment reduces canopy over by only 3% of the total area within the Jo-Cat Resource Area and the reasonably foreseeable activities would not significantly increase peak flows, the increases in flows for the proposed activities would be within the historic range of variability.

Cumulative Effects in regards to Rain-On-Snow Events: In the event of a rain-on-snow event, peak flow increases would not cause any cumulative effects to the subwatersheds of the resource area because 90% of the activity would occur above 4,500 feet in elevation, which typically does not experience rain-on snow conditions. These events are natural processes that occur episodically in time and space. Vegetation prescriptions would trend vegetation towards natural conditions and patterns, which would be observed from past natural disturbance events. As discussed in the Affected Environment section, the greatest impacts observed from rain-on-snow events occur when culverts become plugged from resulting floods and debris flows. The activities proposed with the Proposed Action are not expected to open canopy enough to have any affect on runoff and flooding due to rain-on-snow events. The activity of installing rolling dips on Road 6006 would reduce the risk of road failure during snowmelt and potential rain-on-snow events

Cumulative Effects in regards to changes in Stream Channel Morphology: Estimated peak flow increases would also not effect channel degradation or stream bank erosion. Since the estimated increases in water yield and peak flows are 1% or less for the watershed and subwatershed areas, they are judged to be within the historic range of variation and not be a factor in any cumulative effects to changes in stream channel morphology. The existing condition in most of the headwater streams of the analysis (Rosgen A and B channels; PF Doc. AQ-33), area are such that they are well armored with mixed substrate and large woody debris, have good to excellent stream vegetation, and are stable and resilient. Lower reaches sensitive to disturbance in middle Prichard Creek show signs of past impacts from riparian roads, human development and placer mining. The estimated short-term increases in sediment yield associated with this project, for example the road reconstruction, would not be of a magnitude that would cause changes to stream channel morphology (e.g. migration, braiding, and widening of channels). Overall, stream channel morphology in the Jo-Cat Resource Area and cumulative effects watershed scale (i.e. Upper Prichard Creek subwatershed) would be maintained.

Cumulative Effects in regards to changes Fisheries Habitat: In consideration of the influences from direct and indirect effects associated with the proposed project and ongoing and reasonable foreseeable activities, the cumulative effects are not expected to change the existing condition trend for fisheries resources. In general, there would be "long-term benefits" to fisheries if the proposed fuels reduction work is implemented under the action alternative.

The Jo-Cat Resource Area road construction, reconstruction, in conjunction with ongoing and reasonably foreseeable actions, would result in a minimal net increase in sediment and water yields and peak flow in the short term. Based on the direct and indirect effects and disclosure of ongoing and reasonably foreseeable activities discussed above, the cumulative effects risk of any sediment delivery actually reaching a live channel is 1%. The predicted increase in water yield and peak flow changes (≤ 1.0%) would be localized and would likely not be measurable in fish-bearing channels. Primary and secondary contact recreation (also see summary of Executive Order 12962 – Recreational Fishing); the Proposed Action is consistent with this executive order regarding aquatic systems and recreational fisheries. The immeasurable, potential short-term increase in sediment yield, water yield, and peak flow changes may affect individual westslope cutthroat trout, but would **not** lead toward a trend in federal listing. Short-term effects of this project would not affect designated critical bull trout habitat in the lowest most reaches of Prichard Creek (No Effect).

4. Consistency with Regulatory Framework for Aquatic Resources

A. Consistency with the Forest Plan

All alternatives would meet the requirements of the Forest Plan for water resources and fisheries. Specific requirements and how this project meets them are listed in Aquatics Appendix A – BMPs (watershed) and Aquatics Appendix B INFS (fisheries). Alternative 1 would not change riparian habitat conditions, except for a steady increase in the risk of a stand replacement fire over time and the potential for road failures. The proposed action also met the requirements for fisheries resources in the Forest Plan, as amended by the Inland Native Fish Strategy (see Appendix B). The following are the water and fish standards to the Forest Plan and responses on each (USDA 1987, pp II 29-31; PF Doc. CR-002).

Consistency With Forest Plan Water Standards

Water Standard 1: Management activities on Forest Lands will not significantly impair the long-term productivity of the water resource and ensure that state water quality standards will be met or exceeded.

Idaho State BMPs (BMPs) are designed to protect the long-term productivity of the water resource and ensure state water quality standards will be met. The Jo-Cat Resource Area will meet standard BMPs. Site-specific BMPs were also included with this project as mitigation measures to improve water quality.

Water Standard 2: Maintain concentrations of total sediment or chemical constituents within state standards.

The net increase and delivery of sediment would be a maximum of 1% above existing conditions in the Upper Prichard Creek watershed with an average of (1 %) for the subwatershed as modeled by WATSED, (PF Doc. AQ-79 and 80). This increase in sediment will not further degrade water quality in streams of the resource area or downstream in Prichard Creek. The proposed activities in conjunction with past and foreseeable actions would not impair beneficial uses. The action alternative would meet State standards for chemical constituents given that "Required Design Criteria for All Action Alternatives," State and site-specific BMPs, and INFISH standards would be applied if the proposed action is selected.

Water Standard 3: Implement project level standards and guidelines for water quality contained in the BMPs (IPNF Forest Plan - Appendix S), including those defined by State regulation and agreement between the State and Forest Service such as: Idaho Forest Practices Rules, Rules and Regulations and Minimum Standards for Stream Channel Alterations, and BMPs for Road Activities.

Specific road maintenance and repair is needed for Alternative 1 to be consistent with Idaho Forest Practices Rules. The proposed action is consistent with this criterion. In addition to standard State BMPs, other soil and water conservation practices that are approved BMPs are built into the timber sale contract. Site-specific BMPs are specified and are listed in the BMP portion of this appendix. Soil and water conservation principles were used during alternative design to determine the location and types of treatments including

which areas should be avoided or restored. The specified and designed measures surpass those required by the State Forest Practices Act and are consistent with Forest Service standards.

Water Standard 4: Cooperate with the states to determine necessary instream flows for various uses. Instream flows should be maintained by acquiring water rights or reservations.

Instream flows are not an issue with any portion of the proposed project. Therefore, this Standard is not applicable.

Water Standard 5: Manage public water system plans for multiple uses by balancing present and future resources with public water supply needs. Project plans for activities in public water systems will be reviewed by the water users and the State.

Streams not defined as public water systems, but used by individuals for such purposes, will be managed to standards established by the state's forest practices rules and/or the National Forests' BMPs or to the INFS standards and guidelines whichever is applicable. Streams within the Jo-Cat Resource Area are not defined as a "Municipal Watershed" but the streams of the Prichard watershed are the public water supply for the town of Murray, Idaho.

Water Standard 6: Activities within non-fishery drainages, including first and second order streams, will be planned and executed to maintain existing biota. Maintenance of existing biota will be defined as maintaining the physical integrity of these streams. BMPs (Forest Plan Appendix S), Appendix 0, and riparian guidelines will be used to accomplish this objective.

The existing biota will be maintained in first and second order streams through standard and site specific BMPs and the application of INFS standards and guidelines. Site Specific BMPs and applicable INFS standards and guidelines are listed and described in the BMP portion Aquatic Appendix A.

Water Standard 7: It is the intent of this plan that models be used as a tool to approximate the effects of National Forest activities on water quality values. The models will be used in conjunction with field data, monitoring results, continuing research and professional judgment, to further refine estimated effects and to make recommendations.

All alternatives meet this standard. The WATSED model was used to predict water and sediment yield changes. A Risk Analysis model for culvert failure was not used because no culverts are present on the #6006 road.

Consistency With Forest Plan Fish Standards

Fish Standard 1: Activities on National Forest lands will be planned and executed to maintain existing water uses. Maintain is defined as "limiting effects from National Forest activities to maintain at least 80 percent of fry emergence success in identified fishery streams." The percent is measured from pristine conditions. Current methodology will not detect an impact of less than 20 percent. During the life of the plan, new technologies may permit more precise assessments; however, the goal of this standard will remain as "to maintain 80 percent of fry emergence success.

Fish Standard 2: Streams providing spawning and rearing habitat, which are considered critical to the maintenance of river and resident populations of special concern *["high value streams"],* will be managed at a standard higher than the 80 percent standard. Monitoring will be needed to detect this higher standard.

On June 2, 2005, the Forest Supervisor for the Idaho Panhandle National Forests signed a Decision Notice and Finding of No Significant Impact that amended the Forest Plan to modify or remove objectives, standards, and monitoring requirements pertaining to fry emergence success (USDA Forest Service 2005; PF Doc. AQ-56d). The amendment was implemented because the fry emergence objectives, standards and monitoring requirements that were in the IPNF Forest Plan did not contribute as well as INFS (PF Doc. CR-

003) objectives, standards, guidelines, and monitoring direction towards meeting the goals of providing sufficient habitat in support of maintaining diverse and viable populations of fish species across the forest. In addition, because of the limited application of the fry emergence models and their unreliability, and the inability to determine fry emergence success in the field due to high variability affected by multiple natural and human-caused factors, the Forest Service was not able to state with any degree of certainty whether measures of fry emergence success were accurate or precise.

Fish Standard 3: The stream and river segments (if listed) will be managed as low access fishing opportunities to maintain a diversity of fishing experiences for the public and to protect sensitive fish populations. Special road management provisions will be used to accomplish this objective.

Forest Plan standard 3 is not applicable to this analysis because no streams in the Jo-Cat Resource Area are listed as "low access fishing streams." However, streams within the Resource Area are recognized as to providing beneficial uses.

Fish Standard 4: Provide fish passage to suitable habitat areas, by designing road crossings of streams to allow fish passage or removing in-stream migration barriers.

Within the Jo-Cat Resource Area no potential fish barriers were identified through surveys. However, in the Prichard Creek watershed, potential fish barriers were located on Forest Highway 9 (i.e. Alder and Hopkins Creeks). These are located well below the Jo-Cat EA resource area. However, they are planned for survey in 2008 as directed under the Prichard-Murray EA using standard fish barrier data collection protocol (Clarkin et al. 2003; PF Doc. AQ-56b). No new stream migration barriers will be created with this project. This objective does apply to the Jo-Cat Resource Area.

Fish Standard 5: Utilize data from stream, river, and lake inventories to prepare fishery prescriptions that coordinate fishery resource needs with other resource activities. Pursue fish habitat improvement projects to improve habitat carrying capacities on selected streams.

As stated in the aquatics specialist report, information was utilized from stream inventories, field reviews, historical records, aerial photographs, analysis of watershed conditions, published scientific literature, discussions with other Fisheries Biologists and electrofishing/stocking data from the Idaho Department of Fish and Game, and the U.S. Fish and Wildlife Service.

Fish Standard 6: Coordinate management activities with water resource concerns as described in MA 16, Appendix I, and Appendix O.

Water resource concerns are protected in Management Area 16 through INFS standards and guidelines (See Aquatics Appendix B – INFS Standards and Guidelines).

B. Consistency With the National Forests Management Act – Species Viability

Fish species that may be affected by the project (westslope cutthroat trout and rainbow trout) are also distributed across the Forest. For example, westslope cutthroat and rainbow trout are found in 13 of 13 (100 %) of 4th code HUC watersheds (i.e., large watersheds, such as Coeur d'Alene River) on the IPNF. There is possible connectivity between the Coeur d'Alene River basin and one of the twelve other 4th code HUC watersheds on the Forest (i.e. St. Joe River).

- *Further westslope cutthroat are well distributed and found in 100% of the 6th code HUCs in the Coeur d'Alene River basin. Though introduced, rainbow are not as well distributed;*
- *At the smaller watershed scale, westslope cutthroat and rainbow are known to inhabit tributary stream in the analysis area (≤7th Code HUC watershed). Based on the distribution of species across the Forest, the lack of connectivity between large watersheds, and the limited cumulative effects area the Jo-Cat Resource Area will not affect viability of any threatened, endangered, sensitive, or MIS fish species on the IPNF;*

- *Therefore, the project will not affect viability, not only because of species distribution, but also because the project is not predicted as modeled to lead to an adverse impact on fish or fish habitat conditions.*

C. Consistency With the Endangered Species Act

All alternatives meet requirements of the Endangered Species Act. Critical habitat has been designated for bull trout in the lowest mostly private land segments of the Prichard Creek watershed, which is outside the cumulative effects area for the Jo-Cat Resource Area and its tributaries. The project will have no effect on critical habitat or threatened bull trout (NE).

D. Consistency With the Clean Water Act (Including State of Idaho Implementation)

All alternatives would be consistent with the requirements of the Clean Water Act, 33 U.S.C. §1251. Sediment and metals, the pollutants of concern, would not increase in the water quality limited Prichard Creek drainage with the proposed activities. Risks to beneficial uses in all streams of the Jo-Cat Resource Area would not be changed by this project. In compliance with the current TMDL for the North Fork of the Coeur d'Alene River, there would be no net measurable increase in sediment or metals into the North Fork of the Coeur d'Alene River or streams of the project area through the proposed management activities.

E. Consistency With the Safe Drinking Water Act and Amendments of 1996 Act (Including State of Idaho Implementation).

All alternatives would be consistent with the requirements of the Safe Drinking Water Act and Amendments of 1996. BMP's were developed from protection measures recommended from this assessment along with site specific BMPs outlined in Aquatics Appendix A.

F. Consistency with the Idaho Forest Practices Act

No municipal watersheds are within the effects area of the Jo-Cat analysis area. The town of Murray does draw its domestic water from sources within the Prichard Creek watershed. Proposed activities are away from water sources used for domestic purposes. BMPs (Aquatics Appendix A) or Soil and Water Conservation Practices (PF Doc. AQ-53) would be applied under all alternatives, and all activities are in compliance with the guidelines in the Soil and Water Conservation Handbook.

G. Consistency With Executive Order 12962 – Recreational Fishing

The Proposed Action is consistent with this executive order regarding aquatic systems and recreational fisheries. The immeasurable, potential short-term increase in sediment yield, water yield, and peak flow changes may affect individual westslope cutthroat trout, but would **not** lead toward a trend in federal listing. Short-term effects of this project would not affect designated critical bull trout habitat in the lowest most reaches of Prichard Creek (No Effect).

H. Consistency with the State of Idaho Governor's Bull Trout Plan

The mission of the Governors Bull Trout Plan (1996; PF Doc. AQ-11) is to "…maintain and or restore complex interacting groups of bull trout populations throughout their native range in Idaho." A bull trout population in the N.F. Coeur d'Alene River system is not known to currently persist based on all the information available at the time of this developed document. In the Plan the Coeur d'Alene River basin is defined as a drainage area that is a key watershed for a bull trout metapopulation, however no map is provided to explain watershed boundary and scope.

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AQUATICS APPENDIX A
BEST MANAGEMENT PRACTICES

The wildlife analysis is commensurate with the importance of the impact (40 CEQ 1502.15), the risk associated with the project, the species affected, and the level of knowledge already on hand (USDA Forest Service, 1992; PF Doc. WL-R65. Some wildlife species or their habitat are present in the analysis area, but would not be measurably affected because they would not be impacted by the proposed activities, the impacts would not be sufficient to influence their use or occurrence, or their needs can be adequately addressed through design of the project. No further discussion or analysis is necessary for those species and/or suitable habitat that are not found within the resource area or for those which would not be measurably affected. These species and the rationale for dismissing them from further consideration are described below and in the Project Files (PF Doc. WL-48).

INTRODUCTION

The Forest Service is required by law to comply with water quality standards developed under authority of the Clean Water Act. The Environmental Protection Agency and the State of Idaho are responsible for enforcement of these standards. The Idaho Panhandle National Forest Plan states (Chapter II, p. 27) that the Forest will "maintain high quality water to protect fisheries habitat, water based recreation, public water supplies and be within state water quality standards". The use of BMP's is also required in the Memorandum of Understanding between the Forest Service and the State of Idaho as part of our responsibility as the Designated Water Quality Management Agency on National Forest System lands. The State's water quality standards regulate nonpoint source pollution from timber management and road construction activities through application of Best Management Practices (BMPs). The BMPs were developed under authority of the Clean Water Act to ensure that Idaho's waters do not contain pollutants in concentrations, which adversely affect water quality or impair a designated use. State recognized BMPs that will be used during project design and implementation are contained in these documents:

a. Rules and Regulations Pertaining to the Idaho Forest Practices Act, (IFPA), as adopted by the Idaho Land Board; and

b. Rules and Regulations and Minimum Standards for Stream Channel Alterations, as adopted by the Idaho Water Resources Board under authority of the Idaho Stream Channel Protection Act (ISCPA).

Many of the rules and regulations for stream channel alterations are contained, in slightly different forms, in two Memorandum of Understandings (MOU) between the USFS and the State of Idaho. These MOUs are incorporated into the Forest Manual and R-1 Supplement 31, contains provisions which are not currently state recognized BMPs.

The practices described herein are tiered to the practices in FSH 2509.22. They were developed as part of the NEPA process, with interdisciplinary involvement, and meet state and Forest water quality objectives. The purpose of this appendix is to: 1) establish the connection between the Soil and Water Conservation Practice (SWCP) employed by the Forest Service and BMP's identified in Idaho Water Quality Standards (IDAPA 16.01.2300.05) and 2) identify how the SWCP Standard Specifications for the Construction of Roads, and the Timber Sale Contract provisions meet or exceed the Rules and Regulations pertaining to the Idaho Forest Practices Act, Title 38, Chapter 13, Idaho Code. The relevant portions of the Rules and Regulations developed under the Idaho Stream Protection Act are also covered.

The objective of this appendix is to provide conservation practices for use on National Forest Lands to minimize the effects of management activities on soil and water resources. The conservation practices were compiled from Forest Service manuals, handbooks, and contract and permit provisions, to directly or indirectly

improve water quality, reduce losses in soil productivity and erosion, and abate or mitigate management effects, while meeting other resource goals and objectives. They are of three basic forms: administrative, preventive and corrective. These practices are neither detailed prescriptions nor solutions for specific problems. They are purposely broad. These practices are action initiating process mechanisms, which call for the development of requirements and considerations to be addressed prior to and during the formulation of alternatives for land management actions. They serve as checkpoints, which are considered in formulating a plan, a program and/or a project.

Although some environmental impacts may be characteristic of a management activity, the actual effects on soil and water resources will vary considerably. The extent of these management effects on soil and water resources is a function of:

1. The physical, meteorological and hydrologic environment where the activity takes place (topography, physiography, precipitation, channel density, geology, soil type, vegetative cover, etc.);

2. The type of activity imposed on a given environment (recreation, mineral exploration, timber management, etc.) and its extent and magnitude;

3. The method of application and the duration of the activity (grazing system used, types of silvicultural practice used, constant vs. seasonal use, recurrent application or onetime application, etc.);

4. The season of the year that the activity occurs or is applied.

These factors vary within the National Forests in the Northern Region and from site to site. It follows then that the extent and kind of impacts are variable, as are the abatement and mitigation measures. No solution prescription, method, or technique is best for all circumstances. Thus the management practices presented in the following include such phrases as "according to the design", "as prescribed," "suitable for," "within acceptable limits," and similar qualifiers. The actual prescriptions, specifications, and designs are the result of evaluation and development by professional personnel through interdisciplinary involvement in the NEPA process. This results in specific conservation practices that are tailored to meet site specific resource requirements and needs.

BMP IMPLEMENTATION PROCESS

In cooperation with the States, the USDA Forest Service's primary strategy for the control of nonpoint sources is based on the implementation of BMP's determined necessary for the protection of the identified beneficial uses. The Forest Service Nonpoint Source Management System consists of:

1. BMP selection and design based on site-specific conditions; technical, economic and institutional feasibility; and the designated beneficial uses of the streams;

2. BMP Application;

3. BMP monitoring to ensure that they are being implemented and are effective in protecting designated beneficial uses;

4. Evaluation of BMP monitoring results;

5. Feeding back the results into current/future activities and BMP design.

The District Ranger is responsible for insuring that this BMP feedback loop is implemented on all projects. The Practices described herein are tiered to the practices in the R1/R4 FSH 2509.22. They were developed as

part of the NEPA process, with interdisciplinary involvement, and meet State and Forest water quality objectives. The purpose of this appendix document is to: 1) establish the connection between the SWCP employed by the Forest Service and BMP's identified in Idaho Water Quality Standards (IDAHO APT 16.01.2300.05) and 2) identify how the SWCP, Standard Specifications for the Construction of Roads, and the Timber Sale Contract provisions meet or exceed the Rules and Regulations Pertaining to the Idaho Forest Practices Act, Title 38, Chapter 13, Idaho Code (BMP's). The relevant portions of the Rules and Regulations developed under the Idaho Stream Protection Act are also included.

FORMAT OF THE BMPS

Each Soil and Water Conservation Practice (SWCP) is described as follows:

Title: Includes the sequential number of the SWCP and a brief title.

OBJECTIVE: Describes the SWCP objective(s) and the desired results for protecting water quality.

EFFECTIVENESS: Provides a qualitative assessment of expected effectiveness that the implemented BMP will have on preventing or reducing impacts on water quality. The SWCP effectiveness rating is based on: 1) literature and research (must be applicable to area 2) administrative studies (local or within similar ecosystem); and 3) professional experience (judgment of an expert by education and/or experience). The expected effectiveness of the SWCP is rated either High, Moderate or Low.

High: Practice is highly effective (>90%) and one or more of the following types of documentation are available:

a) Literature/Research - must be applicable to area;
b) Administrative studies - local or within similar ecosystem;
c) Experience - judgment of an expert by education and/or experience;
d) Fact - obvious by reasoned (logical response).

Moderate: Documentation shows that the practice is effective less than 90% of the time, but at least 75% of the time.

Or

Logic indicates that this practice is highly effective, but there is little or no documentation to back it up.

Or

Implementation and effectiveness of this practice will be monitored and the practice will be modified if necessary to achieve the objective of the BMP.

Low: Effectiveness unknown or unverified, and there is little to no documentation

Or

Applied logic is uncertain in this case, or the practice is estimated to be less than 75% effective.

Or

This practice is speculative and needs both effectiveness and validation monitoring.

The effectiveness estimates given here are general, given the range of conditions throughout the Forest. More specific estimates are made at the project level when the BMPs are actually prescribed.

COMPLIANCE: Provides a qualitative assessment of how the implementation of the specific measures will meet the Forest Practice Act Roles and Regulations pertaining to water quality.

IMPLEMENTATION: This section identifies: (1) the site-specific water quality protection measures to be implemented and (2) how the practices are expected to be applied and incorporated into the Timber Sale Contract.

ITEMS COMMON TO ALL SOIL & WATER CONSERVATION PRACTICES

Responsibility For Implementation: The District Ranger (through the Presale Forester) is responsible for insuring the factors identified in the following SWCP's are incorporated into: Timber Sale Contracts through the inclusion of proper B and/or C provisions; or Public Works Contracts through the inclusion of specific contract clauses.

The Contracting Officer, through his/her official representative (Sale Administrator and/or Engineering Representatives for timber sale contracts; and Contracting Officers Representative for public works contracts) is responsible for insuring that the provisions are properly administered on the ground.

Monitoring: Implementation and effectiveness of water quality mitigation measures are also monitored annually. This includes routine monitoring by timber sale administrators, road construction inspectors, and resource specialists which is documented in diaries and project files. Basically, water quality monitoring is a review of BMP implementation and a visual evaluation BMP effectiveness. Any necessary corrective action is taken immediately. Such action may include modification of the BMP, modification of the project, termination of the project, or modification of the state water quality standards.

Table 1.1: Key to abbreviations.	
TSC = Timber Sale Contract	**SAM** = Sale Area Map
TSA = Timber Sale Administrator	**COR** = Contracting Officer Representative
PWC = Public Works Contract	**IFPA** = Idaho Forest Practices Act
SCA = Stream Channel Alteration Act	**SWCP**= Soil and Water Conservation Practices
BMP = Best Management Practices	**SMZ** = Streamside Management Zone
SPS = Special Project Specifications	**EPA** = Environmental Protection Zone
CFR = Code of Federal Regulations	

KEY SOIL & WATER CONSERVATION PRACTICES

Class * Soil and Water Conservation Practice (FSH 2509.22)

11 WATERSHED MANAGEMENT

W 11.05 - Wetlands Analysis and Evaluation
W 11.07 Oil and Hazardous Substance Spill Contingency Planning
W 11.09 Management by Closure to Use
W 11.11 Petroleum Storage & Delivery Facilities & Mgt

13 VEGETATION MANIPULATION

G 13.02 Slope Limitations for Tractor Operation
G 13.03 Tractor Operation Excluded from Wetlands, Bogs, and Wet Meadows
E 13.04 Revegetation of Surface Disturbed Areas
E 13.05 Soil Protection During and After Slash Windrowing

E 13.06 Soil Moisture Limitations for Tractor Operation

14 TIMBER

A 14.02 Timber Harvest Unit Design
A 14.03 Use of Sale Area Maps for Designating Soil and Water Protection Needs
A 14.04 Limiting the Operating Period of Timber Sale Activities
E 14.05 Protection of Unstable Areas
A 14.06 Riparian Area Designation
G 14.07 Determining Tractor Loggable Ground
E 14.08 Tractor Skidding Design
E 14.09 Suspended Log Yarding in Timber Harvesting
A 14.10 Log Landing Location and Design
E 14.11 Log Landing Erosion Prevention and Control
E 14.12 Erosion Prevention and Control Measures During Timber Sale Operations
E 14.13 Special Erosion Prevention Measures on Areas Disturbed by Harvest Activities
E 14.14 Revegetation of Areas Disturbed by Harvest Activities
E 14.15 Erosion Control on Skid Trails
E 14.16 Meadow Protection During Timber Harvesting
S 14.17 Streamcourse Protection (Implementation and Enforcement
E 14.18 Erosion Control Structure Maintenance
A 14.19 Acceptance of Timber Sale Erosion Control Measures Before Sale Closure
E 14.20 Slash Treatment in Sensitive Areas
A 14.22 Modification of the Timber Sale Contract

15 ROADS AND TRAILS

A 15.02 General Guidelines for Road Location/Design
E 15.03 Road and Trail Erosion Control Plan
E 15.04 Timing of Construction Activities
E 15.05 Slope Stabilization and Prevention of Mass Failures
E 15.06 Mitigation of Surface Erosion and Stabilization of Slopes
E 15.07 Control of Permanent Road Drainage
E 15.08 Pioneer Road Construction
E 15.09 Timely Erosion Control Measures on Incomplete Road and Streamcrossing Projects
E 15.10 Control of Road Construction Excavation & Sidecast Material
S 15.11 Servicing and Refueling of Equipment
S 15.12 Control of Construction In Riparian Areas
S 15.13 Controlling In-Channel Excavation
S 15.14 Diversion of Flows Around construction Sites
S 15.15 Stream crossings on Temporary Roads
S 15.16 Bridge & Culvert Installation (Disposition of Surplus Material and Protection of Fisheries)
E. 15.17 Regulation of Borrow Pits, Gravel Sources, and Quarries
E 15.18 Disposal of Right-of-Way and Roadside Debris
S 15.19 Streambank Protection
E 15.21 Maintenance of Roads
E 15.22 Road Surface Treatment to Prevent Loss of Materials
E 15.23 Traffic Control During Wet Periods
G 15.24 Snow Removal Controls
E 15.25 Obliteration of Temporary Roads
E 15.27 Trail Maintenance and Rehabilitation

18 FUELS MANAGEMENT

E 18.02 Formulation of Fire Prescriptions

E 18.03 Protection of Soil and Water from Prescribed Burning Effects

Table 1.2: Classes of SWCP (BMP)	
A = Administrative	**G** = Ground Disturbance Reduction
E = Erosion Reduction	**W** = Water Quality Protection
S = Stream Channel Protection/Stream Sediment Reduction	

SITE-SPECIFIC BEST MANAGEMENT PRACTICES

PRACTICE 11.05 - Wetlands Analysis and Evaluation;

OBJECTIVE: To delineate wetlands within sale areas in order do o facilities or degradation of soil and water resources.

EFFECTIVENESS: High

COMPLIANCE: FPA Rule 4.d.v(c) - Meets

PRACTICE 11.07 - Oil and Hazardous Substance Spill Contingency Planning
PRACTICE 11.11 - Petroleum Storage and Delivery Facilities & Management
PRACTICE 15.11 - Servicing and Refueling of Equipment

OBJECTIVE: To prevent contamination of waters from accidental spills of fuels, lubricants, bitumen's, raw sewage, wash water, and other harmful materials by prior planning and development of Spill Prevention Control and Countermeasure Plans.

EFFECTIVENESS: Although SPCC Plans cannot eliminate the risk of materials being spilled and escaping into waters, they can if followed be effective at reducing adverse effects to tolerable levels. Depending on the location and quantity of a spill, a properly implemented Plan can provide for up to 100 percent containment of a spill.

COMPLIANCE: FPA Rule 2.j.i,ii - Meets

IMPLEMENTATION: TSC provisions holds the purchaser responsible for taking appropriate preventive measures to insure that any spill of oil or oil products does not enter any stream or other waters of the United States. If the total oil or oil products storage exceeds 1320 gallons or if any single container exceeds a capacity of 660 gallons, the purchaser will prepare a Spill Prevention Control and Countermeasures Plan. The plan shall meet EPA requirements including certification by a registered professional engineer. If necessary, specific requirements for transporting oil to be used in conjunction with the contract will be specified in TSC provisions.

The Contracting Officer Representative will designate the location, size and allowable uses of service and refueling areas. The criteria below will be followed at a minimum:

1. Petroleum product storage containers with capacities of more than 200 gallons, stationary or mobile, will be located no closer than 100 feet from stream, water course, or area of open water. Dikes, berms, or embankments will be constructed to contain the volume of petroleum products stored within the tanks. Diked areas will be sufficiently impervious and of adequate capacity to contain spilled petroleum products. [FPA RULE 2(j)]

2. Transferring petroleum products: During fueling operations or petroleum product transfer to other containers, there shall be a person attending such operations at all times [FPA Rule 2(j)(i)].

3. Equipment used for transportation or storage of petroleum products shall be maintained in a leak proof condition. If the Forest Service Representative determines there is evidence of petroleum product leakage or spillage he/she shall have the authority to suspend the further use of such equipment until the deficiency has been corrected. [FPA Rule 2(j)(ii)]

4. For longer-term storage, a sump pond lined with plastic will be constructed equal to the volume of fuel stored on the site.

In the event any leakage or spillage enters any stream, water course or area of open water, the operator will immediately notify the COR who will be required to follow the actions to be taken in case of hazardous spill, as outlined in the Forest Hazardous Substance Spill Contingency Plan.

PRACTICE 11.09 - Management by Closure to Use
PRACTICE 15.23 - Traffic Control During Wet Periods

OBJECTIVE: To reduce the potential for road surface disturbance during wet weather and to reduce sedimentation probability by excluding activities that could result in damages to facilities or degradation of soil and water resources.

EFFECTIVENESS: Moderate

COMPLIANCE: FPA Rule 4.d.v(c) - Meets

IMPLEMENTATION: Specific guidelines for closure of roads during the period of the contract and at the end of the purchasers operations will be spelled out in the TSC provision (Closure to Use by Others):

Roads that must be used during wet periods should have a stable surface and sufficient drainage to allow such use with a minimum of resource impact. Rocking, paving and armoring are measures that may be necessary to protect the road surface and reduce erosion potential. Roads not constructed for all weather use should be closed during the wet season. Where winter field operations are planned, roads may need to be upgraded and maintenance intensified to handle the traffic without creating excessive erosion and damage to the road surfaces.

PRACTICE 13.02 - Slope Limitations for Tractor Operation
PRACTICE 14.07 - Determining Tractor Loggable Ground

OBJECTIVE: To reduce gully & sheet erosion and associated sediment production by restricting tractor operation to slopes where corrective measures for proper drainage are easily installed and effective.

EFFECTIVENESS: In general, the less the slope percentage, the less are the chances of rilling, gullying, and soil displacement as a consequence of tracked or wheeled skidding.

COMPLIANCE: FPA Rules 3.c.i. & c.ii - **VARIES FROM FPA RULE - FPA Rules 3.c.i**

IMPLEMENTATION:

Example 1:

1) Tractor or wheel skidding shall not be conducted on geologically unstable, saturated, or easily compacted soils. On slopes exceeding 35 percent gradient, tractor or wheel skidding shall be conducted during the winter with a minimum of 18 inches of snow cover or with a softtrack skidding machine. On slopes exceeding 45 percent gradient and which are immediately adjacent to a class I or II stream, tractor or wheel skidding shall not be conducted unless the operation can be done without

causing accelerated erosion. Where slopes in the area to be logged exceed 45 percent gradient, skidding shall be done in the winter with a minimum of 18 inches of snow cover and a softtrack skidding machine shall be used. [FPA Rule 3.c.i.]

a. This provision does not apply to any units .

2) Constructed skid trails on geologically unstable, saturated, or highly erodible or easily compacted soils on slopes over 20 percent will be prohibited [FPA Rule 3.c.ii and TSC Provisions].

Example 2:

1) Tracked or wheel skidding shall not be conducted on geologically unstable, saturated, or easily compacted soils or on slopes exceeding 30 percent. Constructed skid trails on geologically unstable, saturated, or highly erodible or easily compacted soils on slopes over 20 percent will be prohibited [FPA Rules 3.c.i and ii and TSC Provisions].

a. This provisiondoes not appys to any units:

Mandatory: When tractor skid trails are required on geologically unstable, saturated, or highly erodible or easily compacted soils, the maximum grade of the trail shall be limited to 30 percent. The Forest Service shall document any differences from the FPA Rule requirements in a variance and so note the variance in the Decision Document.

PRACTICE 13.03 - Tractor Operation Excluded from Wetlands, Bogs, & Wet Meadows

OBJECTIVE: To maintain wetland functions and avoid adverse soil and water resource impacts associated with the destruction or modification of wetlands, bogs and wet meadows.

EFFECTIVENESS: Much of this mitigation consists of avoiding the impact [40 CFR 1508.20(a)]. The Forest Service has near-complete control over construction operations. Effectiveness is expected to be high.

COMPLIANCE: FPA Rule 3.h.iii - Meets

IMPLEMENTATION: At a minimum, the following specific protective requirements for wetlands identified on the Sale Area Map (SAM) will be incorporated into CT6.61# (Wetlands Protection):

1. Soil and vegetation along lakes, bogs, swamps, wet meadows, springs, seeps, or other sources where the presence of water is indicated will be protected from disturbance which would cause adverse effects on water quality, quantity, and wildlife and aquatic habitat (FPA Rule 3.h.iii].
2. An equipment exclusion zone shall extend a minimum of 65 feet from the wetlands, bogs, and wet meadows or as directed by INFS (1995) Standards and Guidelines under category 4 definitions.

PRACTICE 13.04 - Revegetation of Surface Disturbed Areas

PRACTICE 14.14 - Revegetation of Areas Disturbed by Harvest Activities

OBJECTIVE: To protect soil productivity and water quality by minimizing soil erosion.

EFFECTIVENESS: Revegetation can be moderately effective at reducing surface erosion after one growing season following disturbance and highly effective in later years. Effectiveness has been shown to vary from 10 percent on 3/4:1 slopes to 36 percent on 1:1 slopes to 97 percent on 1:1 slopes in later years (King, John G. and

E. Burroughs. Reduction of Soil Erosion on Forest Roads. Intermountain Research Station General Technical Report, 1988).

COMPLIANCE: FPA Rules 3.d.iii & e.i, ii - Meets

IMPLEMENTATION: All temporary roads, landings, and skid trails in the sale area will be seeded within one year after harvesting is completed. Seed mixes and fertilizer specifications will be incorporated into Timber Sale Contract provision CT6.601# (Erosion Control Seeding). Timber Sale Contract provision CT6.623# (Temporary Road, Skid Trail/Skid Road and Landing) will identify that scarification/ripping of compacted landings and closed roads will be a minimum of 4 inches, not to exceed 2 feet.

a. All temporary roads, landings, and skid trails will also be fertilized to give the new plants extra support in becoming established.

b. The standard Idaho Panhandle National Forests moist site erosion control seed mix will be used.

PRACTICE 13.05 - Soil Protection During and After Slash Windrowing

OBJECTIVE: To reduce erosion and sedimentation from road surfaces and fill slopes, slash is windrowed below the fill slope.

EFFECTIVENESS: Slash filter windrows are logging slash placed at the base of fill slopes and below culverts where fish passage is not required has been shown to reduce sediment leaving fill slopes by 75 to 85 percent (Cook and King, "Construction Cost and Erosion Control Effectiveness of Filter Windrows on Fill Slopes," Research Paper INT-335, Intermountain Research Station, 1983; Burroughs, *et al.*, "Relative Effectiveness of Fillslope Treatment in Reducing Surface Erosion, Horse Creek Road, Nez Perce National Forest" Intermountain Research Station, 1985.) Slash filter windrows are effective immediately and during the first few years thereafter; they may later be near capacity and in some cases would have begun to decompose. By that time, though, revegetation would have become more effective.

COMPLIANCE: No directly related FPA Rule.

IMPLEMENTATION: Slash windrows will be installed 100 feet on both sides of all new stream crossings where sediment delivery from the fill slope can be expected. Slash filter windrows will also be used on fill slopes where there is a possibility of erosion or sedimentation into a nearby stream or channel (STD FS Spec 201).

PRACTICE 13.06 - Soil Moisture Limitations for Tractor Operation

OBJECTIVE: To minimize soil compaction, puddling, rutting, and gulling with resultant sediment production and loss of soil productivity by ensuring that activities are done when ground conditions are such that erosion and sedimentation can be controlled.

EFFECTIVENESS: Responsible implementation and enforcement are required for high effectiveness.

COMPLIANCE: No Related FPA Rule

IMPLEMENTATION:

1. Tractor operations will be limited to periods when the soil moisture content is 18% or less, the ground

is frozen, or there is at least 18 inches of snow depth. Tractor operations will only be allowed outside of these specifications through the use of designated skid trails. These requirements will be incorporated into TSC provisions.

PRACTICE 14.02 - Timber Harvest Unit Design;
PRACTICE 14.08 - Tractor Skidding Design;
PRACTICE 14.10 - Log Landing Location and Design

OBJECTIVE: To insure that timber harvest unit design will maintain water quality and soil productivity by locating/designing landings and skidding patterns to best fit the terrain and avoid soil erosion.

EFFECTIVENESS: Restricting tractor skidding to designated skid trails can reduce the areal extent of soil disturbance from the typical 18-36 percent to 10 percent or less. Properly located landings and skid trails produce similar results. Effectiveness is expected to be moderate.

COMPLIANCE: FPA Rules 3.c.iii; 3.d.i & ii - Meets

IMPLEMENTATION: TSC provision B6.422 (Landings and Skid Trails) requires that the location of all skid trails and landings must be agreed upon before construction. Specific criteria that will be addressed during sale-layout and pre-work with the operator will include:

General: All new or reconstructed landings, skid trails, and fire trails shall be located on stable areas outside riparian areas. Side casting will be held to a minimum [FPA Rule 3.d.i].

Skid Trails:

a. Skid trails shall be kept to the minimum feasible width and number [FPA Rules 3.c.iii];

b. Located skid trails to avoid concentrating runoff and provide breaks in grade and waterbars;

c. Use existing skid trails wherever possible as long as the existing trails meet INFISH requirements.

Landings:

1. Landing sizes will be the minimum necessary for safe, economical operation [FPA Rule 3.d.ii];
2. Landings and log decks will not be located within Riparian Areas;

Landings, log decks, and/or burn piles will be located a minimum of 100 feet from streams, far enough away that direct (unfiltered) entry of sediment, bark, or ash and burning products, will not occur.

PRACTICE 14.03 - Use of Sale Area Maps for Designating Soil & Water Protection Needs

OBJECTIVE: To delineate the location of protection areas and special treatment areas, to insure their recognition, proper consideration, and protection on the ground.

EFFECTIVENESS: High

COMPLIANCE: No related FPA rule.

IMPLEMENTATION: The following features will be designated on the SAM:

1. The stream courses (Category 1, 2, and 4) listed below will be designated as Stream Course Protection areas to be protected under the TSC. During layout of the units these areas will be excluded where possible. Where these areas cannot be easily excluded from the unit, these areas will be excluded by designating the timber as leave trees. INFS (1995) standards and and guidelines using buffer categories will be applied to the following areas:
    a) Streams within the Upper Prichard Creek watershed - The mainstem length of these streams and their tributaries are delineated on project GIS maps for all alternatives;

    b) Any unnamed channels that are shown on the sensitive landtype map;

2. Wetlands (meadows, lakes, potholes, etc.) to be protected per the timber sale contract clauses are those designated on the Fish and Wildlife Service 1:24000 scale wetland maps;

3. Ephemeral channels will be protected through unit layout, marking plans, and/or designation on sale area maps;

The Purchaser and the Sale Administrator prior to harvesting will review these features on the ground.

MONITORING: A Watershed Specialist (Forest or District) will insure that the above features have been designated on the Sale Area Map during contract development.

PRACTICE 14.04 - Limiting the Operating Period of Timber Sale Activities;
PRACTICE 15.04 - Timing of Construction Activities

OBJECTIVE: To minimize soil erosion, sedimentation and soil productivity loss by insuring activities, including erosion control work, road maintenance, etc., are done: (1) within the time period specified in the TSC; or (2) when ground conditions are such that erosion and sedimentation can be prevented.

EFFECTIVENESS: Moderate

COMPLIANCE: FPA 4.c.ix - Meets

IMPLEMENTATION: Within the sale area, the following specifications relating to operating periods have been identified and recommended by the IDT:

1. Earthwork shall be postponed during wet periods if, as a result, erodible material would enter streams (FPA 4(c)(ix));

TSC provisions allows operations to occur outside Normal Operating Season subject to requirements in stated in the TSC.

G. The following requirements apply to operations outside the Normal Operating Season (see H-1, 2 for specific winter operations):

    1. Drain dips will be built into skidtrails and temporary roads at the time of construction, where feasible. Where draindips are not feasible, or are not functioning, trails and temporary roads will be waterbarred and maintained as necessary and/or prior to any prolonged shutdown;

    2. Pioneering on specified road construction will be limited to 1,000 feet after October 31;

3. Temporary Roads will be seeded immediately following construction;

4. All surface erosion and stabilization activities will be placed prior to November 1 of each year.

H. The following requirements apply to winter operations:

1. Skid trails will be constructed with waterbars and/or draindips, and allowed to freeze prior to skidding operations;

2. Prior to spring shutdown, slash and/or cull logs will be placed into skidtrails to approximate waterbars;

3. Breaks will be provided in the snow berm during snowplowing activities;

Winter operations will also require the following language in the referenced TSC provisions:

a. All streams and channels within harvest units will be flagged or otherwise identified;
b. During all snowplowing activities, breaks will be maintained in the snow berm along the outside of roads, particularly in the areas where needed for road drainage.

Operations will be discontinued if conditions change and activities are no longer operating on frozen or snow covered ground, the intent of winter logging.

PRACTICE 14.05 - Protection of Unstable Areas
PRACTICE 15.05 - Slope Stabilization and Prevention of Mass Failures

OBJECTIVE: To identify and protect unstable areas and to avoid triggering mass movements of the soil mantle and resultant erosion and sedimentation.

EFFECTIVENESS: Avoidance is the most effective measure on high-risk landforms. Risk assessment based on experience is essential. Effectiveness is expected to be moderate

COMPLIANCE: FPA Rule 3.d.iii - Meets

IMPLEMENTATION: Unstable areas will be avoided by project design within the sale area. The following are guidelines that will be followed:

1. Avoid road locations or timber harvesting on or adjacent to active landslides, slump blocks and other mass wasting processes;

2. To prevent landslides, fill material used in landing construction shall be free of loose stumps and excessive accumulations of slash. On slopes where sidecasting is necessary, landings shall be stabilized by use of seeding, compaction, riprapping, benching, mulching, or other suitable means [FPA Rule 3.d.iii];

3. If road construction is necessitated in an area of moderate instability, the embankment should be layer placed or as recommended by a geotechnical engineer;

Identify any opportunities to stabilize existing unstable areas or minimize the adverse impacts associated with the unstable areas.

PRACTICE 14.09 - Suspended Log Yarding in Timber Harvesting

OBJECTIVE: To protect the soil from excessive disturbance and accelerated erosion and to maintain the integrity of the Riparian Area and other sensitive watershed areas.

EFFECTIVENESS: The more suspended log yarding can be used, the less soil disturbance will result. Effectiveness is expected to be moderate

COMPLIANCE: FPA Rule 3.g.ii - Meets

IMPLEMENTATION: The TSC provisions, requires that areas requiring special yarding, as identified in TSC provisions (Skidding and Yarding), be identified on the SAM. Cable yarding (partial or full suspension) will be used on all areas identified for such logging on the SAM. Uphill cable yarding is preferred. Where downhill yarding is used, reasonable care shall be taken to lift the leading end of the log to minimize downhill movement of slash and soils [FPA Rule 3.c.iv].

The following requirement will be included in TSC (Conduct of Logging):

Units 1, 2, 3, 4, 5, 7blm, 8, 9, 10, 11, 12, 13, 15, 16, 17, 21, 22, 23, 24, 26, and 27 (all skyline units) will be uphill yarded with at least one end of the logs suspended.

PRACTICE 14.11 - Log Landing Erosion Prevention and Control;

PRACTICE 14.12 - Erosion Prevention & Control During Timber Sale Operations;

PRACTICE 14.15 - Erosion Control on Skid Trails.

OBJECTIVE: To protect water quality by minimizing erosion and subsequent sedimentation derived from log landings and skid trails.

EFFECTIVENESS: Moderate

COMPLIANCE: FPA Rules 3.e.i, ii; 3.d.iii - Meets

IMPLEMENTATION: The following criteria will be used in controlling erosion and restoring landings and skid trails to minimize erosion:

General:

4. Deposit waste material from construction or maintenance of landings and skid and fire trails in geologically stable locations outside of Riparian Habitat Conservation Areas.
5. Skid trails and landings, seeding will be done with a seed/fertilizer mix specified in the contract.

Landings:

1. During period of use, landings will be maintained in such a manner that debris and sediment are not delivered to any streams. Landings will not be located in ephemeral draws or swales that were created by or are prone to landslides.
2. Landings shall be reshaped as needed to facilitate drainage prior to fall and spring runoff. Landings shall be stabilized by establishing ground cover or by some other means within one year after harvesting is completed [FPA Rule 3.e.ii].

3. Landings will drain in a direction and manner that will minimize erosion and will preclude sediment delivery to any stream.

4. After landings have served the Purchaser's purpose, the Purchaser shall ditch or slope them to permit the water to drain or spread [Provision BT6.63 (Landings)].

Skid Trails:

1. Skid trails and fire trails shall be stabilized whenever they are subject to erosion, by waterbarring, cross-draining, outsloping, scarifying, seeding, or other suitable means. This work shall be kept current to prevent erosion prior to fall and spring runoff [FPA Rule 3.e.i].

2. The sale administrator and/or watershed specialist will designate the spacing of water bars on skid trails. [Reference FSH 7709.56].

3. Unit design and location will facilitate logging with a minimum amount of excavated skid trails. Where excavated trails are constructed they will be kept to a minimum and must be decommissioned by the purchaser following completion of the logging activities. The decommissioning will include restoring natural slope contours and placing slash and logs on top of the disturbed soil, and use of seeding where needed.

4. Skid trails and fire trails shall be stabilized whenever they are subject to erosion, by waterbarring, cross draining, outsloping, scarifying, seeding, or other suitable means. This work shall be kept current to prevent erosion prior to fall and spring runoff.

5. Spacing of water bars on skid trails will be based on guides for controlling sediment from secondary logging roads (no date). If necessary, additional water bars will be prescribed by the sale administrator and/or watershed specialist.

6. All skid trail and landing locations will be approved by the Forest Service prior to harvesting and will be rehabilitated as necessary to assure that normal drainage patterns are maintained, and that exposed soil surfaces are seeded or covered with slash. This will minimize the potential for sediment production and delivery.

7. Skid trail distance will average 100 feet or greater on ground skidded units, except where the trails converge to landings and as terrain dictates otherwise. This measure will help assure that no more than 15 percent of the activity area will be detrimentally disturbed per Region 1 soil standards;

8. Mechanical fellers will only be allowed off skidtrails if they travel on 18 inches of snow, frozen ground, or a slash mat (to avoid soil compaction levels that exceed Region 1 standards).

Corridors:

1. Corridors that have become entrenched below the litter layer into the top soil and could channel water will be water-barred and/or covered with debris.

PRACTICE 14.13 - Special Erosion Prevention Measures on Areas Disturbed by Harvest Activities
PRACTICE 14.14 - Revegetation of Areas Disturbed by Harvest Activities

OBJECTIVE: To establish a vegetative cover on disturbed sites in order to reduce erosion and sedimentation on disturbed areas where **normal revegetation** **methods where other contract provisions will not apply**.

EFFECTIVENESS: Moderate

COMPLIANCE: FPA Rules 3.e.i and 3.d.iii - Meets

IMPLEMENTATION: Revegetation by seeding and fertilization to control erosion is planned for all temporary roads, skid trails, and landings. If erosion problems still occur on these areas, or other problem areas are discovered or are brought to the attention of the Sale Administrator, KV Plans will be revised to reseed and/or fertilize, or provide for other control measures. If KV Funds are not available, Appropriated Funds will be used.

PRACTICE 14.16 - Meadow Protection During Timber Harvesting

OBJECTIVE: To avoid damage to the ground cover, soil and water in meadows.

EFFECTIVENESS: High. INFS standards and guidelines un applied category deliniations protect meadows from such described activity as well as botany buffers.

COMPLIANCE: No Related FPA Rule

IMPLEMENTATION: Vehicular or skidding equipment shall not be used on meadows except where roads, landings, and tractor roads are approved. In all cases, soil and vegetation will be protected from disturbance which would cause adverse affects on water quality, quantity and aquatic habitat. The TSC Provision (Meadow Protection) is a standard provision in all contracts.

Unless otherwise agreed, trees felled into meadows shall be removed by end lining, and resulting logging slash shall also be removed. Damage to meadows, stream courses, and riparian areas caused by unauthorized Purchaser's operations shall be repaired by the Purchaser in a timely manner to restore and prevent further damage.

PRACTICE 14.17 - Stream Channel Protection (Implementation and Enforcement).
PRACTICE 15.19 - Streambank Protection

OBJECTIVE: To protect stream beds and streamside vegetation, during and after forest practice operations and road construction, by (1) maintaining unobstructed passage of stormflows; and (2) reducing sediment and other pollutants from entering streams.

EFFECTIVENESS: Much of this mitigation consists of avoiding the impact, minimizing the impact, or rectifying the impact [40 CFR 1508.20 (a-c)]. The Forest Service has near-complete control over construction operations. Effectiveness is expected to be high.

COMPLIANCE: FPA Rules 3.f.i, ii; 3.g.i,ii – Meets SCA Rules

IMPLEMENTATION: To reduce sediment and channel bank degradation at sites disturbed by construction of stream crossing or roadway fill, it may be necessary to incorporate "armoring" in the design of a structure to allow the water course to stabilize after construction. Riprap, gabion structures, and other measures are commonly used to armor stream banks and drainage ways from the erosive forces of flowing water. These measures must be sized and installed in such a way that they effectively resist erosive water velocities. Stone used for riprap should be free from weakly structured rock, soil, organic material and materials of insufficient size, all of which are not resistant to stream flow and would only serve as sediment sources. Outlets for drainage facilities in erodible soils commonly require rip-rapping for energy dissipation (FSH 7709.56B, and Std. FS Spec. 619).

The intent of the regulations and clauses is to protect the integrity of stream channels, and minimize adverse

impacts to the channel and downstream resources and beneficial uses. To list all of the regulations that would be implemented to protect and restrict channel alterations, would require a small book. The following items however, highlight some of the principal provisions incorporated into the TSC that will govern channel protection in the sale area.

1. Care shall be taken to cause only the minimum necessary disturbance to the natural appearance of the area. Streambank vegetation shall be protected except where its removal is absolutely necessary for completion of the work [SCPA Rule 9,1(c) and TSC Provisions];

    a. All streambanks will be avoided by design.

2. If the channel is damaged during construction, it will be restored as nearly as possible to its original configuration without causing additional damage to the channel;

3. Purchaser shall repair all damage to a stream course if the Purchaser is negligent in their operations, including damage to banks and channel, to an acceptable condition as agreed to by the certified Sale Administrator and Purchaser's representative;

4. All project debris shall be removed from stream course, in an agreed manner that will cause the least disturbance. (TSC, Stream course Protection). Specifically:

    a. Whenever possible trees shall be felled, bucked, and limbed in such a manner that the tree or any part thereof will fall away from any Class I streams. Slash that enters Class I streams as a result of harvesting operations shall be continuously removed, as will other debris that enters Class I streams whenever there is a potential for stream blockage or if the stream has the ability for transporting such debris. Material removed shall be placed five feet slope distance above the ordinary high water mark [FPA Rule 3.f.i];

    b. Material to be removed will be all logging debris that is less than six inches in diameter and less than six feet long;

        ii. Slash and other debris that enters Class II streams whenever there is a potential for stream blockage or if the stream has the ability for transporting the debris shall be removed immediately following skidding and placed above the ordinary high water mark [FPA Rule 3(f)(ii)].

Material to be removed will be all logging debris that is less than six inches in diameter and less than six feet long.

PRACTICE 14.18 - Erosion Control Structure Maintenance

OBJECTIVE: To insure that constructed erosion control structures are stabilized and working effectively.

EFFECTIVENESS: High

COMPLIANCE: No directly related FPA Rule

IMPLEMENTATION: TSC provisions requires that during the period of the contract, the Purchaser shall provide maintenance of soil erosion control structures constructed by the Purchaser until they become stabilized, but not for more than one year after their construction. After 1 year, any erosion control work needed is accomplished through performance bond earmarked for that use. TSC provisions requires the

Purchaser to maintain erosion control structures concurrently with his operations under the sale and in any case not later than 15 days after completion of skidding each unit or subdivision.

PRACTICE 14.19 - Acceptance of Timber Sale Erosion Control Measures Before Sale Closure

OBJECTIVE: To assure the adequacy of required timber sale erosion control work.

EFFECTIVENESS: High

COMPLIANCE: No directly related FPA Rule

IMPLEMENTATION AND RESPONSIBILITY: Timber Sale Contract provisions requires that upon the purchaser's written request and assurance that work has been completed, the Forest Service shall perform an inspection. Areas that the purchaser might request acceptance for are specific requirements such as logging, slash disposal, erosion control, or snag felling. In evaluating acceptance the following definition will be used by the Forest Service: "Acceptable" erosion control means only minor deviation from established standards, provided no major or lasting impact is caused to soil and water resources. Certified Timber Sale Administrators will not accept as complete erosion control measures that fail to meet these criteria.

PRACTICE 14.22 - Modification of the Timber Sale Contract

OBJECTIVE: To modify the Timber Sale Contract if new circumstances or conditions indicate that the timber sale will cause irreversible damage to soil, water, or watershed values.

EFFECTIVENESS: High

COMPLIANCE: No directly related FPA Rule

IMPLEMENTATION: Over time, the Forest Service adopts new policies and direction that amend how we address timber harvest operations. An example is the recent change in direction to leave some large organic debris in stream channels instead of removing it all. In cases such as this, modifications to the TSC would occur under the appropriate provisions.

If evidence indicates that unacceptable impacts would occur to soil and water resources if the sale was harvested as planned, the Forest Service Representative will request the Contracting Officer to gain Regional Forester advice and approval to proceed with a resource environmental modification, mutual cancellation, or unilateral cancellation of the Timber Sale Contract as allowed by TSC Provisions. If the decision is for a resource environmental modification, once the action is approved by the Regional Forester, the appropriate Line Officer will assign an interdisciplinary team to make recommendations of implementation.

PRACTICE 15.02 - General Guidelines for the Location and Design of Roads and Trails

OBJECTIVE: To locate and design roads and trails with minimal soil and water resource impact while considering all design criteria.

EFFECTIVENESS:

1. Route location ground-truths the results of transportation planning and provides site-specific information on possible problem areas (Gray and Megahan, 1981; Cline et. al., 1981; Megahan and Kidd, 1972; King and Gonsior, 1980);

2. Designed and controlled cut slopes, fill slopes, road width, and road grades effectively reduce sediment production by fitting the roads to the land (Bethalmy and Kidd, 1966; Burroughs, Watts, King, and Hanson, 1985; King, 1979; Megahan, 1978).

COMPLIANCE: FPA Rules 4.b.i,ii,iii & 4.c.i – Meets SCA Rules 9,7 - Meets

IMPLEMENTATION: The following listed items are incorporated in general road location and design guidelines for minimizing impacts on water quality:

Design:

1. Roads shall be planned no wider than necessary to safely accommodate the anticipated use and equipment needs . Cut and fill volumes shall be minimized by designing the road to fit natural terrain features as closely as possible. As much of the excavated material as possible shall be used in fill sections. Minimum cuts and fills shall be planned, particularly near stream channels [FPA Rule 4.b.ii]

Location:

1. Utilize natural benches, follow contours, avoid long, steep road grades. Balance cut/fill where possible to avoid waste areas;

2. Embankments and waste shall be designed so that excavated material may be disposed of on geologically stable sites [FPA Rule 4.b.iii];

3. Avoid slumps and slide-prone areas, and steep sidehills;

4. Road construction shall be minimized within stream protection zones. Areas of vegetation shall be left or re-established between roads and streams [FPA Rule 4.b.i and Standard Road Specifications-Special Project Specification 204.01];

5. Where possible, locate turnouts and turn-arounds at least 200 feet from water bodies or riparian zones. Where placement within 200 feet is necessary due to safety considerations, emphasize erosion control measures to protect water quality; i.e additional windrowing, seeding, etc.

Stream crossing sites:

1. Minimize the number of stream crossings, and choose stable sites. Major culverts will be sized, based on hydrologic analysis, to function effectively at 50-year peak flows, without water backing up. These culverts will be tested to withstand 100-year peak flows without failing. All other live streams will be sized, based on hydrologic analysis, for 20 year peak flows with maximum headwater depth ratios of 1.2, and withstand 50 year peak flows without failing;

Road drainage: SEE SWCP 15.07

1. Locate and design roads and trails to drain naturally by appropriate use of out-sloping, rolling dips, and grade changes, where possible. Cross drains will be installed in ditched areas to 1) carry intercepted flow across constructed areas; 2) to relieve the length of undrained ditch; and 3) to reduce disruption of normal drainage patterns. Road and trail drainage should be channeled to effective buffer areas, either natural or manmade, to maximize sediment deposition prior to entry into live water;

2. Ditch lines and road grades will be designed to minimize unfiltered flow into streams. A rolling dip,

relief culvert or similar structure will be installed as close as practical to crossings to minimize direct sediment and/or water input directly into streams. Route the drainage through SMZ, buffer strips, or other sediment settling structures where possible;

3. Roads shall be planned to drain naturally by out-sloping or in-sloping with cross drainage and by grade changes where possible. Dips, water bars and/or cross drainage will be planned when necessary [FPA Rule 4(b)(iv)];

Relief culverts and roadside ditches shall be planned whenever reliance upon natural drainage would not protect the running surface, excavation, or embankment. Culvert installations shall be designed to prevent erosion of the fill. Drainage structures shall be planned to achieve minimum direct discharge of sediment into streams [FPA Rule 4.b.v].

PRACTICE 15.03 - Road and Trail Erosion Control Plan

OBJECTIVE: To minimize the effects of erosion and the degradation of water quality through erosion control work and road design.

EFFECTIVENESS: Moderate

COMPLIANCE: No Related FPA Rule

IMPLEMENTATION: Prior to the start of construction, the Contractor shall submit a schedule for proposed erosion control work as required in the Standard Specifications. The schedule shall include all erosion control items identified in the specifications. Erosion control work to be done by the Contractor will be defined in Standard Specification 204 and/or in the Drawings. The schedule shall consider erosion control work necessary for all phases of the project. The Engineer will certify that the Contractors Erosion Control Plan meets the specifications of Std. FS Spec. Section 204.

PRACTICE 15.06 - Mitigation of Surface Erosion and Stabilization of Slopes:

OBJECTIVE: To minimize soil erosion from road cutslopes, fillslopes, and travelway.

EFFECTIVENESS: Moderate

COMPLIANCE: FPA Rule 4.c.iii & d.ii - Meets

IMPLEMENTATION: Areas requiring mitigation of surface erosion will occur during the life of the timber sale contract. When these are found, the following provisions will be implemented.

a. All disturbed areas associated with road construction and reconstruction will be seeded. The first seeding will be applied as soon as practical after cuts and fills are brought to grade within seeding seasons as established in specification 625. A second seeding in the fall or spring season following road construction will be required where original seeding did not adequately revegetate exposed soil area;

b. Where surface erosion is occurring because of inadequate vegetative cover, additional seeding and re-fertilization will occur using recommended seed and fertilizer mixes. A T108 specification covers re-seeding of cut slopes if bared by the purchaser's maintenance operation. If the purchaser has done his required seeding, or bare spots are not caused by the purchaser, revise the KV Plan to cover costs;

c. Where ditches are carrying erosion products into stream channels, straw bale and erosion cloth ditch blocks will be installed to "short-circuit" the delivery. Seeding of the eroding surfaces, and seeding of the stored sediment in the ditch will also be accomplished. If problem areas are known before contract award, add C6.602# to require cross ditching on segments of road;

d. Where either straw bale/erosion cloth structures are not felt to be effective, underdrains or other measures will be installed to drain the ditches onto suitable ground, or at least reduce erosion impacts to the stream. If problem areas are known before contract award, add C6.602# to require cross ditching on segments of road;

e. Slumping of cutslopes will require a combination of both mechanical and vegetative controls. If/when this problem is found, a solution will be determined in consultation with Engineers and resource specialists and appropriate actions taken to remedy the situation or minimize adverse impacts.;

Additional underdrains and/or french drains will be constructed where intercepted moisture is encountered on incised stream approaches. Erosion control blankets and straw bales will be used to dissipate ditch scour and stabilize fill slopes.

PRACTICE 15.07 - Control of Permanent Road Drainage

OBJECTIVE: To minimize the erosive effects of concentrated water and the degradation of water quality by proper design and construction of road drainage systems and drainage control structures.

EFFECTIVENESS: Moderate. Designed and controlled ditches, cross drain spacing, and culvert discharge prevent water from running long distances over exposed ground.

COMPLIANCE: FPA Rules 4.c.viii; 4.d.iii(a) & (b) - Meets

IMPLEMENTATION: The following items will be included in the timber sale contract provisions or road contract special project specifications.

1. Drainage ways shall be cleared of all debris generated during construction and/or maintenance that potentially interfere with drainage or water quality [IFPA Rule 4(c)(ii), Timber Sale Contract Clause C5.4, and Standard Road Specifications-Special Project Specification 204.04].

2. During and following operations on out-sloped roads, out-slope drainage shall be retained and berms shall be removed on the outside edge except those intentionally constructed for protection of road grade fills [IFPA Rule 4(c)(vi) and Timber Sale Contract Clause C5.4].

3. Cross drains and relief culverts shall be constructed to minimize erosion of embankments. The time between road construction and installation of erosion control devices shall be minimized. Drainage structures or cross drains shall be installed on uncompleted roads which are subject to erosion prior to fall or spring runoff. Relief culverts shall be installed with a minimum grade of 1 percent [IFPA Rule 4(c)(viii) and Standard Road Specifications-Special Project Specification 204.1].

4. Cross drains and relief culverts will be installed so as to minimize concentrations of intercepted water (see also Practice 15.02 f.(3)).

5. For New Construction and Reconstruction - The following criteria will be incorporated into the road:

    a. Design:

i. The temporary road will be constructed as an outsloped road that follows the natural terrain. Following use: the purchaser will obliterate this road by restoring natural slope contours and placing slash and logs on top of the disturbed soil, and use of seeding if needed. The purpose of this requirement is to minimize potential for increasing sediment production and delivery.

ii. The reconstruction will include increasing pipe sizes or changing design on many of the existing stream crossings to provide fish passage (if needed) and pass 100 year flood discharges and prevent diversion of streamflow by the road.

iii. Unstable cut and fill slopes will be stabilized.

iv. Additional relief culverts will be installed to very frequently cross drain the road. Distances between relief pipes will generally not exceed 200 to 250 feet.

v. The grade of outsloped and insloped roads will be varied with graded rolling dips, drivable dips, or drivable waterbars to frequently cross drain surface water and to safely return water to stream channels in the event the culvert plugs.

vi. During and following operations on out sloped roads, retain out slope drainage and remove berms on the outside except those intentionally constructed for protection of road grade fills.

vii. Construct cross drains and relief culverts to minimize erosion of embankments. Minimize the time between construction and installation of erosion control devices. Use riprap, vegetative matter, downspouts and similar devices to minimize erosion of the fill.

viii. Prior to fall or spring runoff, install drainage structures or cross drain uncompleted roads that are subject to erosion;

ix. Install relief culverts at a minimum grade of 1 percent greater than road gradient;

x. Energy dissipaters or downspouts will be placed below problem culvert outlets (Reconstruction item).

xi. Roads restricted after use will also have erosion control measures in place prior to final pull-out. Roads to be closed by any closure device other than a gate will be decommissioned.

PRACTICE 15.08 - Pioneer Road Construction

OBJECTIVE: To minimize sediment production and mass wasting associated with pioneer road construction.

EFFECTIVENESS: Moderate

COMPLIANCE: No directly related FPA Rule

IMPLEMENTATION: The following contract specifications will be required:

1. Construction of pioneer roads shall be confined to the designed location of the road prism unless otherwise approved by the Contracting Officer (Std. FS Spec. 203.11).
2. Pioneering shall be conducted so as to prevent undercutting of the designated final cut slope, and to prevent avoidable deposition of materials outside the designated roadway limits (Std. FS Spec. 203).

3. Permanent culverts will be installed at wet crossings during the pioneer phase unless positive control of sediment can be accomplished during installation, use, and removal of the temporary structure.

PRACTICE 15.09 - Timely Erosion Control Measures on Incomplete Road and Stream crossing Projects

OBJECTIVE: To minimize erosion of, and sedimentation from, disturbed ground on incomplete projects.

EFFECTIVENESS: Moderate

COMPLIANCE: FPA Rules 4.c.ii,iii,iv; & 4.d.iii - Meets

IMPLEMENTATION: The following measures will be implemented during projects:

1. Temporary culverts, side drains, flumes, cross drains, diversion ditches, energy dissipaters, dips, sediment basins, berms, debris racks, or other facilities needed to control erosion will be installed as necessary. The removal of temporary culverts, culvert plugs, diversion dams, or elevated stream crossing causeways will be completed as soon as practical;
2. The removal of debris, obstructions, and spoil material from channels and floodplains;
3. Seeding with an erosion control seed mix approved for use on the Idaho Panhandle National Forests to minimize erosion.
4. Install drainage structures or cross drain uncompleted roads that are subject to erosion prior to fall or spring runoff. (Std Spec 204)

Erosion control measures must be kept current with ground disturbance, to the extent that the affected area can be rapidly "closed," if weather conditions deteriorate. Areas must not be abandoned for the winter with remedial measures incomplete.

PRACTICE 15.10 - Control of Road Construction Excavation and Sidecast Material

PRACTICE 15.18 - Disposal of Right-of-Way and Roadside Debris

See also Practice 13.05

OBJECTIVE: To insure that unconsolidated excavated and sidecast material, construction slash, and roadside debris, generated during road construction, is kept out of streams and to prevent slash and debris from subsequently obstructing channels.

EFFECTIVENESS: High

COMPLIANCE: FPA Rule 4.c.iii,iv; & 4.d.i,ii,iii

The slash windrow and other erosion control devices will not be placed in existing stream channels or obstruct culvert outfalls. Large limbs and cull logs may be bucked into manageable lengths and piled alongside the road for fuelwood.

IMPLEMENTATION: In the construction of road fills near streams, compact the material to reduce the entry of water, minimize the amount of snow, ice, or frozen soil buried in the embankment. No significant amount of woody material shall be incorporated into fills. Slash and debris may be windrowed along the toe of the fill, but in such a manner as to avoid entry into a stream and culvert blockage.

Where slash windrows are not desirable or practical, other methods of erosion control such as erosion mats, mulch, and straw bale or fabric sediment fences will be used. Where exposed material (excavation,

embankment, borrow pits, waste piles, etc.) is potentially erodible, and where sediments would enter streams, the material will be stabilized prior to fall or spring runoff by seeding, compacting, rip-rapping, benching, mulching or other suitable means.

The following standard specs will be included in all road contracts that include clearing and excavation.

1. Standard Specification 201 (Slash Treatment)
2. Standard Specification 203 (Excavation and Embankments)

PRACTICE 15.13 - Controlling In-Channel Excavation

OBJECTIVE: To minimize downstream sedimentation by insuring that all in-channel excavations are carefully planned.

EFFECTICENESS: High

COMPLIANCE: SCA Rule 9,1(a) - Meets

IMPLEMENTATION: Location and method of stream crossings will be designed and agreed to prior to construction. The following items highlight some of the principal provisions incorporated into the TSC that will govern channel protection:

1. Construction equipment may cross, operate in, or operate near stream courses only where so agreed to and designated by the Forest Service prior to construction. Crossing of perennial stream channels will be done in compliance with the specifications in the Stream Channel Alteration Act Rules and Regulations and included in the project specifications.
2. No construction equipment shall be operated below the existing water surface except that fording the stream at one location only will be permitted, and work below the water level that is necessary for culvert bedding or footing installations will be permitted to the extent that it does not create unnecessary turbidity or stream channel disturbance [SCA Rule 9,1 (a) and Standard Road Specifications-Special Project Specification 204.04].
3. Wheeled or track laying equipment shall not be permitted to operate within 5 feet slope distance of the apparent high water mark of Class II streams and 75 feet of Class I streams. (C6.6 Erosion Prevention and Control).
4. Construction of any hydraulic structures in stream channels will be in compliance with the Rules and Regulations pertaining to the Stream Channel Protection Act, Title 42, Chapter 38, Idaho Code).

PRACTICE 15.14 - Diversion of Flows Around Construction Sites

(See also Practice 15.13)

OBJECTIVE: To restore the natural course of any stream as soon as practical if the stream is diverted as a result of timber management activities.

EFFECTIVENESS: High

COMPLIANCE: Meets SCA Rule

IMPLEMENTATION: Flow in stream courses may only be diverted if the Forest

Service deems it necessary for the contractor to do the job. Such a diverted flow shall be restored to the natural stream course as soon as practicable and, in any event, within the period stated in Stream Channel Alteration Act Rules and Regulations. Stream channels impacted by construction activity will be restored to their natural grade, condition, and alignment. (Std. FS Spec. 206, 206A).

1. On perennial Class I and II streams dewatering shall be accomplished prior to excavation for culvert installation;

2. Filter cloth, erosion control blankets, plastic, straw bales, and rip-rap can be used to keep live water from contacting new fill during culvert installations;

When dewatering of stream crossings is required, a non-erodeable conduit, flex pipe or geotextile fabric will be used. Diversion dams above the crossing shall be hand constructed. Sediment traps shall be constructed below the stream crossing.

PRACTICE 15.15 - Stream Crossings on Temporary Roads

(See also Practice 15.13)

OBJECTIVE: To keep temporary roads from unduly damaging streams, disturbing channels, or obstructing fish passage.

EFFECTIVENESS: Moderate

COMPLIANCE: SCA Rules - Meets

IMPLEMENTATION: Culverts, temporary bridges, low-water crossings, or log-fords will be required on all temporary roads and crossings. Streams that will have flowing water during the life of the temporary crossing will normally use culverts or a bridge. The number of temporary crossings will kept to the minimum needed for access.

a. Temporary crossings on temporary roads will be removed when no longer needed, and any fills will be removed and the channel restored to pre-project condition (TSC);

b. Material from temporary road and skid trail stream crossings will be removed and streambanks restored to an acceptable condition. (Temporary Roads);

Temporary crossings on temporary roads will only be allowed where anticipated or calculated flow is 40 CFS or less (approx. 48" CMP). Flow situations greater than this will normally not allow temporary crossings. Larger temporary crossing structures may be allowed following IDT review.

PRACTICE 15.16 - Bridge and Culvert Installation (Disposition of Surplus Material and Protection of Fisheries)

(See also Practice 15.13)

OBJECTIVE: To minimize sedimentation and turbidity resulting from excavation for in-channel structures.

EFFECTIVENESS: High

COMPLIANCE: SCA Rule - Meets

IMPLEMENTATION: The following preventive measures will be included in contract specifications for such installations:

1. Diverting stream flow through or around project sites if needed during construction in order to minimize erosion and downstream sedimentation. Active streams will be de-watered or diverted during culvert installations;

2. Erodible material shall not be deposited into live streams;

3. Any material stockpiled on floodplains shall be removed before rising waters reach the stockpiled material;

4. During excavation in or near the stream course, it may be necessary to use suitable cofferdams, caissons, cribs or sheet piling. This will usually be the case where groundwater is contributing a significant amount of water to the immediate excavation area. If any of the aforementioned devices are used, they will be practically watertight and no excavation will be made immediately outside of them;

5. Water pumped from foundation excavation shall not be discharged directly into live streams, but shall be pumped into settling ponds or into locations where water will not re-enter water;

All fill material shall be placed and compacted in horizontal lifts. Areas to be filled shall be cleared of all vegetation, debris, and other materials that would be objectionable in the fill [SCPA Rule 9,1(d) and Standard Road Specifications-Special Project Specification 203.15].

PRACTICE 15.17 - Regulation of Borrow Pits, Gravel Sources and Quarries

OBJECTIVE: To minimize sediment production from borrow pits, gravel sources, and quarries, and limit channel disturbances in those gravel sources suitable for development in floodplains.

EFFECTIVENESS: High

COMPLIANCE: No Related FPA Rule

IMPLEMENTATION: Minimize opportunities for erosion from Borrow pits and gravel sources from entering streams.

1. Complete any crushing and/or screening of excavated bedload away from any active stream channels and minimize future opportunities for waste materials to enter area streams, even under flood conditions;

2. Identify opportunities to minimize erosion from existing borrow pits within the drainage;

If development of new rock sources are needed within the watershed, complete a pit development plan or rock source development plan which outlines all mitigation measures needed to control future erosion at the rock source.

PRACTICE 15.21 - Maintenance of Roads

OBJECTIVE: To conduct regular preventive maintenance operations to avoid deterioration of the roadway surface and minimize disturbance and damage to water quality, and fish habitat.

EFFECTIVENESS: Moderate

COMPLIANCE: FPA Rule 4.d.i, ii, iii, iv, v - Meets

IMPLEMENTATION: For roads in active timber sale areas standard TSC provisions (Road Maintenance) requires the purchaser to perform or pay for road maintenance work commensurate with the purchasers use. Purchaser's maintenance responsibility shall cover the before, during, and after operation period during any year when operations and road use are performed under the terms of the timber sale contract (Road Maintenance). Purchaser shall perform road maintenance work, commensurate with purchaser's use, on roads controlled by Forest Service and used by purchaser in connection with this sale except for those roads and/or maintenance activities which are identified for required deposits in the TSC. All maintenance work shall be done concurrently, as necessary, in accordance with T-specifications set forth herein or attached hereto, except for agreed adjustments.

1. Sidecast all debris or slide material associated with road maintenance in a manner to prevent their entry into streams [IFPA Rule 4(d)(i), Timber Sale Contract Clauses, and Standard Road Specification-Special Project Specification T108].

2. Repair and stabilize slumps, slides, and other erosion features causing stream sedimentation [IFPA Rule 4(d)(ii), Timber Sale Contract Clauses, and Special Project Specification T108].

3. Active Roads. An active road is a forest road being used for hauling forest products, rock and other road-building materials. The following maintenance shall be conducted on such roads.

    (a) Culverts and ditches shall be kept functional.

    (b) During and upon completion of seasonal operations, the road surface shall be crowned, out-sloped, in-sloped or water barred, and berms removed from the outside edge except those intentionally constructed for protection of fills.

    (c) The road surface shall be maintained as necessary to minimize erosion of the subgrade and to provide proper drainage.

    (d) If road oil or other surface stabilizing materials are used, apply them in such a manner as to prevent their entry into streams [IFPA Rule 4(d)(iii)] and Timber Sale Contract Clauses C5.441 and C6.341].

EFFECTIVENESS: These measures should effectively minimize erosion from roads.

4. Inactive roads. An inactive road is a forest road no longer used for commercial hauling but maintained for access (e.g., for fire control, forest management activities, recreational use, and occasional or incidental use for minor forest products harvesting). The following maintenance shall be conducted on inactive roads.

    (a) Following termination of active use, ditches and culverts shall be cleared and the road surface shall be crowned, out-sloped or in-sloped, water barred or otherwise left in a condition to minimize erosion. Drainage structures will be maintained thereafter as needed.

    (b) The roads may be permanently or seasonally blocked to vehicular traffic [FPA Rule 4.d.iv].

    (c) Roads will be seeded and fertilized.

(d) The roads may be permanently or seasonally blocked to vehicular traffic.

5. Abandoned Roads. An abandoned road is not intended to be used again. No subsequent maintenance of an abandoned road is required after the following procedures are completed:

   (a) The road is left in a condition suitable to control erosion by out-sloping, water barring, seeding, or other suitable methods.

   (b) Ditches are cleaned.

   (c) The road is blocked to vehicular traffic.

   (d) The department may require the removal of bridges and culverts except where the owner elects to maintain the drainage structures as needed.

For roads not in an active timber sale area, road maintenance must still occur at sufficient frequency to protect the investment in the road as well prevent deterioration of the drainage structure function. This will be accomplished by scheduling periodic inspection and maintenance, including cleaning dips and cross drains, repairing ditches, marking culvert inlets to aid in location, and cleaning debris from ditches and culvert inlets to provide full function during peak runoff events (FSH 7709.15).

PRACTICE 15.22 - Road Surface Treatment to Prevent Loss of Materials

OBJECTIVE: To minimize the erosion of road surface materials and consequently reduce the likelihood of sediment production.

EFFECTIVENESS: Stabilization of road surface and ditch lines over 6 percent with competent rock (rock that does not rapidly disintegrate) is often over 90 percent effective (Burroughs, et.al., 1983a, 1983b, 1984, 1985; King and Burroughs, 1988). High

COMPLIANCE: No directly related FPA Rule

IMPLEMENTATION: On timber sale roads, the Purchaser shall undertake measures to prevent excessive loss of road material if the need for such action has been identified. Road surface treatments may include: watering, applying magnesium chloride, sealing, aggregate surfacing, chip-sealing, or paving.

PRACTICE 15.24 - Snow Removal Controls

Objective: To minimize the impact of snow melt on road surfaces and embankments and to reduce the probability of sediment production resulting from snow removal operations.

Effectiveness: Moderate

Compliance: No directly related FPA Rule

Implementation: For Forest roads that will be used throughout the winter, the following measures will be employed:

1. The Purchaser is responsible for snow removal in a manner that will protect roads and adjacent resources.

2. Rocking or other special surfacing and/or drainage measures may be necessary before the operator is allowed to use the roads.

3. During snow removal operations, banks shall not be undercut nor shall gravel or other selected surfacing material be bladed off the roadway surface. Ditches and culverts shall be kept functional during and following roadway use. If the road surface is damaged, the Purchaser shall replace lost surface material with similar quality material and repair structures damaged in blading operations.

4. Snow berms shall not be left on the road surface or shall be placed to avoid channelization or concentration of melt water on the road or erosive slopes. Berms left on the shoulder of the road shall be removed and/or drainage holes opened at the end of winter operations and before the spring breakup. Drainage holes shall be spaced as required to obtain satisfactory surface drainage without discharge on erodible fills. On insloped roads, drainage holes shall also be provided on the ditch side, but care taken to insure that culverts and culvert inlets are not damaged.

PRACTICE 15.25 - Decommissioning of Temporary Roads

OBJECTIVE: To reduce sediment generated from temporary roads by decommissioning them at the completion of their intended use.

EFFECTIVENESS: High

COMPLIANCE: FPA Rule 4.d.v. - Meets

IMPLEMENTATION: Effective decommissioning is generally achieved through a combination of the following measures: (TSC)

1. Road effectively drained and blocked;

2. Temporary culverts and bridges removed and any modified channel slopes stabilized and revegetated;

3. Road returned to resource production through revegetation (native species, or trees);

Sideslopes reshaped and stabilized.

PRACTICE 18.02 - Formulation of Fire Prescriptions

OBJECTIVE: To provide for soil and water resource protection while achieving the management objective through the use of prescribed fire.

EFFECTIVENESS: High

COMPLIANCE: No Related FPA Rule

IMPLEMENTATION: The prescription elements are defined by the interdisciplinary team during the environmental analysis. Field investigations are conducted to identify site-specific conditions, which may affect the prescription. Both the optimum and tolerable limits for soil and water resource needs should be established. Prescription elements will include such factors as fire weather, slope aspect, soil moisture and fuel moisture, which influence the fire intensity. These elements have a direct effect on whether or not a litter layer remains after burning and whether or not a water repellent layer is formed. The amount of remaining litter significantly affects erosion rates, water quality and runoff volumes.

PRACTICE 18.03 - Protection of Soil and Water from Prescribed Burning

OBJECTIVE: To maintain soil productivity, minimize erosion, and prevent ash, sediment, nutrients, and debris form entering surface water.

EFFECTIVENESS: High

COMPLIANCE: No Related FPA Rule

IMPLEMENTATION: Forest Service and/or other crews are used to prepare the units for burning. This includes water barring firelines and reducing fuel concentrations. The interdisciplinary team identifies Riparian Areas and soils with water repellant tendencies as part of the environmental analysis. Some of the techniques used to prevent soil erosion and water quality degradation are: (1) construct water bars in fire lines; (2) reduce fuel loadings in drainage channels; (3) maintain the integrity of the Riparian Area; (4) avoid intense fires, which may promote water repellency, nutrient leaching, and erosion; (5) retain or plan for sufficient ground cover to prevent erosion of the burned sites and (6) removal of all debris added to stream channels as a result of prescribed burning, unless debris is prescribed to improve fisheries habitat.

7. Foaming agents will not be used for water control lines where any of the category INFS buffers have been applied nearer units which these channels could carry the material to intermittent or perennial streams;
8. Machine constructed firelines will not be used on the sensitive landtypes displayed in Figures 3.5;
9. Firelines must be frequently waterbarred (not to exceed 50 foot spacing when going up and down the hill);
10. Maintain large organic debris appropriate to the habitat type (see "Managing Coarse Woody Debris in the Forests of the Rocky Mountains" by Graham et. al. 1994);
11. Limit prescribed burning to those times when surface soil moisture is above 25 percent to reduce the potential for damage from hot burns (Guideline developed by J. Neihoff, USFS – IPNF).

Appendix B – Stream Categories and INFS Standards and Guidelines (USDA A7-13; 1995)

Standard Widths Defining Interim RHCAs

(USDA FS, 1995; INFS, pp. A-5, A-6; PF Doc. CR-0039)

Category 1 - Fish-bearing Streams: Interim RHCAs consist of the stream and the area on either side of the stream extending from the edges of the active stream channel to the top of the inner gorge, or to the outer edges of the 100-year floodplain, or to the outer edges of riparian vegetation, or to a distance equal to the height of two site-potential trees, or 300 feet slope distance (600 feet total, includes both sides of the stream channel), whichever is greatest.

Category 2 - Permanently flowing non-fish bearing streams: Interim RHCAs consist of the stream and the area on either side of the stream extending from the edges of the active stream channel to the top of the inner gorge, or to the outer edges of the 100-year floodplain, or to the outer edges of riparian vegetation, or to a distance equal to the height of one site-potential tree, or 150 feet slope distance (300 feet total, including both sides of the stream channel), whichever is greatest.

Category 3 – Ponds, lakes, reservoirs, and wetlands greater than 1 acre: Interim RHCAs consist of the body of water or wetland and the area to the outer edges of the riparian vegetation, or to the extent of the seasonally saturated soil, or to the extent of moderately and highly unstable areas, or to a distance equal to the height of one site-potential tree, or 150 feet slope distance from the edge of the maximum pool elevation of constructed ponds and reservoirs or from the edge of the wetland, pond or lake, whichever is greatest.

Category 4 - Seasonally flowing or intermittent streams, wetlands less than 1 acre, landslides, and landslide-prone areas: This category includes features with high variability in size and site-specific characteristics. At a minimum, the interim RHCAs must include:

a) The extent of landslides and landslide-prone areas;

b) The intermittent stream channel and the area to the top of the inner gorge;

c) The intermittent stream channel or wetland and the area to the outer edges of the riparian vegetation;

d) For Priority Watersheds, the area from the edges of the stream channel, wetland, landslide or landslide-prone area to a distance equal to the height of one site-potential tree, or 100 feet slope distance, whichever is greatest

For watersheds not identified as Priority Watersheds, the area from the edges of the stream channel, wetland, landslide or landslide-prone area to a distance equal to the height of one-half site potential tree, or 50 feet slope distance, whichever is greatest.

INFS Standards and Guidelines

(USDA FS, 1995; INFS, pp. A-5:13; PF Doc. CR-0039)

Only INFS standards and guidelines that apply to the range of alternatives for the Jo-Cat Project Area are addressed here; those standard and guidelines that do not apply are in the INFS document located in the project file. These INFS standards and guidelines are addressed with comments in italics.

Timber Management (A-7)

TM-1. Prohibit timber harvest, including fuelwood cutting, in Riparian Habitat Conservation Areas, except as described below.

a. Where catastrophic events such as fire, flooding, volcanic, wind, or insect damage result in degraded riparian conditions, allow salvage and fuelwood cutting in Riparian Habitat Conservation Areas only where present and future woody debris needs are met, where cutting would not retard or prevent attainment of other Riparian Management Objectives, and where adverse effects can be avoided to inland native fish. For priority watersheds, complete watershed analysis prior to salvage cutting in RHCAs.

b. Apply silvicultural practices for Riparian Habitat Conservation Areas to acquire desired vegetation characteristics where needed to attain Riparian Management Objectives. Apply silvicultural practices in a manner that does not retard attainment of Riparian Management Objectives and that avoid adverse effects on inland native fish.

Using "Standard Widths Defining Interim RHCAs," no commercial timber harvest activities are proposed under the action alternatives within RHCAs in the project area. In some units, non-commercial (i.e. ladder fuel reduction) treatments were deemed necessary in order to reduce fuel hazards and loading. This form of activity would meet the intent of silvicultural practices that would not retard RMOs and avoid adverse effects to inland native fish (see Fire/Fuels) by preventing long-term RMO damage or reduction.

***Effectiveness*:** *High. No commercial harvest is to occur within the RHCAs.*

Roads Management (A-7-8)

RF-1. Cooperate with Federal, Tribal, State, and county agencies, and cost-share partners to achieve consistency in road design, operation, and maintenance necessary to attain Riparian Management Objectives.

The proposed activities are all on USFS publicly managed lands and the activities associated with the project have been coordinated with all those listed where applicable (e.g. RAC, BLM Projects).

***Effectiveness*:** *High. This coordination is standard policy.*

RF-2. For each existing or planned road, meet the Riparian Management Objectives and avoid adverse effects to inland native fish by:

a. Completing watershed analyses prior to construction of new roads or landings in Riparian Habitat Conservation Areas (RHCAs) within priority watersheds.

This project area is not within an INFS priority watershed nor is any activities (e.g. roads, landings, etc.) proposed within RHCAs.

b. Minimizing road and landing locations in Riparian Habitat Conservation Areas.

No new roads or landings are proposed within RHCAs under any of the action alternatives.

***Effectiveness*:** *High.*

c. Initiating development and implementation of a Road Management Plan or a Transportation Management Plan. At a minimum, address the following items in the plan:

1. Road design criteria, elements, and standards that govern construction and reconstruction.
2. Road management objectives for each road.
3. Criteria that govern road operation, maintenance, and management.
4. Requirements for pre-, during-, and post-storm inspections and maintenance
5. Regulation of traffic during wet periods to minimize erosion and sediment delivery and accomplish other objectives such as protection of the road surface.
6. Implementation/effectiveness monitoring plans for road stability, drainage, and erosion control.
7. Mitigation plans for road failures.

The interdisciplinary team (IDTeam) evaluated access and road improvement needs within the project area (i.e. Jo-Cat RAP process). Several access options were critically reviewed and selected on based on the implementation of these actions having the least impact on all resources. The project includes several opportunities to improve road surfaces.

***Effectiveness*:** *Moderate to High. The Roads Analysis Process (RAP) will be employed to assist in making these management decisions.*

d. Avoiding sediment delivery to streams from the road surface.

1. Outsloping of the roadway surface is preferred, except in cases where outsloping would increase sediment delivery to streams or where outsloping is unfeasible or unsafe.

   This standard is applied directly for the road reconstruction work.

***Effectiveness*:** *High. Roads would be constructed with this design criterion.*

2. Route road drainage away from potentially unstable stream channels and hillslopes.

Effectiveness: *High. Improved road drainage would be part of the road package. Water would be less concentrated below existing roads than at present.*

e. Avoiding disruption of natural hydrologic flow paths.

Roadwork associated with this project including road reconstruction will be completed.

Effectiveness: *High. Road related work of any kind that would be improvement by classification would restore the hydrologic flow paths.*

f. Avoid sidecasting of soils or snow. Sidecasting of road material is prohibited on road segments within or abutting RHCAs in priority watersheds.

No streams in the Jo-Cat Project Area are listed as priority watersheds.

Effectiveness: *High. Sidecasting of snow and/or soils would be prohibited at all stream crossings*

RF-3. Determine the influence of each road on the Riparian Management Objectives. Meet Riparian Management Objectives and avoid adverse effects on inland native fish by:

a. Reconstructing road and drainage features that do not meet design criteria or operation and maintenance standards, or that have been shown to be less effective than designed for controlling sediment delivery, or that retard attainment of Riparian Management Objectives, or do not protect priority watersheds from increased sedimentation.

b. Prioritizing reconstruction based on the current and potential damage to inland native fish and their priority watersheds, the ecological value of the riparian resources affected, and the feasibility of options such as helicopter logging and road relocation out of Riparian Habitat Conservation Areas.

c. Closing and stabilizing; or obliterating and stabilizing; roads not needed for future management activities. Prioritize these actions based on the current and potential damage to inland native fish in priority watersheds, and the ecological value of the riparian resources affected.

The proposed road reconstruction and maintenance described in Chapters II and III originate from the above standards. The action alternatives would meet this standard.

Effectiveness: *High. Existing roads are proposed for reconstruction with the Timber Sale Contract, so the likelihood that the projects would be completed is high.*

RF-4. Construct new, and improve existing, culverts, bridges, and other stream crossings to accommodate a 100-year flood, including associated bed load and debris, where those improvements would/do pose a substantial risk to riparian conditions. Substantial risk improvements include those that do not meet design and operation maintenance criteria, or that have been shown to be less effective than designed for controlling erosion, or that retard attainment of Riparian Management Objectives, or that do not protect priority watersheds from increased sedimentation. Base priority for upgrading on risks in priority watersheds and the ecological value of the riparian resources affected. Construct and maintain crossings to prevent diversion of streamflow out of the channel and down the road in the event of crossing failure.

The proposed road crossing improvements originate from the above standard. The action alternatives would meet this standard.

Effectiveness: *High.*

RF-5. Provide and maintain fish passage at all road crossings of existing and potential fish-bearing streams.

There are no crossings planned across fish bearing waterway, consequently the only identified need at crossings is listed in RF-4 above.

Effectiveness**:** *High. There are no fish bearing crossings being implemented with this project*

Fires/Fuels Management (A-11)

FM-1. Design fuel treatment and fire suppression strategies, practices, and actions so as not to prevent attainment of Riparian Management Objectives, and to minimize disturbance of riparian ground cover and vegetation. Strategies should recognize the role of fire in ecosystem function and identify those instances where fire suppression or fuel management actions could perpetuate detrimental conditions, or be damaging to, long-term ecosystem function or inland native fish.

FM-2. Locate incident bases, camps, helibases, staging areas, helispots, and other centers for incident activities outside of Riparian Habitat Conservation Areas. If the only suitable location for such activities is within the Riparian Habitat Conservation Area, an exemption may be granted following a review and recommendation by a resource advisor. The advisor would prescribe the location, use conditions, and rehabilitation requirements, with avoidance of adverse effects to inland native fish a primary goal. Use an interdisciplinary team, including a fishery biologist, to predetermine incident base and helibase locations during presuppression planning.

FM-3. Avoid delivery of chemical retardant, foam, or additives to surface waters. An exception may be warranted in situations where overriding immediate safety imperatives exist, or, following a review and recommendation by a resource advisor and a fishery biologist, when the action agency determines that an escape fire would cause more long-term damage to fish habitats than chemical delivery to surface waters.

FM-4. Design prescribed burn projects and prescriptions to contribute to the attainment of the Riparian Management Objectives.

The proposed prescribed burn projects described in Chapters II and III originate from the above standards. The action alternatives would meet this standard.

***Effectiveness*:** *High. Planting of long-lived tree species to provide for large woody debris recruitment would follow prescribed burning within the RHCAs.*

FM-5. Immediately establish an emergency team to develop a rehabilitation treatment plan to attain Riparian Management Objectives and avoid adverse effects on inland native fish whenever a wildfire or a prescribed fire burning out of prescription significantly damages Riparian Habitat Conservation Areas.

The proposed fires/fuels management described in Chapter II and III originate from the above standards. The action alternatives would meet this standard.

Effectiveness: *Moderate to High. Prescribed fire in the project area is designed to meet these standards.*

General Riparian Area Management (A-12)

RA-1. Identify and cooperate with Federal, Tribal, State and local governments to secure instream flows needed to maintain riparian resources, channel conditions, and aquatic habitat.

This project does not adversely affect instream flows.

RA-2. Trees may be felled in Riparian Habitat Conservation Areas when they pose a safety risk. Keep felled trees on site when needed to meet woody debris objectives.

This project would adhere to this standard if it was to occur near unit boundaries that are buffered.

RA-3. Apply herbicides, pesticides, and other toxicants, and other chemicals in a manner that does not retard or prevent attainment of Riparian Management Objectives and avoids adverse effects on inland native fish.

By following the BMPs (Appendix A) and fisheries criteria as listed in the Coeur d'Alene River Ranger District Noxious Weed FEIS, all alternatives would meet this standard.

Effectiveness: *High. Standards would be met as required by the Coeur d'Alene River Ranger District Noxious Weed FEIS.*

RA-4. Prohibit storage of fuels and other toxicants within Riparian Habitat Conservation Areas. Prohibit refueling with Riparian Habitat Conservation Areas unless there are no other alternatives. The Forest Service must approve refueling sites within a Riparian Habitat Conservation Area or Bureau of Land Management and have an approved spill containment plan.

Effectiveness: *High. This is a standard BMP that is part of the timber sale contract.*

RA-5. Locate water-drafting sites to avoid adverse effects to inland native fish and instream flows, and in a manner that does not retard or prevent attainment of Riparian Management Objectives.

Effectiveness: *Moderate to High. This standard would be applied in the prescribed burn plans associated with the Jo-Cat Project Area. However, wildfire suppression is beyond the scope of this project and water drafting associated with such an emergency would be addressed as a separate issue.*

Watershed and Habitat Restoration (A-12)

WR-1. Design and implement watershed restoration projects in a manner that promotes the long-term ecological integrity of ecosystems, conserves the genetic integrity of native species, and contributes to attainment of Riparian Management Objectives.

Effectiveness: *Moderate to High.*

WR-2. Cooperate with Federal, State, local, and Tribal agencies, and private landowners to develop watershed-based Coordinated Resource Management Plans (CRMPs) or other cooperative agreements to meet Riparian Management Objectives.

Effectiveness: *Low to Moderate. Cooperation at the multiple levels as listed occurred within the framework for developing the proposed activities of this project.*

Fisheries and Wildlife Restoration (A-13)

FW-1. Design and implement fish and wildlife habitat restoration and enhancement actions in a manner that contributes to attainment of the Riparian Management Objectives.

Effectiveness: *High. Road reconstruction will improve current culverts by upgrading them to 100-yr flow event standards which help better protect downstream fisheries if a failure occurred at a crossing site the currently exists as undersized and at high risk of failure.*

FW-2 Design, construct, and operate fish and wildlife interpretive and other user-enhancement facilities in a manner that does not retard or prevent attainment of the Riparian Management Objectives or adversely affect inland native fish. For existing fish and wildlife interpretive and other user-enhancement facilities inside Riparian Habitat Conservation Areas, assure that Riparian Management Objectives cannot be met and adverse effects on inland native fish are avoided. Where Riparian Management Objectives cannot be met or adverse effects on inland native fish avoided, relocate or close such facilities.

FW-4. Cooperate with Federal, Tribal, and State fish management agencies to identify and eliminate adverse effects on native fish associated with habitat manipulation, fish stocking, fish harvest, and poaching.

Cooperation at the multiple levels as listed occurred within the framework for developing the proposed activities of this project. Using the INFS Standard Widths Defining Interim RHCAs for the project activities, habitat manipulation does not apply. Fish stocking, harvest and/or poaching are all regulated by State management guidelines.

Effectiveness: *High. Existing habitat would be preserved under this project.*

Appendix C – Aquatics Corporate Monitoring

Issue	Core Data	Unit of Measure	No Action	Proposed Action
Water Yield	Intensity and duration of peak flow increases above existing condition. Comparison to Historic Range of Variation	Percent increase	**1%** increase above existing levels due to dead and dying trees. Upper Prichard Creek sub-watershed (above Bear Gulch)	**1%** increase above existing levels – Upper Prichard Creek subwatershed (above Bear Gulch).
Sediment Yield	Anticipated percent increase in sediment yield above existing condition. Comparison to Historic Range of Variation	Percent Increase	**0%** increase above existing levels due past ground disturbance associated with logging activities. Upper Prichard Creek sub-watershed (above Bear Gulch)	**1%**increase above existing levels. Upper Prichard Creek subwatershed (above Bear Gulch)
Hydrologic Integrity road drainage improvements in Cat Creek tributaries along Road 6006	Expected road stream crossings providing potential of chronic sediment delivery	Number of road stream crossings	8 crossings and their observed condition of continued sediment delivery	8 crossings effectively stabilized, observed sediment delivery reduction after installation of armored fords

Issues and core data not tracked with this document are discussed below.

Issue/Core Data	Reason not considered in analysis
Riparian Function	Riparian road density would not change with the project within the Jo or Cat Creek Drainages, as no roads within the riparian area will be decommissioned or built.
Mass Failures and Erosion – Road density on sensitive landtypes	Does not apply. No proposed new or temporary roads are on sensitive landtypes with high landslide potential or high sediment erosion / delivery.
Riparian Function, temperature, and large wood recruitment	INFS (1995) standard and guidelines are included as design criteria for this project. The only work proposed in the Riparian Habitat Conservation Areas is the improvement of a few road crossings. No change in riparian hydrologic opening acreage is expected with this work.
Restricted Fish Use	There are **no** culverts that restrict fish passage in the Jo or Cat Creek Drainages.

AQUATICS APPENDIX D
WATSED MODEL LIMITATIONS:

Jo-Cat Resource Area

Introduction

WATSED is a computer program watershed response simulation model used by several Forests in the Northern Region, developed and updated specifically to do the following:

- Estimate changes in watershed responses in terms of stream flows and sediment yields as a cumulative result of logging, roading, and fire;
- compare differences among management alternatives in forested mountain watersheds;
- identify trends; and
- characterize potential risks.

The model is a tool that objectively estimates expected changes in water and sediment regimens that are likely to result from the cumulative forest practices over time throughout a watershed. It is not designed to produce absolute or accurately quantified solutions; rather, the model is meant to be reasonably precise in terms of changes and trends. It is supported with scientific literature, field review, and field data collected by qualified scientists (hydrologists, fluvial geomorphologists, or soil scientists) and used to provide decision makers with an understanding of different likely watershed responses in response to various forest management alternatives.

WATSED is a watershed response model designed to address the cumulative effects of timber harvest operations, roads, and fire on watersheds generally between 4 and 40 square miles in size. Its precursor the WATBAL model was developed using empirical data primarily from the Clearwater National Forest and north-central Idaho; and its precision has been validated with averaged measured data collected on Forests within the Northern Region of the USDA Forest Service over sequences of years. This validation work will be expanded during 2006.

WATSED is designed to objectively compare relative differences among forest management alternatives in terms of changes in trend, risks, and regimen of water and sediment yield. Estimates are calibrated using measured data that include a combination of primary watershed processes. The model is driven by local climatic conditions and it uses Equivalent Clearcut Area (ECA) notation to represent the apparent degree of landscape disturbance through time. Recovery curves for various road designs and configurations (clearing width, cutslope area, width, and length), logging systems and harvest methods (tractor, cable, aerial), wildfire, and site preparation (mechanical, prescribed fire, or hand) are used to characterize the watershed disturbances that result in cumulative effects.

Watershed processes in WATSED are stratified relative to *landtypes* (USDA Forest Service, 1992). The Forests have measured and rated the typical erosion and slope stability hazards of the landtypes that characterize the Forests' watersheds. They use that information to calibrate the model and resulting interpretations. Slope characteristics and activity data are WATSED input information used to modify the typical values for mapped landtypes. Project-level field investigations may identify local unusual or non-typical conditions. Such information is used to adjust model input or it can be factored into interpretation of the modeled results by the watershed specialist with appropriate skills and experience (e.g., wildland hydrologist, fluvial geomorphologist, or soil scientist).

WATSED incorporates the concepts of the R1/R4 Sediment Guides (Cline et al, 1981), which focus on slope hydrology, erosion, stability, and sediment delivery processes. It generally estimates the water flow and sediment likely to be delivered to the channel network of a study watershed over time as forest management actions occur within the entire watershed from its headwaters to a downstream reach. The routing of sediment and water through the main channel system is estimated using broadly based regional curves. Channel erosion is not modeled directly; however it is represented in the empirical data used to calibrate the model.

WATSED is not intended to simulate watershed response for individual or episodic storm, mass erosion events or extreme drought or flood years. It is not intended to accurately predict sediment and water yields that might occur as a result of stochastic events or non-forest related actions. It does not address or analyze the effects of grazing or mining (other than vegetation removal and road construction) or other non-silviculture related practices.

The expected response to individual events, including singular rain-on-snow events, high intensity thunderstorms, and extreme runoff events (e.g. flood flows) can be addressed using other modeling tools and methods Several supplemental hydrology and watershed analysis tools are available in Region One:

- *Surface erosion models such as WEPP (not used in this analysis) is appropriate to use in helping address some episodic events at the site scale for a specific hillslope. These models and tools coupled with other available information (climate and runoff) and spatial data (soil type, topography, vegetation cover, etc.) may also help estimate the risks and likely impacts of some episodic events. The assumptions and limitations of WEPP (or any model used) should also be documented when they are utilized. These include scale or aerial extent and specific site factors.*

- *Slope stability (including mass erosion and delivery potential can be addressed on a broad scale using the databases associated with the Land System Inventory (landtypes) and the known history of mass erosion. On-the-ground reviews and observations by trained personnel must be conducted to address project level mass erosion potential. In cases where roads or other ground disturbing activities are proposed in unstable sites, geotechnical experts must be utilized to access specific risks. Tools such as the "Level I Stability Analysis" (LISA) are available to estimate the risks associated with slope stability and mass erosion under certain circumstances.*

- *Flood and peak flow in response to storm events can be addressed using many tools published and available from USGS and other sources.*

Model results are not the sole source of information used to support important resource decisions.

The WATSED Model used in this analysis was not the only tool utilized for analysis of watershed responses. The model results have been incorporated with other analysis tools and sources of information to provide the basis for interpretation by the watershed specialist. Important sources of information include:

- *Locally-derived monitoring or monitoring of similar systems;*
- *Reviews of pertinent scientific literature and reports;*
- *Reasonably local calibration of the driving variables used in the models (i.e., land type response variables and hydrologic response curves);*
- *Validation of the model, using independent data for major geomorphic groups used on the Forest (i.e., rock belts, border zone, granitics, etc.); and*
- *Professional judgments and interpretations of skilled watershed specialists with local experience and observations.*

The resource interpretations are based on the integration of these sources and with model results have been used to provide a clear understanding of expected hydrologic responses and changes produced by alternative. The judgments and determinations of the professional resource specialists were based on the integration of available tools and were factored into resource recommendations and considered in management decisions. This relationship should is documented in Decision document, supporting NEPA and project files.

Concluding Remarks

WATSED like any quantitative model is only a tool. Estimates have been verified with, compared to, and evaluated against measured flow and sediment yield data from sites with similar characteristics. User interpretations are expected to have the best possible degree of validity when they are made by trained and

experienced water resource specialists who have the basis to understand the logical framework of the model itself as well as the hydrologic, hydraulic, and slope stability principles and processes that are actually taking place on the watershed and in the stream.

It is the author's intention that WATSED model and its supporting databases and landtype interpretations be continually calibrated and validated and re-calibrated again. The specialists on this project have verified for themselves the results and trends that WATSED simulates. Significant decisions have not been made solely on the results of the model. Interpretation of modeling results, review of pertinent scientific literature, on the ground field observations and measurements have all be used in concert with the informed and educated judgment of the water resource scientist.

Appendix E – List of Preparers for the Specialist's Report on Aquatic Resources

Placer Project – Aquatics Interdisciplinary Team Members:

Name	Title	Area of Expertise	Qualifications
Matthew Davis	Fisheries Biologist	Aquatic Species and Habitat, INFS	B.S. Wildlife Management, M.S. Fish Management; USDA FS 10-years
Robert Davies	Hydrologist	Erosional Processes and Hydrology, BMPs	B.S. Fisheries, B.S. Geology USDA FS 14-years

Aquatics Support Team Members – The following individuals provided technical or other support to the analysis:

Name	Title	Area of Support
John Ruebke	Hydrological Technician	Hydrologic Analysis Support
Edward Lider	Fisheries Biologist	Fisheries Analysis Support
Eric Davis	Fisheries Technician	Fisheries Analysis Support
Cathy Slinger	Hydrological Technician	Hydrologic/Fisheries Analysis Support

Appendix F –Acronyms & Glossary for the Specialist's Report on Aquatic Resources

Acronyms:

BLM – Bureau of Land Management
BMP - Best Management Practices*
CFR - Code of Federal Regulations*
cfsm - Cubic feet per second per square mile (referring to water flow)
DEQ - Department of Environmental Quality
ECA - Equivalent Clearcut Acres
EIS - Environmental Impact Statement
EPA - Environmental Protection Agency
FAR - Functioning at risk (referring to watersheds)
FSH - Forest Service Handbook
FSM - Forest Service Manual
GA - Geographic Assessment
ICBEMP - Interior Columbia Basin Ecosystem Management Project
IDF&G – Idaho Department of Fish and Game
IDL - Idaho Department of Lands
IFPA - Idaho Forest Practices Act
IFTNP - Intermountain Forest Tree Nutrition Cooperative
INFS - Inland Native Fish Strategy
IPNF - Idaho Panhandle National Forests
NEPA - National Environmental Policy Act*
NFMA - National Forest Management Act
NFSL – National Forest Service Lands
NPFC - Not properly functioning condition (referring to watersheds)
PFC - Properly functioning condition (referring to watersheds)
Q2 - level of instantaneous discharge expected to occur on average of every 2 years (referring to watershed conditions)
Q50 - level of instantaneous discharge expected to occur on average of every 50 years (referring to watershed conditions)
Q100 - level of instantaneous discharge expected to occur on average of every 100 years (referring to watershed conditions)
RHCA - Riparian Habitat Conservation Area*
RMO - Riparian Management Objective
SCA - Stream Channel Alteration (Act)
SMU - Streamside Management Unit
SMZ - Streamside management Zone*
SPCC - Spill Prevention Control and Countermeasure (see BMPs - Appendix A)
SPS - Special project specifications
SWCP - Soil and Water Conservation Practices
TES - Threatened, Endangered and Sensitive
TMDL - Total Maximum Daily Load
WQLS - Water Quality Limited Stream
USFWS – United States Fish and Wildlife Service
** These terms are defined in the Glossary below.*

A

Aquatic – Pertaining to water.

Adfluvial – Pertaining to fishes where adults from lake environments (i.e. Coeur d'Alene Lake) migrate up rivers and/or streams to spawn. When fry emerge they may reside in these nursery rivers or streams for a period of 1-6 years until migrating downstream to rear in the connected lake environment until capable of spawning as an adult.

B

Basin (river) –In general, the area of land that drains water, sediment, and dissolved materials to a common point along a stream channel. River basins are composed of large river systems.

Bedload – Sediment moving in or near a streambed.

Beneficial Uses – The many various uses that may be made of water including, but not limited to, domestic water supplies, industrial water supplies, agricultural water supplies, navigation, recreation in and on the water, wildlife habitat, and aesthetics. The beneficial use depends on actual use, the ability of the water to support a non-existing use either now or in the future, and its likelihood of being used in a given manner. The use of water for the purpose of wastewater dilution or as a receiving water for a waste treatment facility effluent is not considered a beneficial use.

Best Management Practices (BMPs) – Practices determined by the State of Idaho to be the most effective and practicable means of preventing or reducing erosion, and water pollution to meet water quality goals.

Biological Diversity (biodiversity) – The variety and variability among living organisms and the ecological complexes in which they occur.

C

Channel (stream) – A stream or riverbed through which the main current of water flows.

Classified Road – A road wholly or partially within or next to National Forest lands determined to be needed for long-term motor vehicle access.

Climate – The composite or generally prevailing weather conditions of a region throughout the year, averaged over a series of years.

Competition – An interaction that occurs when two or more individuals make demands on the same resources that are in short supply.

Composition (species) – The mix of different species that make up a plant or animal community, and their relative abundance.

Connectivity – The arrangement of habitats that allows organisms and ecological processes to move across the landscape; patches of similar habitats are either close together or linked by corridors of appropriate vegetation. The opposite of fragmentation.

Corridor (landscape) – Landscape elements that connect similar patches of habitat through an area with different characteristics. For example, streamside vegetation may create a corridor of willows and hardwoods between meadows or through a forest.

Cover – (1) Trees, shrubs, rocks, or other landscape features that allow an animal to partly or fully conceal itself. (2) The area of ground covered by plants of one or more species.

Cover Type – A vegetation classification depicting a genus, species, group of species, or life form of tree, shrub, grass, or sedge. The present vegetation of an area.

Cumulative Effects – Impacts on the environment that result from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time. ***In this EA, potential cumulative effects include those that were assessed for all ownerships, including lands administered by other federal entities and non-federal lands, especially regarding terrestrial and aquatic species.***

D

Data – Facts used in analysis.

Debris (organic) – Logs, trees, limbs, branches, leaves, bark, etc., that accumulate, often in streams or riparian areas.

Decay (decomposition) – The breakdown of organic matter, usually as a result of bacterial or fungal actions.

Decommission (roads) – Activities that result in the stabilization and restoration of unneeded roads to a more natural state. May include removal of all stream crossings and full recontour of the entire road prism, introduction of woody debris, and revegetation as needed. Fully decommissioned roads would be removed from the transportation system.

Degradation – (1) General lowering of the earth's surface by erosion or moving of materials from one place to another. (2) Reduction in value or quality.

Degrade (habitats) – Measurably change a feature at a defined scale in a way that: further reduces habitat quality, where existing conditions meet or are worse than the objective; reduces habitat quality, where existing conditions are better than the objective.

Density (fish) – The number of fish inhabiting a given area, usually expressed in terms of numbers per one hundred meters squared (i.e. #/100m^2).

Direct Effects – Impacts on the environment that are caused by the action and occur at the same time and place.

Disturbance – Refers to events that alter the structure, composition, or function of terrestrial or aquatic habitats. Natural disturbances include, among others, drought, floods, wind, fires, wildlife grazing, and insects and diseases. Human-caused disturbances include, among others, actions such as timber harvest, livestock grazing, roads, and the introduction of exotic species.

E

Endangered Species – A plant or animal species listed under the Endangered Species Act (1973) that is in danger of extinction throughout all or a significant portion of its range.

Environment – The combination of external physical, biological, social, and cultural conditions affecting the growth and development of organisms and the nature of an individual or community.

Erosion – The wearing away of the land surface by running water, wind, ice, gravity, or other geological activities; can be accelerated or intensified by human activities that reduce the stability of slopes or soils.

Exotic – A plant or animal species introduced from a distant place; not native to the area (e.g. eastern brook trout).

F

Fines (sediment) – Sediment particles smaller than 0.2 inch. Excessive fines in streams can trap fish eggs or newly hatched fish and decrease the amount of water percolating through spawning gravels.

Floodplain – The portion of river valley or level lowland next to streams that is covered with water when the river or stream overflows its banks.

Fluvial – Pertaining to fishes where adults from large river environments (i.e. Kootenai River) migrate upstream to smaller river tributaries to spawn. When fry emerge they may reside in these nursery streams for a period of 1-6 years until they migrate downstream to spend adulthood in the connected large river environment until capable of spawning as an adult.

Forest Health – The condition in which forest ecosystems sustain their complexity, diversity, resiliency, and productivity to provide for specified human needs and values. It is a useful way to communicate about the current condition of the forest especially with regard to resiliency, a part of forest health that describes the ability of the ecosystem to respond to disturbances. Forest health and resiliency can be described, in part, by species composition, density, and structure.

Fragmentation (habitat) – The break-up of a large land area (such as a forest) into smaller patches isolated by a different land type and lacking corridors of appropriate vegetation to allow organisms and ecological processes to move across the landscape. The opposite of connectivity.

Fry – A recently hatched fish, after the yolk sac has been absorbed.

G

Game Species – Wild animals that people hunt or fish for food or recreation according to prescribed seasons and limits.

Gradient – A rate of vertical elevation change per unit of horizontal distance; also called slope.

H

Habitat – A place that provides seasonal or year-round food, water, shelter, and other environmental conditions for an organism, community or population of plants or animals.

Habitat Guild – An artificial assemblage of rare plants that have similar habitat requirements. Rare plant habitat guilds occurring in the IPNF include aquatic, peatland, deciduous riparian, wet forest, moist forest, dry forest, subalpine and cold forest.

Habitat Type – A group of plant communities having similar habitat relationships.

Headwaters – Beginning of a watershed; unbranched tributaries of a stream.

Heterogeneous – Irregular, dissimilar; not uniform throughout.

Historical Range of Variability (HRV) – The natural fluctuation of ecological and physical processes and functions that would have occurred during a specified period of time. ***In this EA, refers to the range of conditions that are likely to have occurred prior to settlement of the project area by Euro Americans (approximately the mid-1800s), which would have varied within certain limits over time. HRV is discussed in this document only as a reference point, to establish a baseline set of conditions for which sufficient scientific or historical information is available to enable a comparison to current conditions.***

Homogeneous – Regular, similar; uniform throughout.

Hydrologic – Refers to the properties, distribution, and effects of water. "Hydrology" refers to the broad science of the waters of the earth-their occurrence, circulation, distribution, and physical properties, and their reaction with the environment.

Hydrologic Unit Code (HUC) – A hierarchical coding system developed by the U.S. Geological Survey to identify geographic boundaries of watersheds of various sizes.

I

Implement – To carry out.

Indicator Species – A species that is presumed to be sensitive to habitat changes; population changes of indicator species are believed to best indicate the effects of land management activities.

Indirect Effects – Impacts on the environment that are caused by the action and are later in time or farther removed in distance but are still reasonably foreseeable.

INFS – Inland Native Fish Strategy for the Intermountain, Northern and Pacific Northwest Regions (1995; Forest Service).

Intermittent Stream – A stream that flows only at certain times of the year when it receives water from other streams or from surface sources such as melting snow.

L

Large Woody Debris – Pieces of wood that are of a large enough size to affect stream channel morphology.

M

Maintain – (1) To continue. ***(2) For this document, the term is intended to convey the idea of keeping ecosystem functions, processes, and/or components (such as soil, air water, vegetation) in such a condition that the ecosystem's ability to accomplish current and future management objectives is not weakened. Management activities may be compatible with ecosystem maintenance if actions are designed to maintain or improve current ecosystem condition.***

Mass Failure (erosion) – A large land slump, in which a mass of rock or soil slips in one unit down from a cliff or slope.

Mitigation – Measures designed to counteract environmental impacts or to make impacts less severe.

Monitoring – A process of collecting information to evaluate whether or not objectives of a project and its mitigation plan are being realized. Monitoring allows detection of undesirable and desirable changes so that management actions can be modified or designed to achieve desired goals and objectives while avoiding adverse effects to ecosystems.

Morphology – Form and structure.

N

National Environmental Policy Act (NEPA) – An act of Congress passed in 1969 declaring a national policy to encourage productive and enjoyable harmony between people and the environment, to promote efforts that will prevent or eliminate damage to the environment and the biosphere and stimulate the health and welfare of people, and to enrich the understanding of the ecological systems and natural resources important to the nation, among other purposes.

National Forest Management Act (NFMA) – A law passed in 1976 requiring the preparation of Forest Service regional guides and forest plans and the preparation of regulations to guide that development.

Native – (1) one born or reared in a particular place. (2) an entity original or indigenous to a particular locality.

Native Species – Species that normally live and thrive in a particular ecosystem or region (e.g. In fishes – westslope cutthroat trout).

Natural Resources – Water, soil, wild plants and animals, air, minerals, nutrients, and other resources produced by the earth's natural processes.

Non-point Source Pollution – Pollution whose source is not specific in location; the sources of the pollutant discharge are dispersed, not well defined or constant. Examples include sediments from logging activities and runoff from agricultural chemicals.

O

Obliteration – By definition designation under the mandated Roads Analysis Process (RAP) this term has been replaced by the use of the word "***Decommission***" (see definition previous). Hence, it no longer applies in subscribing it to roads related work.

P

Perennial Stream – A stream that flows water year-round.

Pool – Portion of a stream where the current is slow, often with deeper water than surrounding areas and with a smooth surface texture. Often occur above and below riffles and generally are formed around stream bends or obstructions such as logs, root wads, or boulders. Pools provide important feeding and resting areas for fish.

Project Area – *In this EA, refers to National Forest lands to which decisions in the Record of Decision will apply.*

Proper Functioning Condition (PFC) – Riparian and wetland areas achieve Proper Functioning Condition when adequate vegetation, landform, or large woody debris is present to dissipate stream energy associated with high water flows. Attainment of Proper Functioning Condition reduces erosion and improves water quality; filters sediment, captures bedload, and aids floodplain development; improves floodwater retention and groundwater recharge; develops root masses that stabilize streambanks against cutting action; develops diverse ponding and channel characteristics to provide habitat and water depth, duration, and temperature necessary for fish production, waterfowl breeding, and other uses; and supports greater biodiversity. The functioning condition of riparian and wetland areas is a result of the interaction of geology, soil, water, and vegetation.

Q

Qualitative – Traits or characteristics that relate to quality and can't be measured with numbers.

Quantitative – Traits or characteristics that can be measured with numbers.

R

Recovery – (1) Return of an ecosystem to a specified condition after a disturbance; (2) return of a previously threatened or endangered species to a condition of population viability.

Redd – Spawning nest made by salmonid fish species in the gravel bed of a river.

Resident – Pertaining to fishes where fish within a streams spend there entire life-cycle within the watershed.

Resilient, Resilience, Resiliency – (1) The ability of a system to respond to disturbances. Resiliency is one of the properties that enable the system to persist in many different states or successional stages. (2) In human communities, refers to the ability of a community to respond to externally induced changes such as larger economic or social forces.

Restoration – Holistic actions taken to modify an ecosystem to achieve desired, healthy and functioning conditions and processes. Generally refers to the process of enabling the system to resume acting or continue acting following disturbance as if the disturbance were absent.

Restoration management activities can be either active (such as control of noxious weeds, thinning of over-dense stands of trees, or redistributing roads) or more passive (more restrictive, hands-off management direction that is primarily conservation-oriented).

Riffle – Relatively shallow section of a stream or river with rapid current and a surface broken by gravel, rubble or boulders.

Riparian Area – Area with distinctive soil and vegetation characteristics between a stream or other body of water and the adjacent upland; includes wetlands and those portions of floodplains and valley bottoms that support riparian vegetation.

Road Work/Maintenance - Includes, as needed, installation of rolling dips, installation of relief culverts, rolling the road grade for increased drainage, armoring of culvert catch basins and outlets, and adding gravel surfacing, replacing existing stream crossings, cut and fill slope stabilization, and removal of encroaching road fills.

S

Salmonid – One of a number of fishes of the genus *Onchorhynchus* of the North Pacific, which ascend freshwater streams to spawn.

Sediment – Solid materials, both mineral and organic, in suspension or transported by water, gravity, ice, or air; they may be moved and deposited away from their original position and eventually will settle to the bottom of the stream.

Sensitive Species – Species identified by a Forest Service Regional Forester for which population viability is a concern either (a) because of significant current or predicted downward trends in population numbers or density, or (b) because of significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution. For example, torrent sculpin and westslope cutthroat trout.

Site – A specific location of an activity or project, such as a campground, a lake, or a stand of trees to be harvested.

Spatial – Related to or having the nature of space.

Spawning Habitat – Areas used by adult fish for laying and fertilizing eggs.

Species – A population or series of populations of organisms that can interbreed freely with each other but not with members of other species.

Specified Road – A road with specific features designed by Forest Service engineers and included in the timber sale contract.

Storage (roads) - Includes removal and recontour of all stream crossings and, as needed, recontour of unstable fill slopes, cutslope stabilization, ripping the road tread, installation of no-maintenance cross ditches, and revegetation. Storage also includes some kind of road closure method such as with a guardrail barrier, gate, an earthen berm, or a short section of full recontour. These roads would remain as classified roads on the transportation system.

Subbasin – A drainage area of approximately 800,000 to 1,000,000 acres, equivalent to a 4th-field hydrologic unit code (HUC). Hierarchically, subwatersheds (6th-field HUC), which in turn are contained within a watershed (5th-field HUC), which in turn are contained within a subbasin (4th-field HUC). This concept is shown graphically in Figure 2-1.

Substrate – The soil or underlying rock on which an organism is growing or to which it is attached.

Subwatershed – A drainage area of approximately 20,000 acres, equivalent to a 6th-field Hydrologic Unit Code (HUC). Hierarchically, subwatersheds (6th-field HUC) are contained within watershed (5th-field HUC), which in turn contained within a subbasin (4th-field HUC). This concept is shown graphically in Chapter 2.

Succession – A predictable process of changes in structure and composition of plant and animal communities over time. Conditions of the prior plant community or successional stage create conditions that are favorable for the establishment of the next stage. The different stages in succession are often referred to as seral stages.

Sustainability – Meeting the needs of the present without compromising the abilities of future generations to meet their needs; emphasizing and maintaining the underlying ecological processes that ensure long-term productivity of goods, services, and values without impairing productivity of the land.

T

Temporary Roads - Those roads not intended to be retained for long-term management.

Thermal cover – Cover used by animals to protect them against weather.

Threatened Species – Species listed under the Endangered Species Act (1973; i.e. bull trout) that are likely to become endangered within the foreseeable future throughout all or a significant portion of their range.

U

Unclassified Road – A road on National Forest land that is not managed in the forest transportation system.

V

Viability – In general, viability means the ability of a population of a plant or animal species to persist for some specified time into the future. For planning purposes, a *viable population* is one that has the estimated numbers and distribution of reproductive individuals to ensure that its continued existence will be well distributed in the planning area.

Viable Population – A population that is regarded as having the estimated numbers and distribution of reproductive individuals to ensure that its continued existence is well distributed in the project area.

W

Water Quality Limited Segment (WQLS) – A Clean Water Act classification for waters where application of best management practices or technology-based controls are not sufficient to achieve designated water quality standards.

Watershed – (1) The region draining into a river, river system, or body of water. (2) In this EA, a watershed also refers specifically to a drainage area of approximately 50,000 to 100,000 acres, which is equivalent to a 5th-field Hydrologic Unit Code (HUC). Hierarchically, subwatersheds (6th-field HUC) are contained within a watershed (5th-field HUC), which in turn is contained within a subbasin (4th-field HUC). This concept is shown graphically in Figure 2-1.

Wetland – In general, an area soaked by surface or groundwater frequently enough to support vegetation that requires saturated soil conditions for growth and reproduction; generally includes swamps, marshes, springs, seeps, bogs, wet meadows, mudflats, natural ponds, and other similar areas.

Specialist's Report on Soils in the Jo-Cat Resource Area

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SPECIALIST'S REPORT ON SOIL PRODUCTIVITY IN THE JO-CAT RESOURCE AREA

1. Regulatory Framework

The regulatory framework providing direction for protecting a site's inherent capacity to grow vegetation comes from the following principle sources:

- *The Multiple Use-Sustained Yield Act of 1960*
- *The National Forest Management Act of 1976 (NFMA)*
- *The Forest Plan and Regional Soil Quality standards (2554.03-R1 Suppl. 2500-99-1)*

The Multiple Use-Sustained Yield Act of 1960 directs the Forest Service to achieve and maintain outputs of various renewable resources in perpetuity without permanent impairment of the land's productivity.

Section 6 of the National Forest Management Act of 1976 (NFMA) charges the Secretary of Agriculture with ensuring research and continuous monitoring of each management system to safeguard the land's productivity.

To comply with NFMA, the Chief of the Forest Service has charged each Forest Service Region with developing soil quality standards for detecting soil disturbance and indicating a loss in long-term productive potential. These standards and guidelines are built into Forest Plans.

Forest Plan direction (Forest Plan, p. II-17, PF Doc. CR-002) is to manage the soil resource to maintain long-term productivity. The objective is that management activities on forest lands will not significantly impair the long-term productivity of the soil or produce unacceptable levels of sedimentation resulting from soil erosion. Forest plan standards are addressed in Section 6 of this report.

The Regional Soil Quality Standards (R-1 Supplement 2500-99-1; PF Doc. SOIL-R-58) were revised in November 1999. Manual direction recommends maintaining 85% of an activity area's soil at an acceptable productivity potential with respect to detrimental impacts, including the effects of compaction, displacement, rutting, severe burning, surface erosion, loss of surface organic matter,and soil mass movement. This recommendation is based on research indicating that a decline in productivity would have to be at least 15% to be detectable (Powers, 1990; PF Doc. SOIL-R-48). In areas where more than 15 percent detrimental soil conditions exists from prior activities, the cumulative detrimental effects from project implementation and restoration should not exceed the conditions prior to the planned activity and should move toward a net improvement in soil quality. These standards do not apply to intensively developed sites such as permanent roads/landings, mines, developed recreation and administrative sites.

2. Methodology Used in the Soil Productivity Analysis

Analysis of the soil resource was carried out utilizing aerial photography, geographic information system (GIS) data, the timber stand database (TSMRS), and the roads database. Hazards from erosion, mass failure, soil productivity, and landtype sensitivity were gathered from landtype descriptions in the Idaho Panhandle National Forests Land Systems Inventory (USDA 1999, PF Doc. CR-019 and SOIL-2; SOIL – Map Appendix, Maps 1 to 6). The proposed action was analyzed to identify those units that would require design modifications to achieve Regional and Forest Plan standards. Discrepancies of acres are possible due to rounding.

Proposed ground-based and other harvest units were field reviewed in 2006 by the Forest Soil Scientist to verify existing soil conditions by conducting the "Onsite Assessment Method" outlined in Niehoff (2002; PF Doc. SOIL-R-44). See soil assessment sheets/data (PF Doc. SOIL-1). Additional documentation of existing conditions are also provided for all units from the forester (PF Doc. SOIL-1). Within the Resource Area, no previous harvest activities were identified in the TSMRS record.

Data lists were developed for all proposed treatment units and summarize existing conditions that include acres of constructed or designated roads (PF Doc. SOIL-5). Potential disturbance for the soil resource was determined using Niehoff's (2002; PF Doc. SOIL-R-44) guidelines for soil NEPA analysis, the Soil

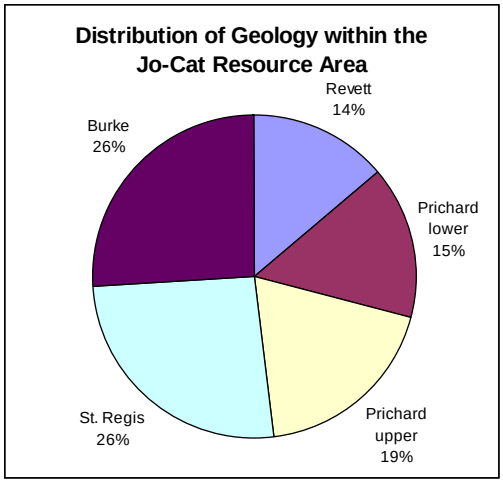
Disturbance Spreadsheet (PF Doc. SOIL-7), and field verification (PF Doc. SOIL-1). The disturbance spreadsheet evaluates detrimental disturbance on proposed harvest units for each harvest method based on empirically derived coefficients that were obtained and averaged from numerous monitored sites throughout the Idaho Panhandle National Forests (Forest Plan Monitoring and Evaluation Reports, 1988, 1991, 1993 and 1997; PF Doc. CR-004, CR-007, CR-009, and CR-013). The disturbance spreadsheet is limited to the harvest and slash disposal methods for which coefficients have been determined and its coefficients assume that best management pratices (BMPs) have been implemented since 1990. The disturbance spreadsheet does not account for changes in soil types or the recovery of soils over time from existing previous harvest activities.

3. Affected Environment

3.A. Geology and Soils

The Resource Area encompasses Jo and Cat Creek and is bordered to the west by Paragon Gulch and to the east by the Bitterroot Divide that forms the state line to Montana. All three tributaries are part of the headwaters of Prichard Creek which joins the Coeur d'Alene River approximately 11 miles downstream. This setting is situated within the Coeur d'Alene Mountains and the Bitterroot Divide, a well eroded feature characteristic of a mature landscape with steep main ridges.

***Figure SOIL-1:* Distribution of geology in the Jo-Cat Resource Area.**



Numerous subsidiary ridges have been created as tributary stream courses formed steep V-shaped channels along the sides of the main ridges. All subordinate drainages and headwaters flow into Prichard Creek which slowly widens as it enters a broader valley bottom near Murray.

Bedrock geology consists of Precambrian Belt Series metasediments of the Prichard, Burke, St. Regis, and Revett Formations (Figure SOIL-1; Resource Area Geology Map, PF Doc. SOIL-10).

Throughout the Resource Area, the soil has developed in a mosaic pattern as dictated by topographic relief, vegetation, and aspect. An elevation difference of over 2900 feet is attained between the highest and lowest portion of the Jo-Cat Resource Area between the Bitterroot Divide and the Prichard Creek valley bottom and consists of a mostly steep sided and incised topography with tributary stream courses.

Under the predominant timber stands, silt loam textured ash capped soil have developed. The volcanic material accumulated from several of the Cascade volcanoes eruptions with most of the ash originating from Mt. Mazama (Crater Lake) in Oregon about 6,700 years ago. The uppermost part of the ash is usually enriched with organic matter that is incorporated into this part of the soil and has a high water- and nutrient-holding capacity, both of which are important for soil productivity, while the subsoils are not as fertile. Extensive snow pack at this high elevation naturally compacts the duff layer to an average depth of 1 to 2 inches.

Moderately deep to shallow skeletal soils make up the majority of the Resource Area with moderately to good timber production potential. The ash cap soils are of a silt loam texture and light brown to reddish brown in color with a general high rock fragment content of 30 to 70 percent and depths of 3 to 12 inches. The angular to subangular rock fragment content increases with depth along the ridges and steep side slopes.

The subsoil is more influenced by the underlying bedrock with a light brown color and sandy loam texture. Rock fragments in the subsoil can range between 40 and 80 percent with occasional cobbles throughout. Few bedrock outcroppings are found along ridge crests and side slopes but talus fields are numerous and increase in size and frequency with elevation.

3.B. Soils and Productivity

The practice of timber management can have long-lasting impacts on the soil resource if precautions are not taken. The following three design and management criteria relate to soil productivity in the Resource Area.

3.B.1. Detrimentally disturbed soils within activity areas (harvest units).

Detrimental soil impacts are defined as the proportion of an activity area that may be subjected to displacement, compaction, rutting, erosion, or severe burning due to a particular management activity (such as harvest or fuels treatment), exclusive of dedicated resources (such as system roads). The soils in an activity area are considered detrimentally disturbed when the following soil conditions exist as a result of Forest practices:

a. *Soil displacement results in the loss of either one inch of or half of the humus-enriched surface layer (A-soil horizon), whichever is less. The loss of the litter layer alone could be detrimental on some marginal sites. Displacement removes the most productive part of the soil resource. Roading, ground-based yarding, dozer piling and cable corridors are the major contributors to displacement.*

b. *Soil compaction that results in a 15 percent or more increase in bulk density, or a 50% reduction in water infiltration rates typical for volcanic ash influenced surface soils. Soil compaction reduces the supply of air, water, and nutrients to plants. Roading, ground based yarding, and piling are the major contributors to compaction.*

c. *Surface erosion is indicated by rills, gullies, pedestals, and localized soil deposition and should be kept within tolerable limits by retaining enough ground cover, depending with onsite conditions.*

d. *Fire consumes most woody debris and the entire duff and litter layer, exposing mineral soil. Burn ash that is white or reddish color, indicates that much of the carbon was oxidized by fire (Burned-Area Emergency Rehabilitation Handbook FSH 2509.13). Burns that create very high temperatures at the soil surface when soil moisture content is low result in an almost complete loss of surface and upper soil horizon organics. Many of the nutrients and ectomycorrhizae associated with these organics can be lost to the atmosphere through volatilization and removed from the site in fly-ash (Garrison and Moore 1998; PF Doc. SOIL-17) or lost to high ground temperature flux (Harvey et al. 1986 p. 7; PF Doc. SOIL-R-24).*

3.B.2. Low Potassium Sites - Sites containing geologic formations that are naturally deficient in potassium bearing minerals.

Whole-tree yarding and removal of treetops can lead to the direct loss of potassium (Morris and Miller 1994, PF Doc. SOIL-R-42). On some sites, 45 percent of the available potassium is detained in trees, with the remainder being held in subordinate vegetation, forest floor, and soil pools. Within the trees, about 85 percent of the potassium is held in the branches, twigs, and foliage (Garrison and Moore 1998, PF Doc. SOIL-R-17; Moore et al. 2004b, PF Doc. SOIL-R-41). It is therefore vital to recycle as many nutrients as possible before removal which can be accomplished by overwintering small-scale debris to leach out potassium (Baker et al. 1989, PF Doc. SOIL-R-2; Barber and Van Lear 1984, PF Doc. SOIL-R-3; Edmonds 1987, PF Doc. SOIL-R-14; Garrison and Moore 1998, PF Doc. SOIL-R-17; Laskowski et al. 1995, PF Doc. SOIL-R-32; and Palviainen et al. 2004, PF Doc. SOIL-R-46).

Under most natural circumstances, potassium returns to the soil when the tree dies. Unlike many other soil nutrients, potassium is derived primarily from underlying bedrock formations of the Precambrian metasedimentary Belt series group that, for the Jo-Cat area, include: 34 percent Prichard, 26 percent Burke, 26 percent St. Regis, and 14 percent Revett (Figure SOIL-1; Resource Area Geology Map, PF Doc. SOIL-10).

The Intermountain Forest Tree Nutrition Cooperative (IFTNC) continues to research potassium contents within tree species and different rock types in order to establish specific minimum thresholds for retention and effects of potassium on tree growth and resistance to root diseases (Mika 2005, PF Doc. SOIL-R-39; Shaw 2005, PF Doc. SOIL-R-52). Until these minimum thresholds are developed through research, the Idaho

Panhandle National Forests are using management recommendations from the IFTNC as a guideline for maintaining sufficient potassium on a site. These measures have been incorporated into the features designed to protect soils (EA Part 3.C.(3)).

3.B.3. Maintenance of large woody debris and organic matter.

The third soil productivity criterion relates to the management of coarse woody debris and organic matter, and follows the research guidelines contained in Graham et al. (1994, PF Doc. SOIL-R-21). Retaining coarse woody debris and organic matter is important to maintaining the soils most productive layer. Coarse woody debris is defined as material derived from tree limbs, boles, and roots greater than three inches in diameter and in various stages of decay (Graham et al., 1994, PF Doc. SOIL-R-21). It performs many physical, chemical, and biological functions in forest ecosystems and is a key habitat component for many wildlife species and for stream ecology. Because coarse woody debris is such a valuable part of a functioning ecosystem, a portion of the material must be maintained to ensure that organic matter is recycled for long-term productivity. Nevertheless, in natural systems organic matter fluctuates with forest growth, mortality, fire, and decay.

The average optimum level of fine organic matter is 21 to 30 percent (Graham et al. 1994, PF Doc. SOIL-R-21), which equates to 1 to 2 inches of surface litter and humus. Optimum levels of fine organic matter relate to ectomycorrhizae fungus, which is a good indicator of healthy forest soil. In moist western hemlock and cedar habitat types, strong levels of ectomycorrhizae exist when organic levels exceed 30 percent. Soil survey data indicates that most forest sites have adequate organic matter levels to support strong ectomycorrhizae populations.

4. Existing Conditions

Four criteria were used to assess existing conditions for soil resources:

1. **Landtypes and hazard ratings of the Idaho Panhandle National Forests;**
2. **Soils and productivity;**
3. **Existing roads and transportation;**
4. **Site conditions from past activities.**

4.A. Land Types and Hazard Ratings

Twenty-four landtypes have been identified and mapped in the Resource Area out of which 16 are in harvest units under the proposed action. Descriptions of each landtype, detailed acreages, and maps displaying landtypes and hazards are contained in the project file and the map appendix (PF Doc. SOIL-2, SOIL-3, SOIL-4; SOIL – Map Appendix , Maps 1 to 6). Hazard ratings have also been compiled and are listed in subcategories for mass failure, surface erosion, landtype sensitivity, and soil productivity. These are rated as low, moderate, or high for each landtype (Table SOIL-1).

Table SOIL-1. Summary of landtype hazards associated with harvest activities in the Jo-Cat Resource Area.

Harvest	Mass Failure Potential			Surface Erosion Potential			Landtype Sensitivity			Soil Productivity		
	L	M	H	L	M	H	L	M	H	LM	M	MH
PA	85%	14%	1%	100%	0%	0%	85%	12%	3%	20%	76%	4%

PA – Proposed Action; L – Low; M – Moderate; H – High; LM- Low to Moderately Low; MH – Moderately High

> ***Mass Failure Potential*** is the relative probability of downslope movement of masses of soil material. Besides natural failure, landslides or slumping can be triggered by a number of mechanisms, including harvest activities, severe burning, and related road building.

Under the Proposed Action, the 265 acres of harvest activity areas contain 85 percent (225 acres) of soils that have a low, 14 percent (38 acres) that have a moderate, and 1 percent (2 acres) that have a high mass failure potential (Table SOIL-1; PF SOIL-3).

Landtypes that exhibit moderate to high mass failure potential are located primarily on side slopes and within stream headlands with incised to steeply incised V-shaped drainages of high relief on concave mountain slopes. After field reviewing the short stretch of high mass failure potential along FS6006, which has been in place for several decades without apparent degradation, the potential for soil mass movement is low if proper drainage remains intact.

An area of moderate mass failure potential is identified below proposed helicopter Units 8 and 9 and within the drainage dividing 9a and 9b. The slopes are steep above and below the road and are of concern due to seepage in the cut slope and extensive pistol butting in the drainage that indicates creep, slope instability, and an increased potential for sediment delivery. A large amount of trees, primarily lodgepole, are already dead and dying above the road prism.

Removal of forest canopy and cover from either clearcutting or wildland fire increases landslide occurrence (Gray and Megahan 1981, PF Doc. SOIL-R-22; Megahan et al. 1978, PF Doc. SOIL-R-38). This is primarily due to root decay, soil disturbance, increased snow accumulation and altered melting rates, and soil water increases from reduced interception and transpiration.

Surface Erosion Potential is a rating of the relative susceptability of exposed soils to sheet and rill erosion.

Little research has been conducted to determine if partial cutting affects landslide rates. Megahan et al. (1978, PF Doc. SOIL-R-38) found that landslide occurrence increased only slightly when overstory canopy was reduced from 100 percent to 11 percent, but increased dramatically when canopy closure went below 11 percent. They also found that crown cover from shrubs affected landslide occurrence after 80 percent crown removal and indicated that landslide occurrence is more sensitive to shrub than tree crown removal.

All soil landtypes associated with the Proposed Action (265 acres) are rated low for surface erosion (Table SOIL-1; PF SOIL-3). The potential for soil erosion concerns on the Coeur d'Alene River Ranger District is not so much associated with harvest treatments as with existing roads (Cacek 1998, PF Doc. SOIL-R-7). The dominant processes in roaded portions are surface erosion from bare soil areas of roads, including the cutslope, fillslope, and travelway. However, the existing road FS6006 that extends into the Resource Area is closed to motorized traffic use and has been stable over the past decades with little to no signs of degradation.

Revegetation of cut slopes and fill slopes is often difficult because of lack of soil moisture, organic material, low productivity potential, and desiccation of seeds and seedlings, especially on south-facing slopes. On moist slopes, revegetation efforts are more successful since erosion of road cut slopes and fill slopes is generally lower.

Road erosion and sediment yield usually decline after construction (Jones 2000, PF Doc. SOIL-R-30; Switalski et al. 2004, PF Doc. SOIL-R-56) but can provide a chronic, long-term source of sediment to streams. Periodic large pulses of erosion may occur during intense water yield and overland flow events in interaction with road drainage systems. Roads and their associated impacts are analyzed in detail in the Specialist's Report on Aquatics.

Landtype Sensitivity is a rating that incorporates mass failure, surface erosion, and sediment delivery potentials to determine a rating of low, moderate, or high sensitivity for a given landtype.

Within the 265 acres of the Proposed Action harvest activity areas, 85 percent (225 acres) of soils have a low, 12 percent (32 acres) have a moderate, and 3 percent (8 acres) have a high landtype sensitivity rating (Table SOIL-1; PF SOIL-3).

The landtypes that exhibit high sensitivity are situated primarily on low to mid-elevation side slopes and stream headlands associated with steep and deeply incised V-shaped drainages of high relief on straight to concave mountain slopes. Because drainage courses and riparian zones are buffered and will not be entered or logged, the potential for increased sediment delivery from the these landtype units is minimal. As part of project planning, all drainage courses and riparian zones have an INFISH designated buffer zone that will not

be entered by any proposed harvest activities. With established buffer zones, the potential sediment increases from fuel or timber management work is minimal.

Roads are considered a potential source for sediment delivery and are analyzed in detail in the Specialist's Report on Aquatics.

> ***Soil Productivity Potential*** is a rating of the relative capacity or ability of a soil to produce and sustain biomass. Low productivity areas a generally associated with shallow, rocky steep slopes on southerly aspects.

Within the 265 acres of the Proposed Action harvest activity areas, 20 percent (53 acres) of soils have a low to moderately low, 76 percent (201 acres) have a moderate, and 4 percent (11 acres) have a moderately high productivity potential (Table SOIL-1; PF SOIL-3).

Soils susceptible to reduced productivity potential are generally those located on shallow, rocky steep slopes on southerly aspects. Removal of canopy can affect soil moisture content in several ways. Precipitation may enter previously intercepted areas and provide existing or establishing vegetation with additional needed moisture and increased decomposition rates. Conversely, rain events may increase erosion on the now exposed soil, especially if the potential is high, and reduce the availability of a growing medium. Furthermore, increased sunlight may also support plant growth or heat up soils to the extent that vegetation is inhibited.

When soils have adequate moisture conditions to retain their biological, chemical, and physical integrity, effects from the loss of forest floor can be minimized (Barnett 1989, PF Doc. SOIL-R-4; Frandsen and Ryan 1985, PF Doc. SOIL-R-15; Hungerford et al. 1991, PF Doc. SOIL-R-26; McNabb and Cromack 1990, PF Doc. SOIL-R-36). Prescribed underburning and pile burning could potentially remove woody debris that would otherwise provide nutrients to the soil as the decay process occurs (Page-Dumroese et al. 2006, PF Doc. SOIL-R-29). Hence, burning when soil moisture content is high helps to maintain coarse woody debris requirements.

However, on an unpredictable site-specific basis, some drier sites may burn at a severity level that removes all of the protecting duff and litter layers, even under managed fire conditions. The duff and litter layer is important in protecting the soil horizons, both as reducing erosion potential and in maintaining soil moisture. Litter prevents the breakdown of soil aggregates and reduces the velocity of any overland flow, thereby reducing the erosion potential (Beschta 2004, PF Doc. SOIL-R-5). Project design features, such as increased tree retention, are expected to minimize this effect.

4.B. Soils and Productivity

The soils found in the Jo-Cat Resource Area owe their productivity to excellent nutrient-holding capacities and other favorable characteristics provided by an ash layer. However, these generally young and poorly developed soils can experience long-term deficiencies when biologically essential elements, like organic matter and coarse woody debris, are not sufficiently available.

Organic matter content varies throughout the Resource Area (PF Doc. SOIL-1) but is generally optimum for all surveyed units, which are primarily south and west facing. Localized variabilities and depths are natural and usually correlate to habitat type and aspect with excessive needle cast often decreasing the establishment of a more herbaceous cover.

Coarse woody debris (CWD) was found to be variable as well (PF Doc. SOIL-1). Some stands contain higher amounts of down wood, generally on the moister west-facing slopes, pockets that have been excluded from the 1910 wildfire, or sites that contain elevated tree mortality. Drier south-facing slopes and ridges have lower CWD levels that often reflect shallower soils or past wildfire activities. Decomposition may also be affected due to light and moisture variations under different canopy densities.

Whole-tree yarding and removal of treetops can reduce nutrients, woody material, and lead to the direct loss of potassium (Morris and Miller 1994, PF Doc. SOIL-R-42). However, none of the proposed activity areas has been or will be whole-tree logged.

4.C. Existing Roads and Transportation

Within the proposed harvest units, field verification located no evidence of past harvesting activities (PF Doc. SOIL-1) except localized firewood removal and dispersed stumps near road locations. An existing network of old roads and trails is scattered around the landscape and can primarily be associated with past mining exploration and test excavations that are assumed to have taken place in the late 1960's to early 1970's.

A total of ~0.3 miles (~1.1 acres) along the existing access road FS6006 are located on landtypes with a moderate subsoil erosion potential rating (SOIL – Map Appendix, Map 6). The area was reviewed during the field visit and does not show any degradation or concerns in regards to the proposed reconstruction of the existing road (also see Specialist's Report on Transportation).

The present road system designated as "classified" (Forest Development Roads) on the National Forest transportation system is considered dedicated land and presently totals approximately 2.6 miles within the Resource Area. Additional mining related dozer trails (PF Doc. SOIL-5) are also associated with the activity areas as well as ~3.5 miles of Federal Highway 9 located within the Resource Area. Roads are categorized as "classified" (dedicated under the area transportation plan) or "unclassified" (non-dedicated roads, which are not considered necessary for long-term forest management objectives). In both cases, the loss of soil productivity on either category of road is considered irretrievable.

4.D. Site Conditions from Past Activities

Within the proposed harvest units, field verification located no evidence of past logging activities with the exception of harvest related to road and trail building (PF Doc. SOIL-1). The majority of previous disturbances in the Jo-Cat area are associated with mining exploration and small test excavations that occurred in the 1960s and 1970s, but no further development occurred. The soil disturbance accounts for approximately ~3.3 acres of localized compaction and displacement scattered within some of the activity areas (PF Doc. SOIL-5) and is factored into the existing condition for each proposed unit as displayed in Table SOIL-2.

5. Environmental Consequences to Soils

5.A. Methodology Used to Analyze Environmental Consequences to Soils

Soil quality standards are applied to "activity areas" or individual harvest units (USDA FS 1999, PF Doc. SOIL-R-58). The activity area is considered an appropriate geographic unit for assessing soil environmental effects because soil productivity is a site-specific attribute of the land and is not dependent on the productivity of an adjacent area. Similarly, if one acre of land receives soil impacts and a second management activity is planned for that same site, then soil cumulative effects are possible. One exception would be the evaluation of slope stability, which requires a closer look at the adjacent terrain outside of activity areas to determine if cumulative effects from past management activities and roads are adverse.

Evaluation of cumulative effects to soil productivity does not require an integrated "watershed-type" assessment since that is not considered an appropriate geographic area. This is because assessment of soil quality within too large an area can mask or "dilute" site specific effects.

To determine whether proposed activities would detrimentally impact or have cumulative effects on soils, the IPNF Soil NEPA Analysis Process (Niehoff 2002, PF Doc. SOIL-R-44) was used. The detrimentally disturbed acres were calculated using coefficients based on past IPNF soil monitoring data. The coefficients were developed as an average soil disturbance level and equated to harvest equipment, fuel treatment methods, and the time of year fuel treatment took place. This monitoring information is contained in Forest Plan Monitoring and Evaluation Reports and is summarized in the IPNF Soil NEPA Analysis Process (Niehoff 2002, PF Doc. SOIL-R-44). Calculations incorporated the acres and types of proposed logging, burning, and roads and landings constructed for direct and indirect effects. Detrimental disturbance associated with the Jo-Cat Project would be an irretrievable commitment of soil resource, because soils would recover over the long-term following detrimental disturbance from proposed vegetation management activities.

Table SOIL-2: Summary of existing conditions and potential impacts for the Proposed Action following guidelines in Niehoff (2002; PF SOIL-44).

						Predicted Impact from Temporary Road Construction			Potential Detrimental Disturbance	
Unit	**Activity Area (acres)**	**Proposed Treatment**	**Proposed Logging System**	**Proposed Slash Treatment**	**Existing Condition** % **	**Proposed Temp Road Construction (miles)**	**Estimated Road Disturbance+ (acres)**	**Disturbance %**	**Estimated Acres***	**In Unit Total %**
1	3	WL-thin	S	UB	0				<0.1	2
2a	3	WL-thin	T	UB	0				0.4	13
2++	10	WL-thin	H	UB	3				0.4	4
3	7	WL-thin	S	UB	0				0.1	2
4	3	LP-removal	H	UB	8				0.2	9
5a++	4	LP-removal	S	UB	0				<0.1	2
5b^	24	LP-removal	T	UB	5				3.1	13
6	13	LP-overstory	H	LS	3				0.5	4
7	18	WL-thin	S	UB	3				0.9	5
8	22	LP-removal	H	UB	2				0.6	3
9a	9	LP-salvage	H	LS	3				0.4	4
9b	11	LP-salvage	H	LS	0				0.1	1
10a	2	LP-salvage	S	LS	0				0.04	2
10b^	8	LP-salvage	T	LS	2				1.0	13
11a	1	LP-removal	C	UB	0				0.05	5
11b	2	LP-removal	H	UB	0				0.02	1
11c^	9	LP-removal	T	UB	6				1.3	15#
11d++	13	LP-removal	S	UB	1				0.4	3
12a	10	WL-thin	S	UB	2	0.2	0.6	6	1.0	10
12b^	20	WL-thin	T	GP	3				2.8	14
12c++	24	WL-thin	S	UB	0	0.2	0.7	3	1.2	5
12d	16	WL-thin	H	UB	0				0.1	1
13	6	LP-removal	H	UB	0				<0.1	1
14	14	LP-removal	H	UB	0				0.1	1
15	5	LP-removal	H	UB	0				<0.1	1
16	8	WL-thin	H	UB	0				<0.1	1
Total	**265**					**0.4**	**1.1**		**15.3**	

WL –Western Larch LP - Lodgepole	T – Tractor S – Skyline H – Helicopter	*Refer to Table SOIL-3 and PF SOIL-7 for coefficients used to predict potential detrimental disturbance for proposed logging and slash treatment scenarios including burning and piling. PF SOIL-10 provides additional details on how above calculations were derived. ^Existing disturbance, all from past mining exploration, was added to all proposed skyline and helicopter units since the roads/trails would not be utilized by the aerial equipment. Existing road and trail related disturbance in tractor units 5b and 10b are incorporated in the potential disturbance coefficient since the majority of the isolated trails will likely be utilized during harvest operations. In Units 11c and 12b, some of the existing disturbance from a mining road may not be able to be incorporated into the skid trail layout and therefore adds to potential impacts. **Existing detrimental disturbance already includes impacts from old non-system roads/trails related to past mining exploration. +Assuming an avg. width of 30 ft. The temp road will be fully obliterated post-harvest. #Unit is at allowable SQS's – if feasible, the disturbance from an existing old dozer trail that extends from the lower Cat Creek slopes over the ridge will be incorporated into the skid trail layout of Unit 11c and, if this occurs, would be re-contoured within the unit in conjunction with the temp road rehab after harvest activities are completed. ++There is a potential that Units 2, 5a, 11d, and 12c would be logged with mechanized felling equipment and yarded with either skyline or helicopter as displayed above. Potential detrimental disturbance levels would adjust to 12%, 10%, 11%, and 13% respectively (PF SOIL-9); mechanized felling equipment would be limited to slopes <45%; all three units are expected to remain below required soil quality standards.

Based on past monitoring efforts (Niehoff 2002, PF Doc. SOIL-R-44), tractor logging prior to 1990 has had the most detrimental soil impacts and ranged between 24 and 42 percent. Since 1990, tractor logging methods and recommended protection measures have decreased most detrimental impacts to an average of 13 percent (Niehoff 2002, PF Doc. SOIL-R-44), which is two percent less than the maximum allowable criteria established by the Regional guidelines.

Helicopter and skyline/cable logging systems tend to have between 0 to 2 percent detrimental effects (Niehoff 2002, Doc. SOIL-R-44; McIver and Starr 2000, pp. 11-16, PF Doc. SOIL-R-35). These logging systems have less impact than tractor systems because the equipment stays on the road and the logs are partially suspended, restricting impacts to times when logs are being dragged over the ground (Krag 1991, PF Doc. SOIL-R-31; Seyedbagheri 1996, pages. 7-9; PF Doc. SOIL-R-51).

Helicopter logging has minimal impacts as the logs are lifted into the air and transported to a landing site (Poff 1996, PF Doc. SOIL-R-47; McIver and Starr 2000, pages 11-16; PF Doc. SOIL-R-35). Helicopter landing sites for the Jo-Cat Resource Area are estimated to range from 1/3 to 1/2 acre in size and receive the most impact from equipment that moves and transports the logs (EA, Appendix C, Resource Area Map).

Direct effects on soils from proposed activities were measured by analyzing the effects of compaction, erosion, burning, rutting, and displacement on the soil surface that is the most productive layer and also the easiest to disturb through activities. Potential impacts are based on the type of logging system and fuel treatments used and also include areas disturbed due to the construction of temporary roads.

Compaction, displacement, rutting, and severe burning can affect the soils physical, chemical, and biological properties, which indirectly can affect the growth and health of trees and other plants. Compaction reduces soil permeability and infiltration, which can cause soil erosion. Displacement reduces plant growth where topsoil and organic matter are removed. Severely burned soils can become hydrophobic (water repellent) and lead to increased erosion, runoff, and/or reduced productivity.

Ground-based, skyline/cable, and helicopter logging systems would be utilized under the Proposed Action. Roads and landings that are to remain on the landscape for future use cause irretrievable effects on productivity as those lands become “dedicated” lands. Those roads that are temporarily needed for project work and are planned for decommissioning have detrimental effects initially, but rehabilitation efforts (ripping, recontouring) would initiate a long-term recovery sequence. Vegetative recovery time is approximately 30 to 70 years as the second growth timber becomes established around the disturbed areas and develops enough crown foliage to intercept and evapotranspirate moisture (Dykstra and Curran 2002, PF Doc. SOIL-R-12; and Froehlich et al. 1985, PF Doc. SOIL-R-16).

Acres of detrimental disturbance were calculated by multiplying activity area size by the disturbance coefficient derived from monitoring reports. Coefficients used for proposed logging systems are displayed in Table SOIL-3.

Table SOIL-3. Potential detrimental disturbance coefficients used for various logging and prescribed fire scenarios.

Tractor Logging	**Detrimental Disturbance Coefficients (%)**
With grapple piling or underburning	13
Aerial Logging	
Helicopter logging	0 - 1
Skyline logging with underburning	0 - 2
Cable Logging	5

Road calculations used 30-foot widths that take into account a 14-foot wide running surface and the cut and fill slope disturbance; however, on gentle ground, the road width is usually less. Helicopter landings are each calculated depending on the size determined by the forester. Effects to these areas would be considered irretrievable and identified as “dedicated” lands.

Indirect effects include the loss of site productivity due to the removal of large woody debris and nutrients. Large woody debris is essential for maintenance of sufficient microorganism populations and long-term site productivity. Research has indicated that potassium (among other nutrients) is an important element for site productivity and may be deficient in certain metasedimentary Belt Supergroup formations. Design features are incorporated into the activities to meet the management of large woody debris and organic matter as detailed in the research guidelines contained in Graham et al. (1994, PF Doc. SOIL-R-21). These recommendations emphasize tons per acre and are defined as any woody residue larger than three inches in diameter.

5.B. Direct and Indirect Effects to Soils with No-Action

With No-Action, no new management induced detrimental soil impacts would occur in the Jo-Cat Resource Area. Stands currently at high mortality risk would not be treated, which may increase infestation levels and associated risks of stand loss due to wildfire, severe burning, erosion concerns, and loss of soil nutrients. On a landscape scale, the promotion of healthy western larch and re-introduction of white pine would not occur. Timber stands would continue to harbor dead and infested lodgepole and move towards moderate to higher risks of considerable losses.

No direct effects to the soil resource would occur with No Action since there would be no road construction, logging, or fuel treatment activities. There would be no compaction or displacement beyond what currently exists. Throughout the silvicultural landscape, tree mortality from pathogens, insects, and weather events would continue as in the past, which has a direct influence on the area's recycling of organic matter and changes in fuel loading. In moister habitat sites, the increase in organic matter is a benefiting function to overall soil productivity. In dry habitat types, increases of organic matter may result in a negative response.

As the fire risk increases over time due to tree mortality and higher fuel loading, the introduction of weeds and unwanted flora following a fire could lead to higher competition between less desirable and native vegetation. In the absence of such a hot fire, nutrients would be retained on site.

5.C. Direct and Indirect Effects from Wildfire to Soils with No-Action and Proposed Action

Given the absence of fire since 1910 and the increased mortality levels in the Resource Area, the chance of a lethal wildfire occurring could be high if an ignition starts in an untreated area during extreme dry weather conditions. The proposed vegetation and fuels treatment in the Resource Area would not necessarily prevent lethal wildfires from occurring, but would increase the ability to suppress such a fire should the ignition occur in the treated areas. Vegetation and fuel treatments would reduce the chance that a wildfire could have as severe of an effect on the soils in treated areas as it could in untreated areas because there would be a reduction in the tons per acre of dead and dying fuels on those treated sites.

The occurrence of a high intensity wildfire would have a high potential for impacts to soils and soil productivity in severely burned areas, especially since the risk of soil erosion increases proportionally with fire intensity (Megahan 1990, p. 146; PF Doc. SOIL-R-37). Ashes that have burned white or a reddish color indicate that much of the organic carbon was oxidized and is no longer available to the soil. Other effects would include the loss of organics, loss of nutrients, and a reduction of water infiltration (Wells et al. 1979, p. 26; PF Doc. SOIL-R-57). Burns that create very high soil surface temperatures, particularly when soil moisture content is low, result in an almost complete loss of soil microbial populations, woody debris, and the protective duff and litter layer over mineral soil (Hungerford 1991, PF Doc. SOIL-R-26; Neary et al. 2005, PF Doc. SOIL-R-43). Nutrients stored in the organic layer (such as potassium and nitrogen) can also be lost or reduced through volatilization and as fly ash (DeBano 1991, pp. 152-153; PF Doc. SOIL-R-9; Amaranthus et. al. 1989, p. 48; PF Doc. SOIL-R-1).

Fire-induced soil hydrophobicity is presumed to be a primary cause of the observed post-fire increases in runoff and erosion from forested watersheds (Huffman et al. 2001). Though hydrophobicity is a naturally occurring phenomenon that can be found on the mineral soil surface, it is greatly amplified by increased burn severity (Doerr et al. 2000, PF Doc. SOIL-R-11; Huffman et al. 2001, PF Doc. SOIL-R-25; Neary et al. 2005, PF Doc. SOIL-R-43).

Soil hydrophobicity usually returns to pre-burn conditions in no more than six years (DeBano 1981, PF Doc. SOIL-R-10). Dyrness (1976, PF Doc. SOIL-R-13) and other studies have documented a much more rapid recovery of one to three years (Huffman et al. 2001, PF Doc. SOIL-R-25). The persistence of a hydrophobic layer will depend on the strength and extent of hydrophobic chemicals after burning and the many physical and biological factors that can aid in breakdown (DeBano 1981, PF Doc. SOIL-R-10). This variability means that post-fire impacts on watershed conditions are difficult to predict and to quantify.

If hydrophobic soils result from a severe, high temperature fire, moderate surface erosion would occur but the potential for mass failures would be low to moderate because of the Jo-Cat Resource Area's overall landtype characteristics; however, localized slope movement would be possible. The areas of primary risk after a severe burn include some of the steep drainages and tributaries in the headwaters. Following a severe fire, rehabilitation efforts to mitigate the fire's effects on erosion and sediment delivery would be performed as funding became available. If completed in a timely manner, rehabilitation work could negate most of the erosion concerns.

5.D. Direct and Indirect Effects to Soils under the Proposed Action

The direct and indirect effects of the Proposed Action on the soil resource were assessed based on their potential to create detrimental impacts and to affect soil productivity. To reduce the impacts to soils and soil productivity, the Proposed Action utilizes Soil and Conservation practices as described in the Soil and Water Conservation Practices (SWCP) Handbook FSH 2509.22 (PF Doc. SOIL-R-54). This handbook outlines Best Management Practices (BMPs) that protect the soil and water resources at a higher level than do existing Idaho Forest Practices rules and regulations, thereby incorporating all Idaho state standards.

The techniques and their effectiveness are documented in several publications (Seyedbagheri 1996, PF Doc. SOIL-R-51; Lynch and Corbett 1989 and 1990, PF Doc. SOIL-R-34 and PF Doc. SOIL-R-33; Idaho DEQ 2001, PF Doc. SOIL-R-28). The BMPs would have a high effectiveness in minimizing soil compaction and displacement, address seeding of disturbed areas, limit operations when soil moistures are high, and address conduct of logging. "Features Designed to Protect Soil and Site Productivity" would be implemented as part of the Proposed Action to ensure that activities are consistent with Forest and Regional guidelines for soil compaction, displacement, and nutrient retention (EA Part 3).

Direct and Indirect Effects of Harvest Treatments – The Proposed Action proposes commercial thinning on 119 acres, lodgepole removal and salvage on 103 acres and 30 acres respectively, and lodgepole overstory removal on 13 acres by utilizing a combination of helicopter (120 acres), skyline/cable (81 acres), and tractor yarding (64 acres) (Table SOIL-4). The post-harvest fuel treatments in activity areas consist of a combination of underburns (102 acres), jackpot burning (99 acres), lop and scatter (43 acres), and grapple piling (20 acres) (Table SOIL-4). Harvest activities would occur during the summer and early fall when the soil profile is dry unless suitable conditions occur outside of this period.

Table SOIL-4. Distribution of harvest treatments for the Proposed Action.

Treatment	Proposed Action
Helicopter	120
Skyline/Cable	81
Tractor	64
Total	**265**
Burn (Underburn and Jackpot Burning)	202
Grapple pile	20
Lop and Scatter	43
Total	**265**
Commercial Thinning	119
Lodgepole Removal	103
Lodgepole Salvage	30
Lodgepole Overstory Removal	13
Total	**265**

The proposed vegetation management activities have the potential to cause soil disturbances, such as compaction and displacement, by detrimentally affecting an estimated 15 acres (6 percent) from a long-term productive growing state (Table SOIL-2; PF SOIL-9). The disturbance is predicted to occur primarily in activity locations subjected to tractor logging. When considering all harvest activities within the 2,266 acre Resource Area, the total disturbance level for the Proposed Action is less than 1 percent. Results of disturbance calculations are included in the Project File (Doc. SOIL-7 and SOIL-9).

Soil compaction effects can last for decades but are not irreversible. Recovery processes vary greatly with soil texture and clay content and their interaction with climatic processes such as cycles of freezing-thawing and wetting-drying (Dykstra and Curran 2002, PF Doc. SOIL-R-12; Landsberg et al. 2003, PF Doc. SOIL-R-63). Persistence of compacted soil and, presumably, long-term consequences of compaction for tree growth depend on the severity of the initial compaction, the ability of species to cope with compacted soils, and rates of processes that decompact the soil (Cromack et al. 1979, PF SOIL-R-8; Froehlich and McNabb 1983, PF Doc. SOIL-R-23; Froehlich et al. 1985, PF Doc. SOIL-16). Soil displacement that mixes or removes the volcanic ash surface layer, however, reduces soil moisture holding capacity and associated productivity, which is essentially irreversible.

The logging proposed for this project consists primarily of helicopter and skyline/cable which, based on past monitoring, would result in an overall soil disturbance level of ~1 to 2 percent for each aerial activity area, excluding existing disturbances (Table SOIL-3). As previously discussed, tractor logging is a smaller yarding component for this project compared to aerial logging but can have the most detrimental effect to the soil resource. "Features Designed to Protect Soils and Site Productivity" in addition to BMPs would be used to decrease the effect of ground-based yarding systems (Section 2.B.2, EA-13). Based on monitored existing conditions and estimated potential impacts, proposed harvest Units 11c, 12b, and 5b should receive the highest attention levels to ensure that proper design features are used to meet required soil quality standards.

Table SOIL-2 displays harvest units and their assigned logging prescription for the Proposed Action. All of the 26 proposed harvest units would meet regional soil quality standards. Unit 11c and 12b could exceed the detrimental disturbance limit of 15 percent if some of the existing roads and trails from previous mining exploration are not incorporated into the skid trail layout. If feasible, the old dozer trail in Unit 11c would be utilized as a skid trail and would be re-contoured within the unit in conjunction with the temp road rehab in Unit 12 after harvest activities are completed.

There is a potential that Units 2, 5a, 11d, and 12c would be logged with mechanized felling equipment and yarded with either skyline or helicopter as originally planned. Potential detrimental disturbance levels would adjust to 12%, 10%, 11%, and 13% respectively (PF SOIL-9); mechanized felling equipment would be limited to slopes <45%; all three units are expected to remain below required soil quality standards.

All landings associated with skyline and ground-based harvest would be located along FS6006. Two helicopter landings are proposed for construction within the Resource Area along the system road (EA, Appendix C, Resource Area Map). These landings are designated as classified on the National Forest transportation system and are considered dedicated lands. The loss of soil productivity on these sites has an irretrievable effect and is included as a capital investment to the permanent transportation system. The landings will aid present and future management activities and provide potential aerial access for fire suppression. The two new helicopter landings, 1/3 and 1/2 acre in size, will account for approximately 1 acre of lands dedicated to the transportation system.

A third potential helicopter landing would utilize an existing small gravel turnout along FH9 near the mouth of Jo Gulch. This turnout is part of the State Highway transportation system. A fourth proposed service landing is located outside of the Resource Area on the Lolo National Forest in Montana. The service landing will utilize an existing road within a seed tree harvest unit and has been approved by the NEPA core team on the Plains Ranger District.

The logging slash from tree limbs, tops, and un-merchantable pieces would remain within all harvest units and be allowed to overwinter before being underburned or grapple piled. This would allow the foliage and branches to leach and recycle nutrients back into the soils' organic layer, primarily potassium. Slash in several units would also be lopped, scattered, and left without additional site preparation.

Determination of fire risk where slash is left untreated for prolonged periods of time will be made by the district fire management officer. Where fire risk is considered high, especially near the roadside in Unit 16 and the hand fuel treatment parcels, flexibility will be given to treat slash prior to it being left for 6 months.

Direct and Indirect Effects of Fuel Reduction Treatments - Treatments are planned adjacent to FH9 and would include 14 acres of hand-thinned fuels reduction. No mechanized equipment would enter the four roadside parcels, therefore, no disturbance from compaction, displacement, or rutting of soils would occur. Localized impacts to soils from pile burning may happen but are expected to be of short-term, especially if soil moisture levels are high. Flexibility will be given to timing of burn treatments due to the close proximity of the parcels to the adjacent highway.

Direct and Indirect Effects of Prescribed Burning and Slash Disposal - No measurable negative effects on soils are anticipated from post-harvest underburning or jackpot burning if soil moisture content is equal or above 25 percent when the burning occurs (Niehoff 1985 and 2002, PF Doc. SOIL-R-46 and SOIL-R-45). On the south facing units, the prescribed burns would have limited detrimental effects when executed in the spring. Burning under controlled conditions of high soil moisture reduces potential nutrient losses and the chance of creating hydrophobic soils that can lead to increased erosion, sedimentation, and debris flows (Ice 2003, PF Doc. SOIL-R-27; Neary et al. 2005, PF Doc. SOIL-R-43; Robichaud 2000, PF Doc. SOIL-R-50; Swanson 1981, PF Doc. SOIL-R-55).

When burn piles are large, nutrient losses from heat and volatilization could be considerable. It is recommended that burn piles be small and numerous rather than large and few. In some cases, burning of the slash piles may create localized patches of hydrophobic soils for as much as one to two years but the areas are generally not large or extensive enough to alter slope hydrologic responses or long-term soil productivity.

However, on an unpredictable site-specific basis, some drier sites may underburn at a severity level that removes all of the protective duff and litter layers, even under managed fire conditions. The duff and litter layer is important in protecting the soil horizons, both as reducing erosion potential and in maintaining soil moisture. Litter prevents the breakdown of soil aggregates and lessens the velocity of any overland flow, thereby decreasing the erosion potential (Beschta et al. 2004, PF Doc. SOIL-R-5). Project design features, such as increased tree retention, are expected to minimize this effect.

Design features also require piling machinery to utilize existing trails, operate on a slash mat whenever enough material is available, and stay on slopes less than ~40 percent to prevent soil disturbance in excess of guidelines. Only Unit 12b is scheduled for grapple piling. The unit would be entered from existing roads and skid trails below or within the proposed unit. Only areas that could be reasonably accessed would be treated and none of the trails would be excavated to facilitate access. The residual logging debris that would be lopped and scattered or that could not be grapple piled and burned would increase potential fire intensity and severity for a few years until snow could compress the debris and the fine organics would decompose.

Direct and Indirect Effects of Road Construction or Reconstruction - Under the Proposed Action, the construction or reconstruction of roads would have a detrimental effect to site productivity through compaction and displacement on approximately 3.6 miles (this includes ~2 miles of already existing road) or 13 acres (PF SOIL-5). When compared to the total 2,266 acre Resource Area, the disturbance is less than 1 percent. Where drainage crossings are upgraded, there would be short durations of increased sediment yields while in-stream work is accomplished. Classified roads designated for long term storage are considered capital investments with irretrievable disturbance and are part of the permanent transportation system. Refer to the Hydrology Specialist's report for additional information of road effects.

A 1.8 mile long existing roadbed (FS6006) currently provides access to the majority of the Cat Creek drainage. Reconstruction would consist of widening the roadbed from 12 to 14 feet by encroaching into the cutbank or dropping the grade along segments on ~0.4 miles of existing road. Additional work would also

include drainage upgrades and two truck turnouts. A gate would be installed near the junction of FS6006 with Highway 9 during the life of the timber sale to restrict access after hours.

New construction would also include the building of ~0.2 miles of a segment that links the formerly decommisioned portion of the FS6006 road as well as extending FS6006 for ~1.1 miles along the ridge between Jo and Cat Creeks (PF SOIL-5). There would be no drainage crossings associated with the new construction of the proposed roadway.

An area of high to moderate mass failure potential is identified below proposed helicopter Units 8 and 9 and within the drainage dividing 9a and 9b (SOIL – Map Appendix, Map 2). The slopes are steep above and below the road and seepage in the cut slope is present. Extensive pistol butting in the drainage also indicates creep, slope instability, and an increased potential for sediment delivery. A large amount of trees, primarily lodgepole, are already dying above the road prism and Units 9a and 9b would only salvage dead lodgepole pine trees by helicopter with no prescribed fire planned for this area. Change in canopy cover, soil water content, and associated seepage is therefore expected to be minimal and would add little effect to the already existing condition.

A total of ~0.3 miles (~1.1 acres) along the existing access road FS6006 are located on landtypes with a moderate subsoil erosion potential rating (SOIL – Map Appendix, Map 6). The area was reviewed during the field visit and does not show any degradation or concerns in regards to the proposed reconstruction of the existing road. French drain rock fords, dips, and waterbars will be incorporated to provide appropriate drainage and to reduce potential sediment movement along the route (See Specialist's Report on Transportation).

The Proposed Action has also scheduled ~0.35 miles of temporary road construction associated with Units 12a and 12c to move personnel, logs, and skyline equipment to complete harvest and fuels treatments (PF SOIL-5). The temporary road would be obliterated upon completion of use, thus helping the recovery of soil productivity, improving infiltration, and reducing hydrologic effects from road surface runoff (Switalski et al. 2004, PF Doc. SOIL-R-56).

An earth barrier would be installed behind the gate after purchaser operations are completed to provide for additional security while interior roadways would be waterbarred, seeded, and put into storage. At the conclusion of post sale activities, the link road would be recontoured and the talus slope near Unit 7 would be pulled to create an effective closure to any motorized use in the area.

Direct and Indirect Effects on Soil Productivity – The Resource Area is underlaid by several formations of metasedimentary Belt Supergroup rocks (Figure SOIL-1; Geology map, PF. Doc. SOIL-10). It is suspected that Belt Series rock can be potassium deficient, with certain formations being more deprived then others (Garrison-Johnston et al. 2004, PF. Doc. SOIL-R-19; Moore et a. 2004a and 2004b, PF Doc. SOIL-R-40 and SOIL-R-41). Because of the lower rates of weathered potassium, it is necessary that fine residue (foliage and branches) is allowed to overwinter on-site within each proposed harvest unit with the exception of treatment areas adjacent to FH 9. This allows potassium and other nutrients to leach out of the fine residue and back into the soil where it would be available for future uptake. Thinning harvest would reduce competition for soil nutrients resulting in higher nutrient concentrations available for uptake by the remaining stand vegetation.

As a direct effect, harvesting on all sites would remove within each tree bole about 14 percent of the potassium that is contained within a tree. This may have an indirect affect on some plants that remain in the stand. The commercial removal of lodgepole, Douglas-fir, and grand fir in association with leaving western larch would allow the release of stored foliar potassium as a beneficial nutrient for uptake by western larch (Garrison and Moore 1998; PF Doc. SOIL-R-17). Western larch is a more potassium-efficient species and would remain throughout the units where it already is a primary stand component. Measuring the effects of on-site productivity, however, cannot be done with certainty until more research information becomes available. At this time, management recommendations from the IFTNC are used as guidelines for maintaining sufficient potassium on a site.

Approximately 7 to 14 tons per acre of coarse woody debris would be left on Douglas-fir/grand fir sites. The majority of harvest units presently display satisfactory coarse woody debris levels though portions of Units 10, 11, and 12 along the ridge line could benefit from additional material. This would provide protection against soil erosion as well as a long-term source of nutrients and organic matter (Brown et al. 2003, PF Doc. SOIL-R-6; Graham et al. 1994, PF Doc. SOIL-R-21). However, removal of excess dead, dying, or disease infested trees reduces the potential for high-intensity uncontrolled fires that could otherwise sterilize the soil at high temperatures, cause highly erosive hydrophobic soil conditions, and reduce overall soil productivity (Pritchett and Fisher 1987, PF Doc. SOIL-R-49).

Indirect effects of soil nutrient loss include reduced growth and yield and increased susceptibility to pathogens, such as root disease (Garrison and Moore 1998, PF Doc. SOIL-17; Garrison-Johnston 2003, PF Doc. SOIL-20) and insect infestation (Garrison-Johnston 2003, PF Doc. SOIL-20; Garrison-Johnston et al. 2003, PF Doc. SOIL-18). Precipitation (Stark 1979, PF Doc. SOIL-53) and weathering of rocks will continue to make additional nutrients available on site. Annual needle, leaf, and twig fall, forbs, and shrub mortality will continue to recycle nutrients as well.

Effects of soil wood loss include altered processes of forest regeneration and growth, favoring species requiring lower soil moisture and nutrient levels. Additional effects could also include loss of habitat for species requiring soil wood as dens or substrate for invertebrates, bacteria, and fungi, which affect food availability for small rodents and their predators.

5.E. Cumulative Effects of Past, Ongoing, and Reasonably Foreseeable Activities

Cumulative effects include the combination of direct and indirect effects from past, present, and reasonably foreseeable activities. Direct, indirect, and cumulative effects on soils are measured within each activity area although adjacent land outside of the activity area is considered as well, primarily in regards to slope stability.

Existing roads and landings designated as classified on the National Forest transportation system are considered dedicated lands. The loss of soil productivity on these sites occurred when the roads and landings were constructed and are an irretrievable effect. These lands are not considered part of the cumulative effects because they are now included as a capital investment to the permanent transportation system.

Spatial Scale - the appropriate spatial scale, or geographic bounds, for cumulative effects analysis relates to an area that would be affected by the proposed action. This area is referred to as the cumulative effects analysis area and may vary between resources. The task of selecting the geographical boundaries involves several factors, including the scope of the project considered and the features of the land. Cumulative effects due to physical, chemical, and biological impacts generally increase with the scope of past and proposed activities (Reid and Hilton 1998, PF Doc. SOIL-64).

Since direct and indirect effects from soils are measured within "activity areas," the cumulative effects analysis area for the soils resource consists of the unit scale (activity areas where management activities are proposed) and the immediate surrounding area adjacent to the activity area.

Temporal Scale - the temporal scale is dependent on the specific issue being addressed with no one scale being appropriate for all issues. The analysis may need to evaluate the effects of proposed management over all seasons for several days, years, decades, or perhaps centuries. This is complicated by data constraints that require monitoring to detect change – though data are often insufficient to identify even trends or trajectories of change until the impact is large enough or has been occurring for some time. Furthermore, there is often a lag between some action and its observed effect. This analysis strives toward an integrated approach to soil processes and function to project future trends in response to proposed management options to the best of abilities.

Generally, detrimental effects on soils are not permanent and depend primarily on soil texture, parent material, aspect, and level of disturbance, i.e. compaction. Recovery time is on the average 30 to 70 years as second growth timber becomes established around disturbed areas (Dykstra and Curran 2002, PF Doc. SOIL-R-12; and Froehlich et al. 1983 and 1985, PF Doc. SOIL-R-69 and SOIL-R-16). However, soil displacement

that mixes or moves the volcanic ash surface layer and reduces soil moisture holding capacity and productivity is essentially irreversible.

Cumulative Effects of Timber Harvest – Limited past timber harvest activity has occurred in the Resource Area, which is likely explained by the loss of the timber resource during the 1910 fires. Some salvage effort may have occurred after the fire but no records or evidence is available. Besides harvest associated with road and trail building from mining exploration several decades ago, no commercial logging activities beyond what is currently proposed has influenced soil productivity in the the analysis area. There are no other foreseeable activities planned in the Jo-Cat Resource Area.

Several private land parcels are also present within the Jo-Cat Resource Area and logging activities have taken place along Prichard Creek and FH9 in the past (EA, Appendix A Table A-1). Activities on non-Forest Service land that detrimentally disturb soils, impair soil productivity, and increase soil water content are site specific and have no additional effects on the analysis area.

Outside of the analysis area, approximately 5 miles to the west, the District is proposing fuel reduction and stand improvement activities near the communities of Prichard, Eagle, and Murray (EA, Appendix A Table A-1). This proposal, identified as the Prichard-Murray HFRA, considers prescribed burning, construction of fuel breaks, and timber removal to decrease the amount of hazardous fuel in the area and to improve growing conditions of remaining trees. No cumulative effects on soils are expected to arise from this proposed project in regards to the Jo-Cat timber sale.

Cumulative Effects of Mining - The majority of previous disturbances in the Jo-Cat Resource Area are associated with mining activities that have occurred in the 1960s and 1970s (EA, Appendix A Table A-2). Several scattered dozer trails and associated excavated test pits are present but no further development occurred. The soil disturbance accounts for approximately ~3.3 acres of localized compaction and displacement scattered within the activity areas and was factored into the existing condition (PF SOIL-5 and SOIL-9).

Cumulative Effects of Roads – All developed roads built in the past for thoroughfare (FH9) and mining, or roads that are proposed for the Jo-Cat harvest activities, have a lasting effect on soil productivity due to compaction and displacement. In the mid 1990s, reconstruction of FH9 created a 2 lane highway that removed approximately 24 acres of timber with the right-of-way clearing on National Forest lands. This resulted in a considerable amount of compaction and displacement with running surface and large cut and fill slopes through the southern portion of the resource area.

The main access road into the Resource Area was built in the 1960s for mining exploration and has been closed to motorized access. Several smaller spurs and trails are present and are naturally recovering at various levels. Proposed road construction may increase sediment movement from road surface runoff though road locations are high on the slope, are at a relatively low gradient, and provide for sufficient buffer zones. Road maintenance includes blading and brushing and typically improves drainage and decreases erosion from water channeling down the road surface. For additional information on roads, please see Specialist's Report on Aquatics.

Cumulative Effects from Recreation – Disturbance from general motorized use and recreational access has been limited since road access to the Cat Creek drainage has been closed. Trail #7 traverses the headwaters of Cat Creek and provides hikers and occasional motorcycle users access. No changes in the existing recreation profile are anticipated. Other recreational activities, such as the gathering of miscellaneous forest products and hunting, is carried out on foot and has no additional effects on the activity areas.

Cumulative Effects of Fire – Fires have been infrequent with the stand replacing fires of 1910 affecting much of the proposed Resource Area. The most recent fire (likely human caused) within the Resource Area occurred in the early 1970s and burned around an already existing natural opening on the slopes below proposed Unit 12 and on private ownership. The affected areas are recovering and no effects to soils remain.

Cumulative Effects of Fire Suppression – Fire suppression has been limited since the 1910 fire burned over much of the Resource Area. The proposed harvest, however, would aid future suppression activties by

reducing current levels of infected dead and dying trees, thereby reducing the potential for larger scale fires. The benefits of fires with lower intensity and severity would include a reduced potential of excessive soil heating and sterilization as well as hydrophobic conditions that tend to increase sediment movement, flooding, and possible slope instability.

On small fires, disturbance from fire suppression activities is usually limited to hand tools; most hand fire-line construction has only minor (insignificant) impacts to the soil resource. During fire suppression, closed roads may be reopened for access and incorporated as fire line. As part of the post-fire work, the areas of disturbance are rehabilitated and the roads returned to their previous condition in most cases.

Cumulative Effects of Noxious Weeds - Noxious weed monitoring and treatment would occur as needed and would follow guidelines established in the Coeur d'Alene Noxious Weeds EIS (USDA 2000, PF Doc. CR-029). Effects to soil resources were analyzed in the document and its adaptive strategy. No additional effects to soils beyond what was analyzed for and disclosed in the EIS are expected to occur.

6. Consistency with Forest Policy and Legal Mandates

The Proposed Action would comply with Forest Plan standards (PF Doc. CR-002, pages II-32 and II-33) and Regional Soil Quality Standards (USDA 1999, PF Doc. SOIL-R-58) related to detrimentally disturbed soils.

Forest Plan Soil Standard #1

Soil disturbing management practices will strive to maintain at least 80 percent of the activity area in a condition of acceptable productivity potential for trees and other managed vegetation. Unacceptable productivity potential exists when soil has been detrimentally compacted, displaced, puddled, or severely burned as determined in the project analysis.

The Proposed Action would comply with this standard; soil disturbing management practices would not exceed 20 percent detrimental conditions and would maintain at least 80 percent of each activity area in a condition of acceptable productivity potential for trees and other managed vegetation (PF Doc. SOIL-8).

Forest Plan Soil Standard #2

Projects should strive to maintain sufficient large woody debris to maintain site productivity. Large woody debris is essential for maintenance of sufficient micro-organism populations.

The Proposed Action would comply with this standard; large woody debris retention would follow the research guidelines of Graham et al. (1994; PF Doc. SOIL-R-21) to ensure the maintenance of site productivity.

Forest Plan Soil Standard #3

In the event of whole tree logging, provision for maintenance of sufficient nutrient capital should be made in the project analysis.

There is no whole-tree logging proposed with the Proposed Action.

Region 1 Soil Quality Standards

Detrimental disturbance would not exceed the recommended 15 percent in any individual activity area.

Organic matter layer thickness would be retained as appropriate for local conditions.

Large woody debris would be maintained at recommended volumes (Graham et al. 1994, PF Doc. SOIL-R-21) in each proposed activity area.

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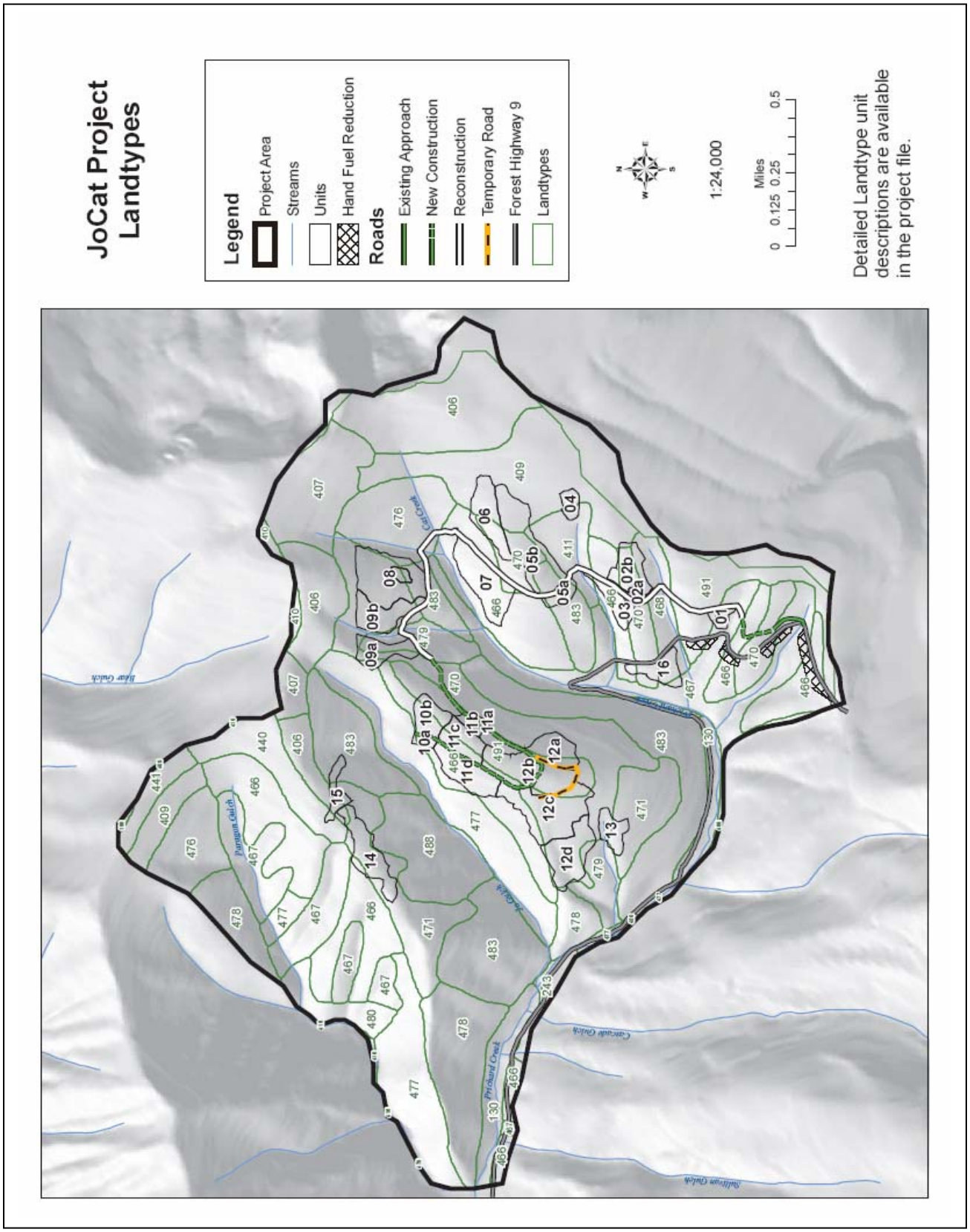
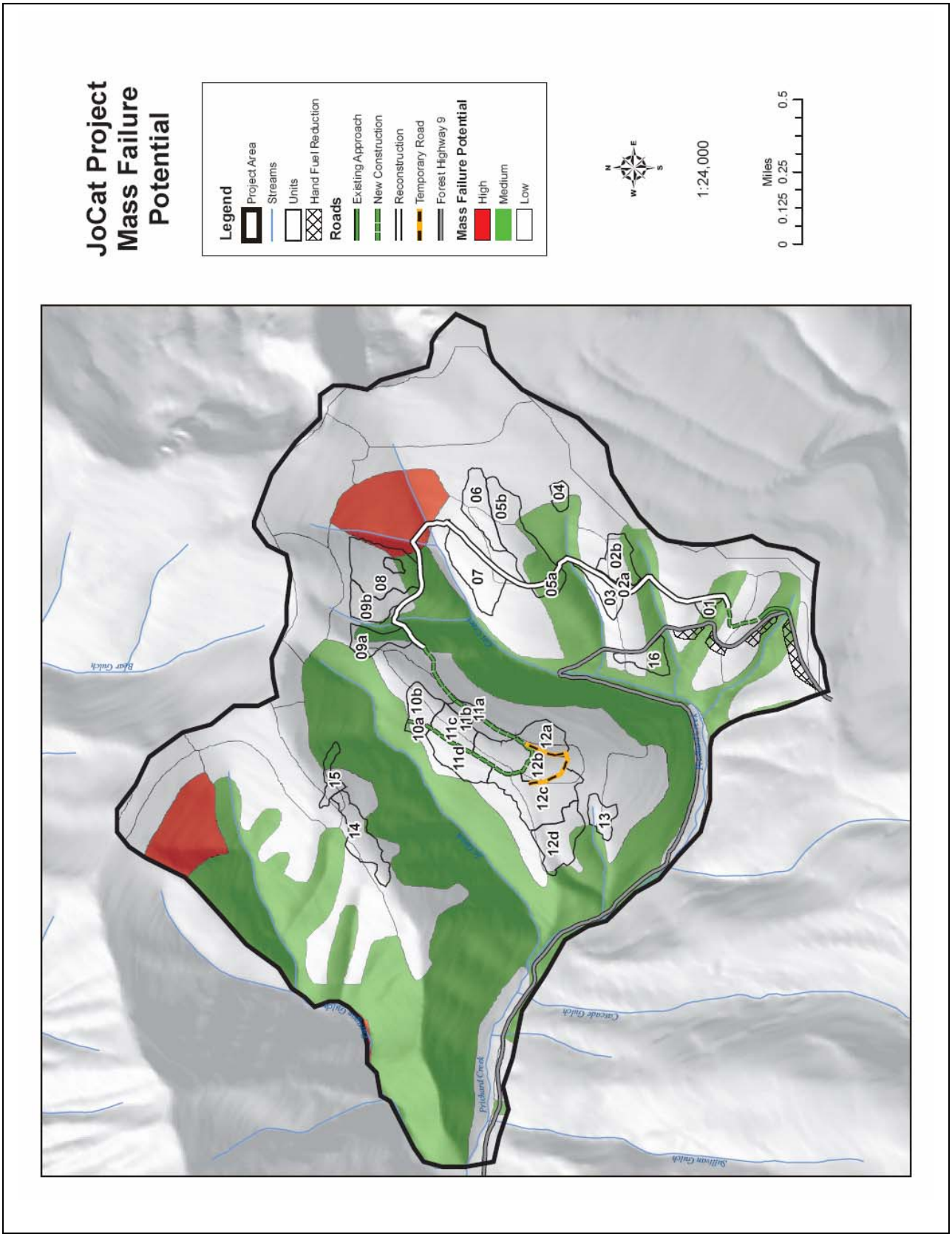
SOILS - Map Appendix A

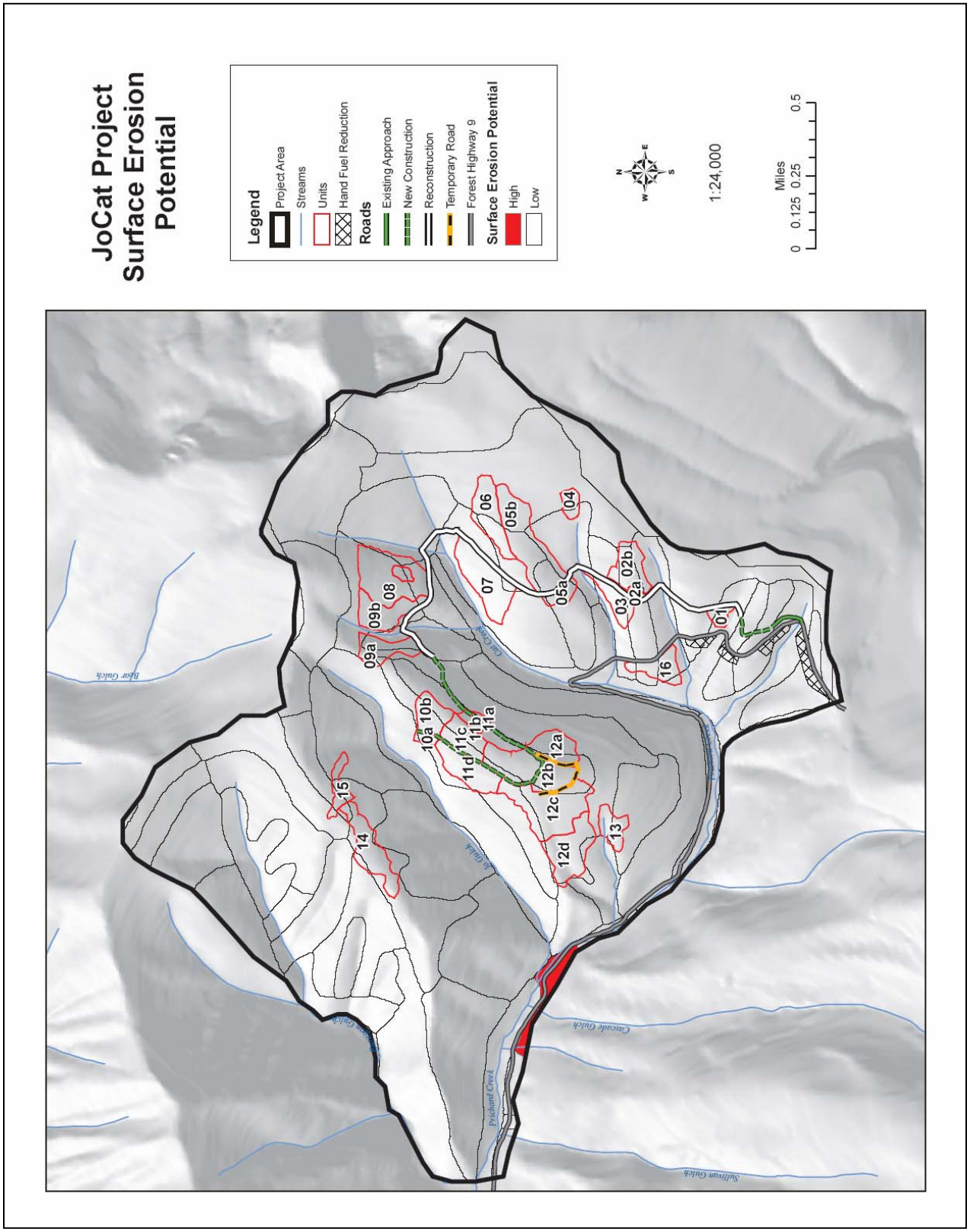
SOIL Map-1: Soil Landtypes. For Detailed Landtype Descriptions Refer to PF Doc. SOIL-2.



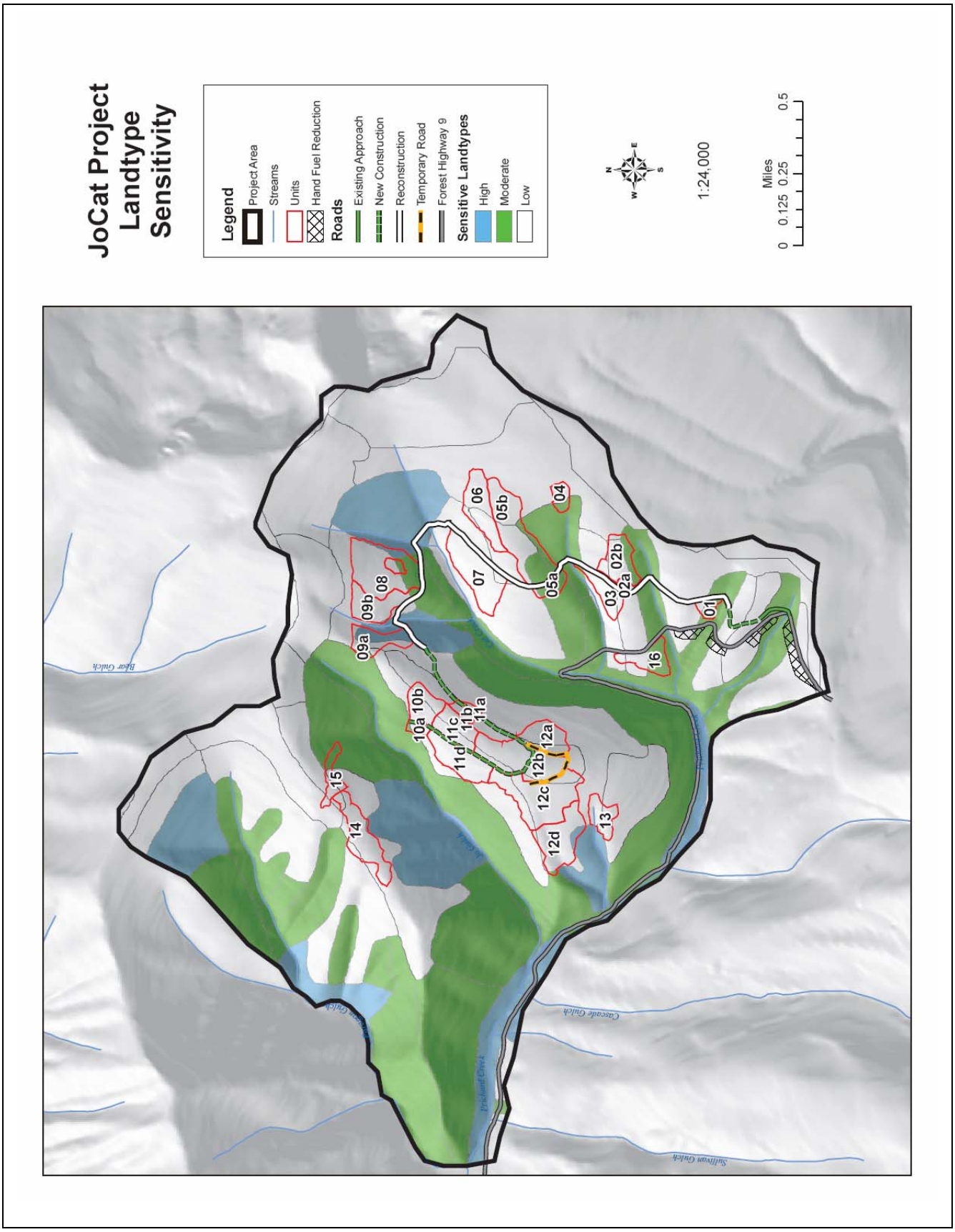
SOIL Map-2: Mass Failure Potential.



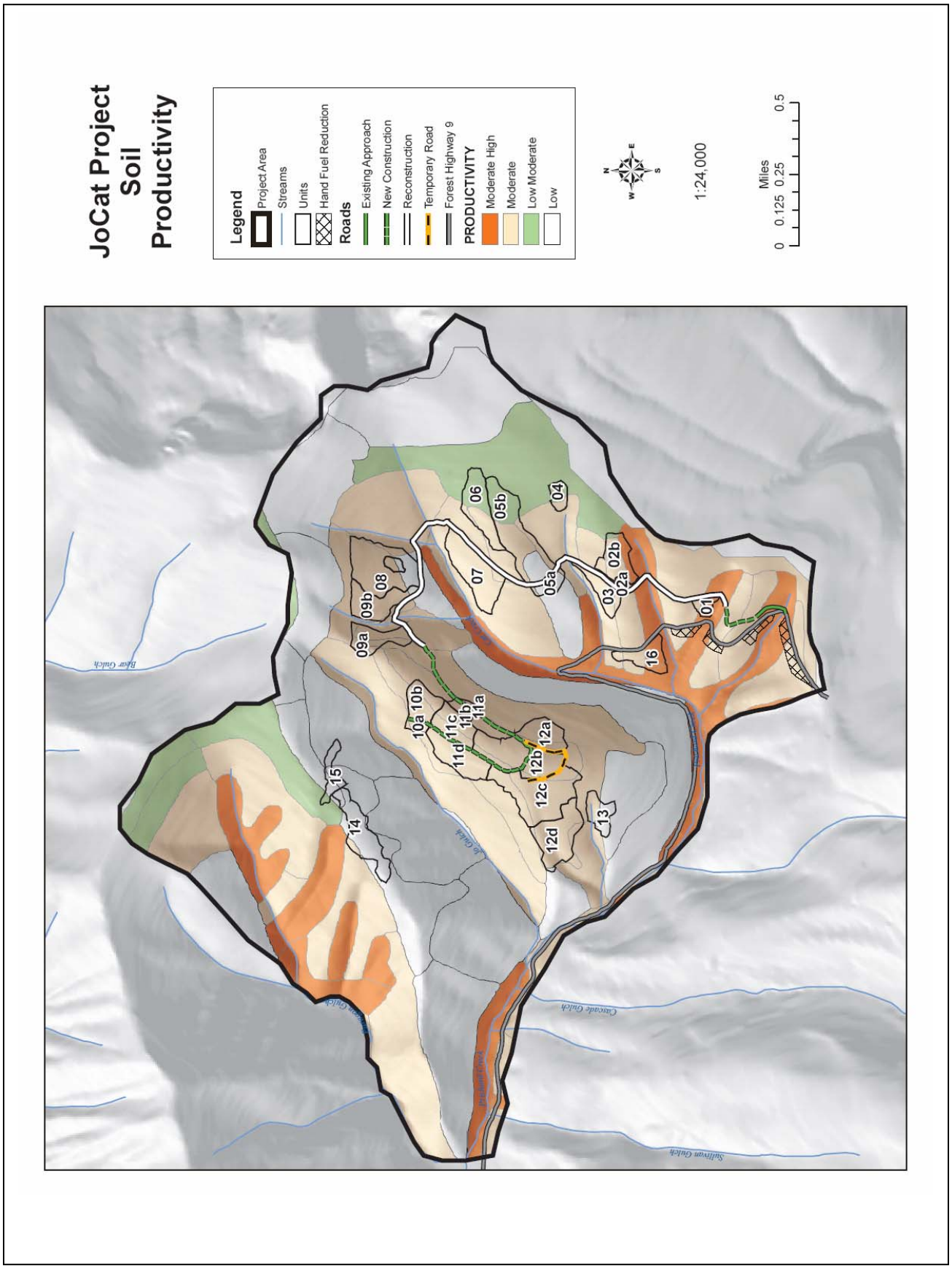
SOIL Map-3: Surface Erosion Potential.



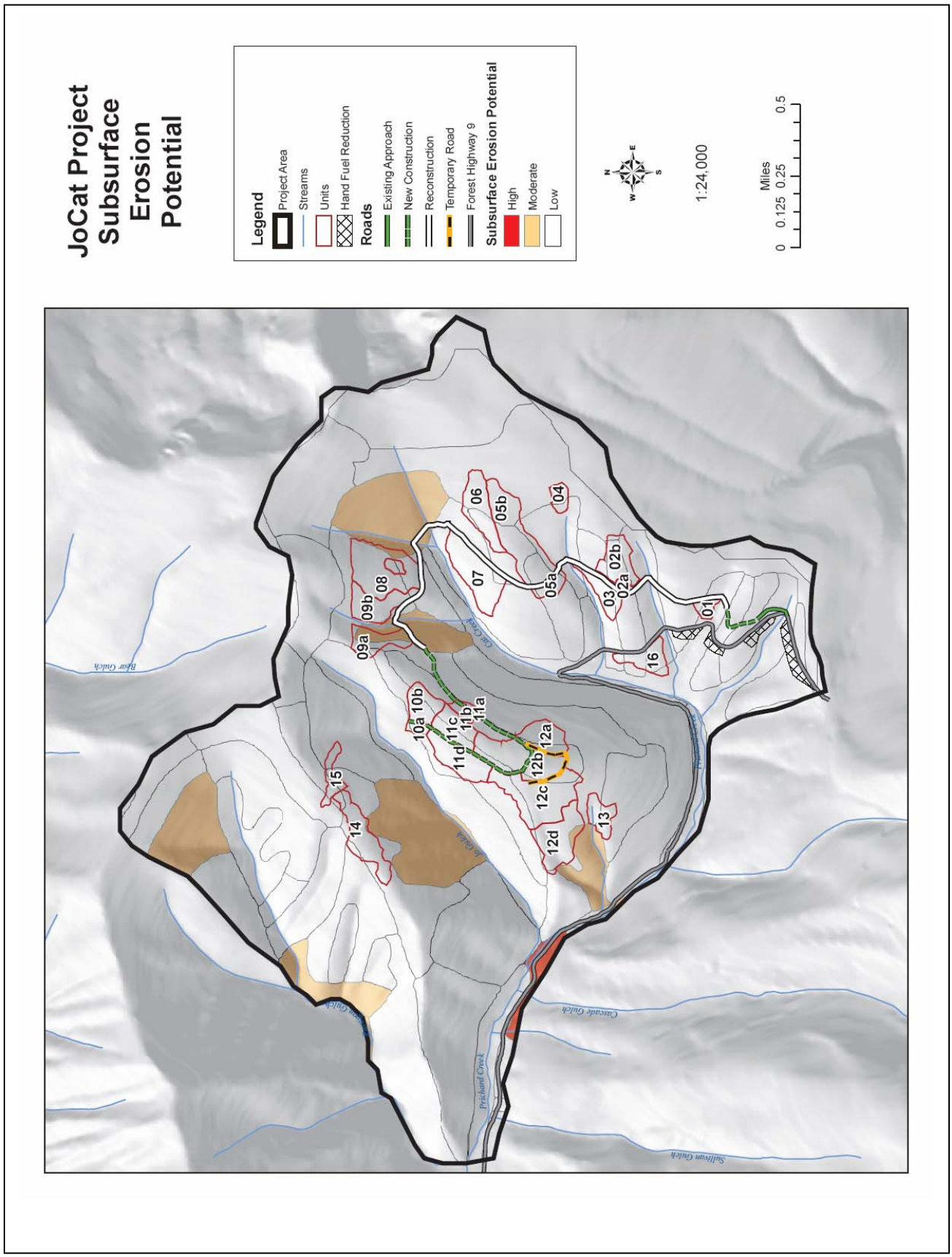
SOIL Map-4: Landtype Sensitivity.



SOIL Map-5: Soil Productivity Potential.



SOIL Map-6: Subsurface Erosion Potential.



Specialist's Report on Wildlife in the Jo-Cat Resource Area

Prepared by Gail Worden
Project Wildlife Biologist

February 2007

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SPECIALIST'S REPORT ON WILDLIFE IN THE JO-CAT RESOURCE AREA

1. Regulatory Framework for Wildlife

Although a variety of sources are used to assess wildlife species and habitat (including historic records, current databases, large scale assessments, scientific studies and management recommendations), the regulatory framework providing direction for the protection and management of wildlife and habitat comes from the following principle sources:

- *Endangered species Act of 1973 (as amended)*: Section 7 of the Endangered species Act (ESA) directs that actions authorized, funded, or carried out by federal agencies do not jeopardize the continued existence of any threatened or endangered species, or result in the adverse modification of habitat critical to these species.
- *National Forest Management Act of 1976:* The National Forest Management Act (NFMA) provides for balanced consideration of all resources. It requires the Forest Service to plan for a diversity of plant and animal communities. Under its regulations the Forest Service is to manage for viable populations of existing and desired species, and to maintain and improve habitat of management indicator species.
- *Forest Plan:* The IPNF Forest Plan (1987), in compliance with NFMA, establishes Forest-wide management direction, goals, objectives, standards and guidelines for the management and protection of wildlife habitat and species, including old-growth habitat, management indicator species, sensitive species, and threatened and endangered species. Sensitive species are designated by each Region of the Forest Service as according to the occurrence of the species and its habitat within Regional boundaries. Region 1 sensitive species are evaluated in this document.
- *Migratory Bird Executive Order:* The Migratory Bird Executive Order (2001) describes the responsibilities of federal agencies to protect migratory bird species through a Memorandum of Understanding (MOU) with the Fish and Wildlife Service. The order directs federal agencies to consider these species in agency plans, and to evaluate the effects of proposed actions on migratory bird populations and their habitat, with emphasis on species of concern (PF Doc. WL-R67).

2. Methodology Used in the Wildlife Analysis

2.A. Introduction

USDA Forest Service policy (Forest Service Manual 2670.32) requires a documented review of Forest Service programs or activities in sufficient detail to determine how an action may affect threatened, endangered, candidate, or sensitive species. This environmental assessment serves as the primary **biological evaluation (BE)** for sensitive wildlife species. Effects to wildlife species listed under the Endangered Species Act are addressed separately in a **biological assessment (BA).** Much of the wildlife analysis is tiered to the following documents and information, which provide the primary direction and methods used to develop the analysis for potential effects on wildlife**:**

- *Integrated Scientific Assessment for Ecosystem Management in the Interior Columbia Basin*
- *Toward an Ecosystem Approach: An Assessment of the Coeur d'Alene River Basin*
- *The Road Analysis Process and the District Travel Plan*
- *Recorded species observations*
- *Suitable and potential habitat models*
- *Applicable scientific research, literature, management recommendations and conservation strategies*

The wildlife analysis is done at different levels (ranging from coarse filter to fine filter) as appropriate to address issues and concerns relative to each species. According to CEQ regulations, the level of analysis should be commensurate with the importance of the impact, the risk associated with the project, the species involved, and the current level of knowledge (CEQ 1502.15). Species for which it has been determined there would be no measurable effects are not analyzed in detail.

Direct, indirect, and cumulative effects are disclosed by alternative and by species. Direct effects are caused by the action and occur at the same time and place. Indirect effects are caused by the action but occur later in time, yet are still reasonably foreseeable to occur (40 CEQ 1508.8). CEQ regulations (40 CFR 1608.7) define cumulative effects as impacts that result from the incremental impact of an action when added to other past, present and reasonably foreseeable actions, regardless of what agency or person undertakes such actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time. Refer to the EA (Appendix A) for a list of ongoing and reasonably foreseeable projects.

For each wildlife species analyzed, the cumulative effects analysis area has been identified based on the species' or guilds' relative home range size in relation to available habitat, topographic features that affect how species move and utilize their home range (such as watershed boundaries), and boundaries that represent the furthest extent of effects. Maps depicting wildlife habitat by species are provided in the project files (PF Docs. WL-4, WL-12, WL-13, WL-14, WL-17, WL-18, WL-19, WL-22, WL-23 and WL-31).

Based on habitat relationships, appropriate indicators of habitat with a potential to be impacted by the proposed action have been measured. Queries of the Timber Stand Management Records System database (TSMRS) were used to identify capable and suitable habitat within each wildlife analysis area (PF Doc. WL-26). Changes in habitat for each relevant species are disclosed with a discussion of the effects on species. Queries have been designed to best utilize the information stored within the TSMRS database (PF Doc. WL-26). Field surveys by the wildlife biologist were conducted to verify the habitat queried in the TSMRS database (PF Doc. WL-25).

2.B. HSI Habitat Model Validation

The IPNF has developed Forest-wide wildlife habitat capability/suitability models for several Threatened, Sensitive, and Management Indicator wildlife species or species guilds (Canada lynx, fisher/marten, Northern goshawk, black-backed woodpecker, pileated woodpecker, and elk). Information used for suitable habitat included: habitat type, size class, past activities, forest type, elevation, basal area, and number of trees above a specific size class (PF Doc. WL-26). Information used varies with each species based on the species particular needs. Vegetation data was validated to insure the stand characteristics queried were accurate (PF Doc. VEG-4).

In addition, Forest Service personnel conducted site visits of representative suitable and capable habitats for these species, with emphasis placed on stands modeled as "currently suitable." The Jo-Cat Resource Area provides suitable habitat for lynx, black-backed woodpecker, marten and elk. Most proposed treatments units were visited by the wildlife biologist to validate habitat. All treatment areas were validated as low quality forage habitat (PF Doc. WL- 25). A small number of proposed treatment areas were not visited if they were determined to be obviously either capable or unsuitable for modeled species based upon field notes and unit descriptions provide by the project team silviculturalist or verification by aerial photo interpretation.

Capable habitat is determined by habitat type and topographic factors. Since these do not change over time, the data offers reliable information on habitat capability. Data used in wildlife habitat suitability models was validated for each species, as follows:

Canada Lynx: Suitable lynx habitat was determined using the Forest-wide Habitat Suitability Index (HSI) model (PF Doc. WL-3, WL-4). Allocated old growth within the Jo-Cat Resource area may provide lynx denning habitat. Low quality forage habitat was located on National Forest System land. Low quality forage habitat is used primarily for travel habitat. A small amount of high quality forage habitat was identified in the Jo-Cat Resource Area (PF Doc. WL-4). Field validation of these habitats was done by the wildlife biologist

(PF Doc. WL-25). Field reviews found low quality forage habitat that, due to fires in the early 1900s, lacked trees and downed wood of sufficient size to provide lynx denning habitat. The area also lacked stands between 25 and 40 years old that could provide habitat for the snowshoe hare; therefore there was little forage available for the lynx.

Northern Goshawk: Northern goshawk nesting habitat was initially determined using the Forest-wide HSI model (PF Doc. WL-22). No suitable habitat was identified for the Northern goshawk within the project area. There is a small amount of future goshawk habitat that lies outside proposed harvest units. Much of the validation for the lack of goshawk habitat was done using aerial photography, surveys by wildlife biologist and forester's reconnaissance notes. Fires around the turn of the century have resulted in a lack of large trees (goshawk habitat) except for some scattered large relics in the Jo-Cat Resource Area.

Marten: Within the Jo-Cat Resource Area, low to moderate quality marten habitat was identified by using vegetative response units (VRUs) based on land types. This low quality habitat is provided by cool, moist forest habitat types with an average diameter tree size of nine inches (PF Doc. WL-27). There is some high quality marten habitat within the Resource Area all located along the Idaho-Montana border (PF Doc. WL-23).

Pileated Woodpecker: Pileated woodpecker habitat was assessed based on stands with an average live tree diameter of "equal or greater than 14-inch diameter" in Douglas-fir, larch or ponderosa pine (PF Doc. WL-31). Based on this information and knowledge about the stands, a prediction can be made that adequate snags would be found within these stands (PF Doc. WL-32). Information used also includes forest type (PF Doc. WL-32), and presence of recruitment snags where diseases, bark beetles or structural damage to trees is known to occur (PF Doc. WL-12). The delineation of this habitat was field verified by the wildlife biologist (PF Doc. WL-25).

Black-backed Woodpecker: Aerial insect and disease detection maps were used to locate forage habitat for the black-backed woodpecker (PF Doc. WL-12). This forage habitat was validated by field reviews (PF Doc. VEG-25).

Elk: The elk model relies on security acres, road density, cover/forage ratio, and distance to cover. Components of the model were verified using information provided by the transportation specialist regarding road densities and condition (PF Doc. WL-20). Security was calculated using GIS data (PF Doc. WL-19). This model does not rely on TSMRS data. The project wildlife biologist verified road and security status.

2.C. Wildlife Conservation Assessments and Strategies

Conservation assessments and strategies are written to assist federal agencies in managing habitat for Threatened and Endangered species and other species of concern. They are most often joint efforts between participating agencies to increase awareness and knowledge of the species by describing life history strategies and habitat requirements. Conservation strategies usually present management recommendations and guidelines to assist in maintaining suitable habitat. This information, in conjunction with scientific literature, is used to assist in planning and in developing project design features that minimize or avoid effects to wildlife and wildlife habitat.

The *Pacific Bald Eagle Recovery Plan*, the *Northern Rocky Mountain Wolf Recovery Plan*, the *Recovery Plan for Woodland Caribou in the Selkirk Mountains* and the *Grizzly Bear Recovery Plan* provide requirements for habitat management for these species. The Jo-Cat Resource Area is not within a recovery area for the Threatened grizzly bear or the Endangered woodland caribou. In February of 2000, a *Lynx Conservation Assessment and Strategy* was released in an effort initiated by the Fish and Wildlife Service and in cooperation with the Forest Service and Bureau of Land Management. The purpose of the Strategy is to provide a consistent and effective approach to avoid or reduce adverse effects resulting from management activities to the species or its habitat. The assessment is based partly on the delineation of Lynx Analysis Units (LAUs) where habitat is managed to provide for lynx denning and foraging habitat.

2.D. Viability

The Northern Region, USDA Forest Service has developed a conservation assessment of the northern goshawk, black-backed woodpecker, flammulated owl and pileated woodpecker in the Northern Region (Samson, 2005; PF Doc. WL-R139). The assessment is intended to satisfy the statutory requirement to provide for diversity of native animal communities based on suitability and capability of the specific land area to meet overall multiple-use objectives as required by the National Forest Management Act (16 U.S.C. 1604 (g)(3)(B)).

For each species, the conservation assessment includes:

1. *A brief overview of ecology, behavior and habitat use*
2. *A brief overview of habitat use in the Northern Region*
3. *Estimates of well distributed habitat and habitat amount by National Forest*
4. *Evaluation of short-term viability*
5. *Evaluation of long-term viability and ecosystem sustainability*

The conservation assessment was based on a principle-based approach to population viability (PVA). The methods and background for this principle-based approach use point observation data and vegetation inventory based on Forest Inventory and Analysis (FIA) to build wildlife habitat relationship models to analyze short-term viability. The conservation assessment included consideration of peer-reviewed literature, non-peer reviewed publications, research reports, and data accumulated by the Forest Service. Where possible, the peer-reviewed professional society literature is emphasized in that it is the accepted standard in science (Samson, 2005; p. 4, PF Doc. WL-R139).

In summary, the conservation assessment shows that short-term viability (less than 100 years) is not an issue in Region 1 for the goshawk, black-backed woodpecker, flammulated owl or pileated woodpecker. Because of habitats trending away from historic range, long-term viability (more than 100 years) is low. An explanation of the reasons viability would be maintained in the Northern Region for the next 100 years is provided in the following table.

Table WL-1. Reasons why viability would be maintained in the Northern Region for the next 100 years, by species (from Samson, 2005; PF Doc. WL-R139, at pages noted)

Species	Reasons Viability is Maintained
Northern goshawk *(Samson, 2005; pages 38-39)*	• No scientific evidence exists that the northern goshawk is decreasing in numbers. • Increases in the extent and connectivity of forested habitat have occurred since European settlement. • Well-distributed and abundant northern goshawk habitat exists on today's landscape. • Level of timber harvest is insignificant (in 2004, harvest occurred on 0.0009 percent of the forested landscape in the Northern Region). • The barred owl represents a significant threat to the northern goshawk. Habitat management (e.g., increasing the connectivity) should not favor the barred owl. • Suppression of natural ecological processes has increased and continues to increase amounts of northern goshawk habitat.
Black-backed woodpecker *(Samson, 2005; pages 51-52)*	• No scientific evidence exists that the black-backed woodpecker is decreasing in numbers. • Increases in the extent and connectivity of forested habitat have occurred since European settlement. • Amounts of small and mid-size trees have increased since European settlement. • Well-distributed and abundant black-backed woodpecker habitat exists on today's landscape. • Level of salvage timber harvest or overall timber harvest of forested landscapes in the Northern Region is insignificant.
Flammulated Owl *(Samson, 2005; pages 62-63)*	• No scientific evidence exists that the flammulated owl is decreasing in numbers. • Increases in the extent and connectivity of forested habitat have occurred since European settlement. • Well-distributed and abundant flammulated owl habitat exists on today's landscape. • Level of timber harvest in the Northern Region is insignificant. The barred owl represents a significant threat to the flammulated owl. Habitat management (e.g., increasing the connectivity) should not favor the barred owl.
Pileated Woodpecker *(Samson, 2005; pages 68-69)*	• No scientific evidence exists that the pileated woodpecker is decreasing in numbers. • Increases in the extent and connectivity of forested habitat have occurred since European settlement. • Well-distributed and abundant pileated woodpecker habitat exists on today's landscape. • Level of timber harvest in the Northern Region is insignificant.

For more detailed information on methodology, peer-reviewed background literature, and statistical analysis in the conservation assessment refer to Wildlife PF Doc. R-139.

2.E. Geographic Scope of the Wildlife Analysis

The geographic scope of analysis varies by species according to the appropriate methodology and level of analysis needed to determine potential effects. A number of variables define the level of analysis for each species including, but not limited to, species occurrence, presence of suitable or potential habitat, existing condition, the potential for impacts and the difference in effects between alternatives. Generally, the geographic scope is the Jo-Cat Resource Area; however, due to species and habitat distribution, home range size, linkages between suitable habitats or between winter and summer range, distances of dispersal, the potential for immigration and emigration into a population, and other variables, the analysis may include an area as large as northern Idaho or an area smaller than the Jo-Cat Resource Area.

2.F. Wildlife Species Relevancy Screen

Wildlife species listed under the Endangered Species Act, Sensitive Species, Management Indicator Species, and Species of Special Concern known to occur on the IPNF were screened for their relevancy to the Coeur d'Alene River Basin and to the Jo-Cat Resource Area by reviewing sighting records, planning documents, habitat suitability models and other sources such as historic records and scientific literature. Relevancy is determined based on whether there is evidence of species or habitat present within the affected area, and whether any such species or habitat could potentially be affected by the proposed activities. Some habitat and species may occur within the Coeur d'Alene River Basin yet not be applicable to the Jo-Cat Resource Area or surrounding areas. A coarse filter screen was applied at the Coeur d'Alene River Basin scale, and then a finer screen was used to assess species relevancy at the watershed scale.

The analysis is commensurate with the importance of the impact (40 CEQ 1502.15), the risk associated with the project, the species affected, and the level of knowledge already on hand (USDA Forest Service, 1992; PF Doc. WL-R65). Some wildlife species or their habitat are present in the analysis area, but would not be measurably affected because they would not be impacted by the proposed activities, the impacts would not be sufficient to influence their use or occurrence, or their needs can be adequately addressed through design of the project. No further discussion or analysis is necessary for those species and/or suitable habitat that are not found within the resource area or for those which would not measurably be affected (see Table WL-1). These species and the rationale for dismissing them from further consideration are described in the Project Files (Appendix WL-A).

Wildlife Species Considered

The US Fish & Wildlife Service provided an updated list of **Threatened, Endangered & Candidate Species** that may occur in the IPNFs on January 22, 2007 (No. 1-9-07-SP-0054; PF Doc. WL-R105). These species, their listing status and the probability that they occur in the Resource Area are displayed in Table WL-1.

Sensitive species are designated by each Region of the Forest Service based upon regional variations in species and habitat occurrence; the probability of each R1 Sensitive species occurring in the Jo-Cat Resource Area is indicated in Table WL-1. The analysis for Sensitive species serves as the primary biological evaluation for this project. These species have been addressed in a coarse filter screen for presence or absence of habitat within the Jo-Cat Resource Area and the Coeur d'Alene Ranger District in Wildlife PF Doc. WL-1. Species that have a low to high likelihood of appearance within the resource area are addressed in analysis of species with similar needs. Other species' needs are addressed by Federal standards (addressed in Part 4 of this report).

The Forest Plan (Appendix L-4; PF Doc. CR-002) identified elk and moose as **Big-game Management Indicator Species** because they are a general forest species easily affected by management activities, particularly access management. Moose frequently use the bottomlands associated with the North Fork Coeur d'Alene River, but since elk are the primary big-game species using the area, this analysis focuses on elk. The effect of management activities on elk is one of the main issues the Forest Plan (IPNF, 1987; PF Doc. CR-001) identified through public involvement. Elk are a priority big-game species for Idaho Fish and Game, and elk hunting is a significant economic factor in Northern Idaho.

The Forest Plan designated three **Old-growth Management Indicator Species** for the monitoring and management of old growth or late successional conditions: pine marten, pileated woodpecker, and northern goshawk (Table WL-1). The status of these species indicates the ability of forest structure to support wildlife populations that inhabit older forests and use large diameter trees, snags and down wood for nesting and/or foraging. Old growth is discussed in more detail in the Specialist's Report on Forest Vegetation. The discussion of old growth habitats in this chapter tiers to that information. Goshawks have been placed on the list of sensitive species for Region 1 and are addressed under the sensitive species discussion.

Nongame species are those not managed by Idaho Fish & Game as a hunted species. They include many species of furbearers as well as raptors, amphibians, rodents and songbirds. Nongame species are often

important prey for other furbearers and large predators like wolves, lynx and bears. Changes in vegetation composition and structure are used to assess effects to non-game species.

Neotropical (migrant) birds are those that breed and nest in one area and migrate to another, usually a long distance away, to reside for the winter months. These birds are impacted in a variety of ways including loss of habitat due to agriculture, logging, and urbanization. The Upper Columbia Basin Draft Environmental Impact Statement (USDA et al., 1994; PF Doc. WL-R55) states that breeding bird surveys on National Forests found an increase of ten species of neotropical birds and a decrease of five species. Often the increases in populations are of less desirable species such as the brown-headed cowbird (Collopy and Smith 1995 in Upper Columbia River Basin Draft Environmental Impact Statement; PF Doc. WL-R10). Changes in habitat are discussed in a qualitative manner. It must be noted that there are many species of neotropical migrant birds for which there is very little population or habitat data available, and changes that may benefit one species may, at the same time, have undesirable effects on other species.

Probability of Wildlife Occurrence

The probability of a specific species occurring in the Resource Area is based on records of species sightings, presence of suitable habitat and the potential of the area under consideration to provide suitable habitat in the future.

Recorded observations come from several sources, including IPNF records, State Conservation Data Center information, Audubon Society, and other organizations that collect recorded observations or conduct surveys for wildlife species in the area. For species considered in this analysis, modeling methods for suitable and potential habitat, field verification, current knowledge of species distribution, scientific studies and applicable management recommendations are discussed in detail. Refer to Appendix WL-A, for specific justification of species not addressed further.

No probability of occurrence
No suitable habitat occurs in the area, and/or the area is outside the known range of the species, and there are no recorded observations in the area.

Low probability of occurrence
Marginally suitable habitat is limited, isolated, and there are no recorded observations of the species in the area.

Moderate probability of occurrence
Suitable habitat exists in the area and it is within the known range of the species, but there are no confirmed observations.

High probability of occurrence
Suitable habitat is present in the area and there have been confirmed observations of the species.

Table 3-WL-2. Wildlife Presence and Level of Analysis.

Species Common Name	Species Scientific Name	Species or Habitat Present on District?	Probability of Occurrence in Resource Area?	Species or Habitat Potentially Affected?	Species Further Analyzed?
Threatened & Endangered					
Gray Wolf (E)	*Canis lupis*	Yes	Moderate	Yes	Yes
Bald eagle (T)	*Haliateetus leucocephalus*	Yes	Low	No	No
Canada Lynx (T)	*Lynx canadensis*	Yes	Moderate	Yes	Yes
Grizzly Bear (T)	*Ursus horribilis*	Yes	Low	No	No
Woodland Caribou	*Rangifer tarandus*	No	None	No	No
Sensitive					
Flammulated owl	*Otus flammeolus*	Yes	Low	No	No
Black-backed woodpecker	*Picoides arcticus*	Yes	High	Yes	Yes
Fisher	*Martes pennanti*	Yes	Low	No	No
Wolverine	*Gulo gulo*	Yes	Moderate	Yes	Yes
Coeur d'Alene salamander	*Plethodon idahoensis*	Yes	Low	No	No
Townsend's big-eared bat	*Plecotus townsendii*	Yes	Low	No	No
Boreal toad	*Bufo boreas*	Yes	Low	No	No
Peregrine falcon	*Falco peregrinus anatum*	Yes	None	No	No
Common loon	*Gavia immer*	Yes	None	No	No
Harlequin duck	*Histrionicus histrionicus*	Yes	None	No	No
Northern bog lemming	*Synaptomys borealis*	Yes	None	No	No
Black Swift	*Cypeloides niger*	Yes	None	No	No
Pygmy Nuthatch	*Sitta pygmaea*	Yes	None	No	No
Fringed Myotis	*Myotis thysanodes*	Yes	Low	No	No
Old Growth Management Indicator Species					
Northern goshawk	*Accipiter gentiles*	Yes	Low	Yes	Yes
Pileated woodpecker	*Dryocopus pileatus*	Yes	Moderate	Yes	Yes
Pine marten	*Martes americana*	Yes	High	Yes	Yes
Big Game Management Indicator Species					
Rocky Mountain elk	*Cervus elaphus*	Yes	High	Yes	Yes
Moose	*Alces alces*	Yes	Moderate	No	No
Other Species & Habitats					
Nongame	*N/A*	Yes	High	Yes	No
Neotropical (migrant) birds	*N/A*	Yes	High	Yes	No

Suitable and Potential Wildlife Habitat

Of primary consideration in the wildlife analysis is the current and potential capability of the structure, composition, arrangement and patch size of the vegetation to provide the habitat components necessary to meet the life history requirements of a particular species.

Quantitative modeling to assess current habitat and potential effects are not always applicable due to a lack of available knowledge about many species and their habitat requirements, and limited amount of information regarding some key habitat components such as size and amount of down wood. Models are used when appropriate based on available information and applicability. When feasible, suitable and potential habitat is modeled using databases describing forest vegetation and Geographic Information (mapping) Systems (GIS) delineating variables such as slope, aspect, soils, road density and riparian habitats. This data is supported by species observation records, field verification, and field surveys for specific species and habitats.

Suitable habitat *defines wildlife habitat that has a combination of features meeting the habitat requirements of a given species at the present time.*

Potential capable habitat *does not currently provide suitable habitat, but because of certain characteristics has the potential to provide suitable habitat in the future as stand conditions change. For example, changing stand conditions may include seral stage, cover type, stand density, tree size, stand age, and stand condition.*

Acres displayed should be considered approximate due to the manner in which different habitat components are grouped and the detail of information available. Differences may occur in the values due to the scale at which the analysis is conducted, the level at which effects become apparent, and the consequences of the action on different resource values. Detailed descriptions of the specific analysis method or modeling process used for each species can be found under the section of this report pertaining to that particular species, and in the associated project files cited in that section.

2.G. Features Designed to Protect Wildlife Habitat

The proposed action was designed to be implemented in a manner that would protect resources in the Jo-Cat Resource Area. The following guidelines would be met during implementation:

- *Snags across the resource area would be retained to meet the Northern Region (Region 1) Snag Management Protocol (PF Doc. VEG-21; PF Doc. WL-28, WL-29 and WL-43).*
- *Long-lived seral conifer species (western white pine and western larch) of all sizes (with emphasis on those 18 inches or greater in diameter) would be favored to remain on site unless removal is unavoidable due to safety reasons or special circumstances.*
- *All closed roads that are opened, constructed, or reconstructed during this project would be closed with a gate or barrier during project activities, and then effectively closed (as good as or better than existing closure) after activities are complete (not to exceed five years). If project activities were not complete within five years, a partial replacement of the closure structure (obliteration or other structures) would occur. The analysis of effects to wildlife under the Proposed Action is based upon meeting these guidelines.*
- *Incidental trees charred during prescribed burning operations would be retained on site for black-backed woodpecker habitat and snags.*
- *If any Threatened or Endangered wildlife species are observed in the resource area during implementation, the District wildlife biologist would determine any project modifications necessary to protect the species and its habitat based on applicable laws, regulations and management recommendations for the species. If any Threatened or Endangered species is found to be nesting in an area scheduled for prescribed burning or silvicultural treatment, activities would be delayed in the area as recommended by the wildlife biologist.*

3. Affected Environment & Effects to Wildlife

3.A. Overview of Terrestrial Wildlife Habitat in the Jo-Cat Resource Area

Old and Mature Forests

Many wildlife species occurring on the IPNF prefer or occur only in mature and old forests. Stands with old and mature structure provide habitat for species that rely on large trees, snags, down logs and maximum structural diversity for nesting, foraging or raising young. Existing structurally immature stands could provide mature stands and old growth habitat over time if not disturbed. If managed for long-lived serals, such as larch, stands would maintain the large, old, dead and decaying structural components of the forest within the levels needed to provide suitable habitat. The IPNF requires maintenance of approximately ten percent across the Forest in old growth to provide for viable populations of old-growth dependent species (Forest Plan, p. II-5; PF Doc.CR-023). For more information on old growth, please refer to the Specialist's Report on Forest Vegetation. The Jo-Cat Resource Area is within Old Growth Management Unit (OGMU) 113. Due to stand-replacing fires in the 1910s, the Jo-Cat Resource Area provides little old and mature forest structure. However, 4.3% of OGMU 113 is allocated old growth, within the Jo-Cat Resource Area there are 32 acres of allocated old growth (Specialist's Report on Forest Vegetation).

This analysis reflects changes in habitat conditions (such as stand structure) resulting from past, present and reasonably foreseeable actions.

Except where specifically stated, it is assumed that private lands do not provide habitat, in order to provide the most conservative ("worst case") assessment on these lands, since the Forest Service has no authority or information base concerning private lands.

Dry Forest Habitats

Some wildlife species prefer open, dry forests with large trees, including flammulated owls, white-headed wood-peckers, Lewis' woodpeckers, pygmy nuthatches, and western bluebirds, just to name a few. Forests that have lost much of their larger structural component and developed a dense understory of shade-tolerant conifers are often no longer suitable for these species. Dry forest habitats have evolved with frequent low or mixed intensity ground fires every 20 to 50 years, which leave large seral trees and decrease fuels in the understory. To protect human developments and future timber resources, fire suppression is ongoing in the Coeur d'Alene River Basin and has been practiced for an extended period of time. This practice allows the establishment of smaller shade-tolerant tree species under the canopy, changing the structure of dry site habitat from a relatively open-grown forest with a large diameter overstory into dense multi-canopy stands with many immature trees. Remaining stands are at higher risk for departure from normal non-lethal, mixed intensity fires to high intensity, stand-replacing fires and from high levels of insects and disease.

Dry forest ponderosa pine habitats are found in limited amounts on the Coeur d'Alene River Ranger District. Since the Jo-Cat Resource area lacks dry site ponderosa pine forested stands, there is no further analysis on these habitats and their effects on dry-forest dependent species.

Figure WL-1. Tree cavities provide habitat for a number of wildlife species.

Snag and Down Woody Habitat

The amount of snags and down woody material present has been identified as a measure of forest integrity (Quigley et al. 1996; PF Doc. WL-R44). Dead trees, both standing and on the ground are critical habitat components for nearly all wildlife species as they depend on snags to differing degrees for nesting, forage and cover. Sensitive and management indicator species which nest in snags include pileated woodpeckers, black-backed woodpeckers, white-headed woodpeckers,

flammulated owls and boreal owls. Some of these species cannot excavate cavities and depend on the other species to create cavities for nesting, denning or shelter. Retaining habitat for cavity excavators is vital to other wildlife dependent on snags.

Within the Jo-Cat Resource Area, large-diameter standing and dead trees are lacking except for scattered residual western larch. Large fires after the turn of the last century consumed large live and dead trees. Today, the area is in young age classes that lack large diameter snags. Inherently, high elevation lodgepole pine habitats have fewer large live and dead trees present. Large diameter snags provide habitat for the greatest variety of wildlife and remain standing longer than smaller snags. Ponderosa pine and western larch tend to last longer than other snags. Even after falling to the ground, large diameter snags provide critical habitat. Down wood is essential in providing den sites, cover and foraging substrate for a variety of species including lynx, fishers, pine martens and other small mammals. Many birds that nest in snags promote forest health by controlling forest insect populations.

Selective harvest for seral species and salvage logging has occurred both historically and in the recent past, particularly on private lands, within the Coeur d'Alene River Basin. Fire suppression and road construction has been ongoing. Large stand-replacing fires occurred between 1910 and 1930, resulting in the current middle-aged stands. These types of activities have resulted in changes to snag habitat across the Coeur d'Alene River Ranger District and in the Jo-Cat Resource Area:

- *Old stands have shifted to mature or middle-aged resulting in a loss of large diameter, durable snags.*
- *Direct removal of large diameter snags and green trees has lead to decreased snag availability and loss of seed sources.*
- *Longer fire intervals have resulted in large diameter snag loss rather than frequent non-lethal, mixed severity fires important to snag recruitment. Longer fire intervals have resulted in an increase in non-seral species that are more prone to insects and disease and are less likely to live long enough to provide large snags.*
- *Patch size has decreased.*

Recognizing changes in snag habitat has lead to management plans designed to provide an amount of snags and down wood shown to support viable populations of species that use these habitat components.

Several studies have suggested the number of snags that should be made available or retained for snag-dependent species. This assessment uses the Region 1 Snag Protocol (USDA 2000; PF Doc. WL-R54) and Upper Columbia River Basin snag guidelines in Bull et al. 1997 (PF Doc. WL-R52). In summarizing 10 years of monitoring information the 1998 IPNF Forest Plan Monitoring Report (PF Doc.CR-014) found that on monitored plots, snag retention guidelines were met. Forest Inventory Analysis (FIA) data shows that across the Central North Fork Coeur d'Alene landscape area 10"-19" diameter snags are found at 11/acre and 20" or greater diameter snags are found at 2/acre (PF Doc. WL-43).

In some areas of Region 1, monitoring has shown that snag retention may not be fully met following the many stages of project implementation (PF Doc. CR-014). Several factors can impact snags during a project including inadequate marking of leave trees, inadequate contractual control, activities involved with felling and yarding, fuels treatment and woodcutting following logging.

Fragmentation and Road Density

One of the main habitat components considered in this analysis is road density. Road density affects the degree to which a species is vulnerable to disturbance and the degree to which the habitat has the potential for providing species needs. Openings associated with roads may act as a barrier to some species. For other species, roads affect movement patterns and the ability for dispersal. Often roads are in preferred wildlife habitat such as riparian areas, ridge tops and flat benches, resulting in displacement or decreased habitat suitability. Roads increase habitat fragmentation and add to edge effects. The access provided by roads can

cause direct and indirect mortality to wildlife. Direct mortality may result from vehicle collisions, incidental trapping and random shooting. Indirect mortality is caused primarily by the level of disturbance and by alteration of habitat.

The primary causes of fragmentation on forestlands are roads and regeneration harvests (which were once typically 40-acre blocks). Roads and urban development have caused fragmentation on private lands. The current level of open road density in the Jo-Cat Resource Area is one mile of road per square mile of land (please refer to the Transportation Report in the Project Files for more on road densities). A road density less than one mile per square mile is considered a high security area, providing habitat for wide-ranging carnivore species (PF Doc. WL-R95).

All closed roads that are constructed, reconstructed, or reconditioned for this project would be closed during and following project activities. Reconstruction would re-open roads that have had the front-end of the road obliterated. These roads would be gated during project activities with a more substantial gate, and then returned to their former state of closure (obliteration) after all project activities are complete. Short-term disturbance would be moderate to high. Over the long term, wildlife security would be improved with the obliteration that prohibits unauthorized use of roads. Following project activities, there would be no increase in open road density in the Jo-Cat Resource Area, but constructed and reconstructed roads would provide increased access on foot even with obliteration in place. Continued implementation of the District Travel Plan under either alternative will identify roads closed to motorized use and improve enforcement of existing closures.

3.B. Gray Wolf (Endangered Species)

Life History of Gray Wolves

Historically, wolves roamed widely throughout North America. In 1915, the United States Government began sponsoring control programs providing for the extirpation of the species to reduce perceived threats to humans and to reduce livestock and big game depredations. The program was very successful in its objective, and by the late 1930s wolves were virtually eliminated from the western United States. Although government control programs ceased in the early 1960s, it was over 50 years before wolf reproduction was again confirmed in the western U.S. in 1986.

The northern Rocky Mountain wolf (a subspecies of the gray wolf) was listed as endangered in 1973. However, based on enforcement problems and a trend to recognize fewer subspecies of wolves, the entire species was listed as endangered throughout the lower 48 states, except Minnesota, in 1978 (USDI 1987, PF Doc WL R135). In 1994, the Fish and Wildlife Service published final rules in the Federal register (Volume 59, Number 224) making a distinction between wolves that occur north of Interstate 90 and wolves that occur south of Interstate 90, in Idaho. Gray wolves occurring north of Interstate 90 are listed as endangered species and receive full protection in accordance with provisions of the Endangered Species Act. Gray wolves occurring south of Interstate 90 are listed as a nonessential experimental population, with special regulations defining their protection and management.

Reference Condition for Gray Wolves

Conservation requirements for wolf populations are not fully understood, but the availability of prey and limiting the risk of human-caused mortality are considered key components (USDI 1987; Northern Rocky Mountain Wolf Plan, PF Doc WL R133; Tucker et al 1990, PF Doc. WL R135). The risk of human-caused mortality can be directly related to the density and distribution of open roads. Security for the wolf, primarily achieved through access management, is important primarily to meet the needs of its prey and as it relates to direct human-caused mortality. However, wolf packs have been found occupying areas in Montana with road densities greater than two miles of road per square mile of land. Reducing human-caused mortality is an important factor in maintaining wolf populations. Reducing access becomes an issue only when human-caused wolf mortality cannot be reduced. The primary method of reducing human-caused wolf mortality is through public education (Koch and Fontaine, 1993 per. com.).

Management Recommendations for Gray Wolves

Wolves are highly social animals requiring large areas to roam and feed. Key elements in gray wolf habitat include a year-round prey base, secluded areas for raising pups, and isolation from frequent human disturbance (Hansen, 1986, PF Doc. WL R134). Studies suggest that there is a strong relationship between key big game summer ranges and calving and fawning areas, and reliable reports of wolves (US Fish and Wildlife Service, 1987 PF Doc. WL R133).

Affected Environment for Gray Wolves

Wolves may occur in the Jo-Cat Resource Area as transient visitors. A wolf was sighted in the Paragon drainage within the Jo-Cat Resource area in 2000 (PF Doc. WL-34). The Idaho-Montana border, along the eastern boundary of the Jo-Cat Resource Area, provides a dispersal corridor for wolves moving from Canada or Montana and into Idaho. A pack has been documented on the St. Joe Ranger District, 20 miles south of the Jo-Cat Resource Area. Another pack has been documented in the DeBorgia District in Montana, approximately 15 miles from the resource area. Although a transient individual could use the area, there is no known pack activity within or around the Jo-Cat Resource Area. Refer to the FWS Wolf Report for current pack locations:

http://www.fws.gov/mountain%2Dprairie/species/mammals/wolf/annualrpt05/2005_WOLF_REPORT_TOTAL.pdf

Figure WL-2. Gray wolf south of I-90 on the Coeur d'Alene River District in 2003 (photo courtesy of Idaho Fish & Game).

Environmental Consequences to Gray Wolves

Since the Jo-Cat Resource Area is north of Interstate 90, the gray wolf falls under the Endangered Species Act. There would be no disturbance or change to elk habitat under the no-action alternative. Under the Proposed Action Alternative, elk habitat effectiveness potential for the EHU would return to existing levels after activities are complete (refer to section 3.I. in wildlife report). During activities there is potential for displacement of wolves potentially traveling along the Idaho-Montana border. Therefore, activities under this project ***may affect but would not adversely affect the gray wolf or its survival***. Viability of the species would be maintained, since the goal to have 30 breeding pairs well distributed throughout three states for three successive years has been met (2001 Wolf Recovery Report; PF Doc. WL-33).

3.C. Canada Lynx (Threatened Species)

Life History of Canada Lynx

Canada lynx (Figure WL-3) are most likely a transient visitor to the Jo-Cat Resource Area. Resident populations currently exist only in Maine, Montana, Washington, and possibly Minnesota. They are considered still existing but no longer sustaining self-supported populations in Wisconsin, Michigan, Oregon, Idaho, Wyoming, Utah, and Colorado; they may no longer exist in New Hampshire, Vermont, New York, Pennsylvania, and Massachusetts (Ruediger, et al. 2000 WL-R80).

Snowshoe hares are the primary prey of the lynx, comprising 35 to 97 percent of the diet. Other prey species include red squirrel, grouse, flying squirrel, and ground squirrels. Southern populations of lynx may prey on a wider diversity of species than northern populations because of lower average hare densities and differences in small mammal communities.

Lynx occur in mesic coniferous forests that have cold, snowy winters and provide a prey base of snowshoe hare (McKelvey et. al 2000, PF Doc. WL-R82; Ruggiero et. al. 2000, PF Doc. WL-R81). Primary vegetation that contributes to the lynx habitat is lodgepole pine, subalpine fir, and Engelmann spruce (Aubry et al. 2000; PF Doc. WL-R83). In extreme northern Idaho, northeastern Washington, and northwestern Montana, cedar-hemlock habitat types may also be considered primary vegetation. In central Idaho, Douglas-fir on moist sites at higher elevations may also be considered primary vegetation. Secondary vegetation (such and cool, moist Douglas-fir, grand fir, western larch and aspen), when interspersed within subalpine forests, may also contribute to lynx habitat.

Reference Condition for Canada Lynx

Historical records of lynx are relatively numerous in the Idaho Panhandle (Davis 1939, PF Doc. WL-R85) as this species appears to have always had a scattered distribution in the U.S. In 1946 lynx were fairly well distributed in wooded areas of the northern counties with 25 to 30 being taken annually by trappers and hunters (Rust 1946, PF Doc. WL-R86).

> The Jo-Cat Resource Area provides habitat for lynx and lies within an LAU. Lynx are probably an infrequent visitor to the area. The Bitterroot Divide provides a movement corridor for the lynx. It is possible that transient lynx may move through the area.

Although lynx are relatively common throughout forested areas of Alaska and Canada, past trapping in the lower forty-eight states of the U.S. and recent lynx hunting in Canada has eliminated or reduced numbers in localized areas. The conservation of lynx populations is a concern particularly in the western mountains of the contiguous United States, at the southern periphery of the species' range.

Lynx occupy regions in North America of arctic or boreal influence. They are restricted to forested habitats within this region and are found from western Alaska to the eastern edge of New Foundland. The northern boundary of this range coincides with the northern extension of the boreal forests. The southern boundary of lynx range is along the high elevation or boreal-forested areas of the Cascades and Rocky Mountains into Washington, Idaho, Montana, Wyoming, Colorado, and Utah.

Lynx are considered low-density species with home ranges averaging 24 square miles, depending on prey abundance. They occur primarily in moist habitat in Northern Idaho above 3,000 to 4,000 feet in elevation**.** Even though lower elevations can be important in some instances, evidence suggests lynx tend to use these areas less because of competition with other predators and overheating in the summer.

Lynx (*Lynx Canadensis)* are associated with the cold winters and deep snows of northern latitudes occurring primarily above 4,000 feet in Washington, Idaho, and Montana, above 6,500 feet in Wyoming, and above 8,000 feet in Colorado and Utah. Lynx habitat includes subalpine fir, spruce, and lodgepole pine forests above 4,000 feet in Idaho. The home range of females is from 15 to 30 miles. At least 80 percent of their diet consists of snowshoe hares, which require deciduous browse and dense lodgepole pine and/or subalpine fir canopies. Lynx also need mature forests for denning and cover. Lynx avoid large openings (greater than 330 feet from cover) and very large openings may disrupt movement between isolated populations (Koehler and Aubry, 1994; PF Doc. WL-R86).

They prefer to hunt in sapling stands adjacent to old growth. Low numbers and a dispersed population make lynx vulnerable to over exploitation and habitat disruption (Koehler and Aubry, 1994; PF Doc. WL-R86).

Management Recommendations for Canada Lynx

In accordance with the Canada Lynx Conservation Assessment and Strategy, federal actions are analyzed relative to their potential for affecting lynx or lynx habitat according to the following recommendations, which are based on the most current information available. The analysis is based on LAUs, which approximate the home range of the species. LAUs were delineated on the Coeur d'Alene River Ranger District by the Fish and Wildlife Service and the Forest Service according to protocol established in the Conservation Strategy. Topography, elevation and vegetation were the main characteristics used to identify LAUs on the District and across the IPNFs. The extent to which these recommendations are implemented assists in the evaluation of effects on lynx habitat.:

- *Within each Lynx Analysis Unit (LAU), no more than 30% of lynx habitat can be unsuitable at any time. Management activities will not change more than 15% of lynx habitat into unsuitable condition within a 10-year period.*
- *Within a LAU, maintain denning habitat on at least 10% of the area that is capable of producing stands with these characteristics. Denning habitat should be well distributed and in patches larger than 5 acres.*
- *Allow no net increase of regularly used or groomed over-the-snow routes and play routes. Open road densities should be managed to not exceed 2 miles per square mile within the LAU.*
- *Maintain vegetative structure that facilitates movement of lynx along important connectivity corridors (e.g. riparian areas, saddles, ridges).*

Affected Environment for Canada Lynx

Although most sightings of lynx in the IPNFs have occurred on the northern Ranger Districts (Priest Lake, Bonners Ferry, and Sandpoint), lynx observations have been reported on the St. Joe District south of Interstate 90 and within the Coeur d'Alene River Ranger District. There have been no recorded observations of lynx in the Jo-Cat Resource Area. The nearest sightings occurred near Revett Lake in 1999 and east of Mullan on the Lookout Pass in 1998 (PF Doc. WL-15). Both observations are considered very reliable. Other sightings in Kootenai County were at Honeysuckle Campground, Meyers Saddle and Stewart/Callis Creek. All other lynx records have occurred near the Bitterroot Divide.

Available lynx habitat was delineated within the Bitterroot Divide South LAU (PF Doc. WL-4). This LAU is 36,453 acres in size (PF Doc. WL-3). Because stand-replacing fires in the early 1900s resulted in stands that are now aged 80-90 years, the Bitterroot Divide LAU provides, almost exclusively, low quality lynx forage. Low quality forage habitat functions primarily as travel habitat for the lynx (PF Doc. WL-R87). These stands have little potential snowshoe hare use and generally support only very low densities of hares (PF Doc. WL-R87).

The low quality forage habitat delineated was field verified by a district biologist within the Jo-Cat Resource area (PF Doc. WL-25) and verified with aerial photos and screening for the remainder of the LAU (PF Doc. WL-24). There is a small amount (18 acres) of lynx high quality forage habitat north of Prichard Creek (PF Doc. WL-4). There is denning habitat south of Prichard Creek, outside the project area. There is 32 acres of allocated old growth which could provide lynx denning habitat within the Jo-Cat Resource Area.

Table WL-3 Lynx Habitat Classification.

Lynx habitat classification	Jo-Cat Resource Area (acres)	Bitterroot Divide South LAU (acres)
Habitat change in the last decade	0	0
Pre-forage	0	609
Forage	18	3,447
Late forage	0	0
Denning	32	4,771
Low quality forage	798	2,3672

Environmental Consequences for Canada Lynx

No Action Alternative: The Jo-Cat Resource Area would continue to provide low quality forage habitat for lynx for the next 25 years. Snowshoe hare populations and prey for the lynx would remain low. In 25 to 50 years, some of the low quality forage stands would provide large diameter downed wood and would provide denning habitat for the lynx. In addition, mortality in lodgepole pine as a result of beetles could provide pockets of denning habitat in the future. The existing 18 acres of high quality forage habitat and 32 acres of denning habitat (old growth) would not be affected. As some of these stands begin to fall apart, understory regeneration could provide habitat for snowshoe hares. No change in movement corridors for the lynx would occur. Groomed snowmobile routes would remain at current levels. No habitat would be converted to unsuitable habitat.

Figure WL-4. Example of low quality forage habitat within Jo-Cat Resource Area

Proposed Action: This alternative would maintain the current 18 acres lynx high quality forage habitat. The 32 acres of allocated old growth could provide denning habitat. No harvest activities are proposed in the allocated old growth stands.

Within areas that currently provide low quality lynx forage there would be 12 acres of lodgepole removal, salvage and overstory removal and another 80 acres of thinning primarily to reduce competition around individual larch trees. These thinned acres would continue to provide low quality forage for

approximately 25 to 50 years. During this time remaining trees in these areas would increase in diameter, shifting the stands from low quality lynx forage habitat to lynx denning habitat. In addition, insects will continue to cause mortality in lodgepole pine stands. As dead trees in these stands fall to the ground, pockets of denning habitat would be created.

Overstory removal in Unit 6 would retain existing climax vegetation resulting in high quality forage habitat as trees increase in size. Where openings are created by harvesting lodgepole pine, stands would provide lynx pre-forage for the next 25-30 years. At 25 to 30 years age, the stands would have snowshoe hare habitat above the snowline and provide high quality forage habitat for lynx for approximately 25 years after that. In addition, lodgepole harvest on another 134 acres not currently classified as lynx habitat would probably provide some lynx forage habitat in another 25-30 years.

Table WL-4. Changes to Lynx Habitat in the Jo-Cat Resource Area and Bitterroot Divide South Lynx Analysis Unit.

Lynx Habitat Classification	Existing in the Jo-Cat Resource Area	Existing in the Bitterroot Divide South LAU	Jo-Cat Resource Area under the Proposed Action	Bitterroot Divide South LAU under the Proposed Action
Denning Habitat acres	32	4,780	32	4,771
Acres of High Quality Forage Habitat acres	18	3,447	18	3,447
Acres of Low Quality Forage (capable) Habitat acres	798	23,672	706	23,580
Preforage Habitat acres	0	609	92	701
Percent change in habitat in the last decade	0%	0%	4%	0%

** The threshold is no more than 15% of lynx habitat changed into an unsuitable condition within an LAU during a 10-year period.*

Cumulative Effects to Canada Lynx: Historically, early mining in the Prichard Creek drainage brought human settlement (Appendix A- Past, Ongoing and Reasonably Foreseeable Activities). It is likely that some mortality of lynx near the Jo-Cat Resource Area either by shooting or trapping resulted from this early human settlement. The 1910 fire most likely provided an abundance of snowshoe hare browse by 1940 within the Resource Area. Little timber harvest has occurred in the vicinity since 1910. The construction of the Murray to Thompson Falls route facilitated access by trappers to the area.

Under either alternative, habitat would continue to be low in quality for lynx within the Jo-Cat Resource Area and the Bitterroot Divide South LAU. The area would continue to function primarily as travel habitat for lynx. Over time, as larch within forested stands would increase in size and lodgepole pine would succumb to mortality, the Jo-Cat Resource Area would trend towards an increase in denning habitat. There would be an increase in forage habitat in approximately 30 years where openings are created within the Resource Area under the proposed action. Since habitat quality is currently low for the lynx; low quality forage harvested would not provide forage habitat for lynx for 30 years; and harvest activities would result in displacement of lynx during activities; ***the Proposed Action may affect but would not adversely affect the lynx or its survival.*** There would be no effect to the lynx with the implementation of the No-Action Alternative.

3.D. Black-backed Woodpecker (Sensitive Species)

Life History of Black-backed Woodpeckers

Black-backed woodpeckers forage for insects in the bark of live trees such as lodgepole pine and larch. Live lodgepole pine provides an important food source in mountain pine bark beetle larve (Dixon et al., 2000; PF Doc. WL-R16). Some studies indicate that they also prefer to forage on burned snags (Dixon et. al. 2000; PF Doc. WL-R16), and may be concentrated in areas that have recently burned. Post-fire habitat is thought to have the greatest value as source habitat for black-backed woodpeckers (O'Connor et al. 2001; PF Doc. WL-R41). They forage in various levels of the canopy, from ground level to 60 feet high or more (Dixon, et al. 1953; PF Doc. WL-R16).

Reference Conditions for Black-backed Woodpeckers

Black-backed woodpeckers are found within coniferous forests of North America including the Cascade Range, northern portions of the Sierra Nevada and the Rocky Mountains (Washington Department of Wildlife 1991; PF Doc. WL-R62). Black-backed woodpeckers have been found in scattered locations throughout Washington, with the heaviest concentrations east of the Cascade crest. Their distribution in Idaho is largely unknown. The species has been sighted during their breeding season on the Coeur d'Alene River Ranger District (PF Doc. WL-34. Annual breeding season surveys for black-backed woodpecker in the Coeur d'Alene Mountains have also confirmed their presence in the basin (PF Doc. WL-35).

There is little information about historic sightings or populations of black-backed woodpeckers. It is likely that their habitat has declined over the past century because of their preference for post-fire habitats and ongoing fire suppression for that time period. Fire exclusion has potentially reduced the amount of young stands that originated from wildfire. Lodgepole pine may have had greater distribution and occurred in larger patches across the forest prior to fire suppression as this conifer species relies on fire to open cones and allow seeds to regenerate. Although the role of white pine in providing black-backed woodpecker habitat is largely unknown, this species may have used white-pine snags when it existed in large blocks across the basin.

Studies in Region 1 suggest that from 1940 to 1987, black-backed woodpecker habitat was below the historical range of variation in the region. From 1989 to the present, black-backed woodpecker habitat is thought to be well above the historic range on a regional scale as a result of the frequent high intensity fires that have occurred since that time (USDA 2003; PF Doc. WL-R58). A Conservation assessment of black-backed woodpecker found habitat to be well-distributed and abundant across the Forest Service's Northern Region (Region 1) and concluded that viability for the species will be maintained for the next 100 years (Samson, 2005, p. 51-52; PF Doc. WL-R139).

Figure WL-4. Black-backed woodpecker. (Photo from the National Image Library, //images.fws.gov).

Management Recommendations for Black-backed Woodpeckers

Specific management recommendations for this species support re-introduction of fire into the ecosystem, particularly in larch (Dixon et al., 2000; PF Doc. WL-R16). Adhering to the Region 1 snag management protocol (USDA 2000; PF Doc. WL-R54), and to the snag guidelines developed in association with the Upper Columbia River Basin (UCRB EIS as described in Bull et. al. 1997, UCRB EIS, Appendix K; PF Doc. WL-33) would maintain snag availability for black-backed woodpeckers under the No-Action and Proposed Action Alternatives.

Affected Environment for Black-backed Woodpeckers

The species could inhabit the Jo-Cat Resource Area. Larch and lodgepole pine, which are preferred for breeding habitat, are found in the Resource Area. Mountain pine beetles have caused an insect infestation that provides foraging opportunities for the black-backed woodpecker in the resource area (Draft Assessment – BBWP, R1-11-5-2003; PF Doc. WL-R58). Aerial surveys occurring between 2001-2005 on the Idaho Panhandle National Forests found increasing mountain pine beetle activity in the Jo-Cat Resource Area (PF Doc. WL-12). This activity is highest near the Idaho-Montana border and to the east in Montana (PF Doc. WL-12).

Larch is scattered across the resource area and the predominant tree species are Douglas-fir, western hemlock and lodgepole pine (PF Doc. WL-44). Little information is available on the benefits of white pine to wildlife, but such stands may have historically provided habitat for black-backed woodpeckers in the resource area. Large-diameter snags within the Jo-Cat Resource Area are in very short supply due to stand-replacing fires in the early 1900s.

In addition to beetle infested lodgepole pine, high quality habitat created by recent wildfires is also available to the black-backed woodpecker. The Revett fire, two miles south of project area, created 97 acres of black-backed woodpecker habitat (Figure WL-6 and PF Doc. WL-37). In addition, the Ulm Peak fire 18 miles north of the resource area created 4000 acres of high quality burn habitat for the black-backed woodpecker.

Environmental Consequences to Black-backed Woodpeckers

The potential effects to black-backed woodpeckers and other snag-dependent species were determined by estimating the change in distribution, quantity and quality of snag habitat as a result of implementing proposed activities. Under the no-action alternative beetle killed trees would continue to be available for foraging by the black-backed woodpecker. The proposed action would target the harvest of beetle killed trees, reducing some feeding opportunities for the black-backed woodpecker. Under the Proposed Action, salvage of lodgepole and daylighting larch harvest treatments would reduce the value of nesting habitat for black-backed woodpecker in the short term due to reduction in tree densities. Beetle infested trees not within units and those outside the resource area would continue to provide habitat for the black-backed

Figure WL-6. Scorched trees resulting from the Revett fire.

woodpecker (PF Doc. WL-12, PF Doc. WL-44).

Direct and Indirect Effects to Black-backed Woodpeckers: No short-term effects or changes would result from the implementation of the No-Action Alternative, because no activities are proposed. Over the long term, natural mortality due to insects would result in snag recruitment. Some mature stands would move towards old growth, while others may deteriorate before they meet old growth criteria. Potential stand-replacing fires would increase forage habitat for approximately five years, after that time insects would no longer use the burned snags and forage value would be greatly reduced.

Under the Proposed Action, treatments that promote larch over the long term would eventually benefit the black-backed woodpecker because larch are a preferred species and provide a long lasting snag on the landscape. Post-harvest, larch thin units would still retain more than 80 trees per acre (PF Doc. WL-28). Lodgepole pine removal would involve harvesting approximately 1/3 of the evident beetle mortality (PF Doc. WL-7), however the highest mortality areas outside of the roadless areas would be treated. These units would provide a mix of species post harvest. Some of these will be scorched during burning operations and provide a source of forage for the black-backed woodpecker. This abundance of woodborers in burned trees would begin to decline after three years. (O'Connor et al., 2001; PF Doc. WL-R41).

Mountain pine beetle infestations would continue to provide foraging habitat for the black-backed woodpecker. Under the Proposed Action, where harvest is implemented in lodgepole pine stands, mature trees would be retained that would provide some black-backed woodpecker habitat in the future. These retained trees would also provide a future snag component and provide another age class as the stand regenerates. Meanwhile, mountain pine beetle activity would increase forage habitat for the black-backed woodpecker (PF Doc. WL-12). Adhering to snag guidelines developed in association with the Upper Columbia River Basin (UCRB EIS as described in Bull et. al. 1997; PF Doc. WL-33) would help to ensure viability of black-backed woodpeckers (UCRB EIS, Appendix K; PF Doc. WL-R52).

Beetles would continue to create snags inside and outside the resource area. Snags across the resource area would meet or exceed R1 snag protocol (PF Doc. WL-29, PF Doc. WL-43).

Cumulative Effects to Black-backed Woodpeckers: Past harvest and historic stand-replacing fires have reduced the number of large snags across the Coeur d'Alene River Basin. The Jo-Cat Resource Area reflects this loss of snags, because of past fires, on the landscape. Although habitat in harvested areas is reduced in the short-term, as the trees age these forested stands would provide a larger diameter component, providing habitat for the black-backed woodpecker. Snags would continue to be recruited within and adjacent to the project area as insect mortality of lodgepole pine continues. Recent district wildfires outside the project area would continue to provide optimal habitat for the black-backed woodpecker for the next five years.

Over time, thinning to promote larch stands within the resource area would provide a larger diameter tree for black-backed woodpecker foraging. In untreated areas, forest pests and diseases would continue to provide foraging opportunities for black-backed woodpeckers.

In the past, across the district, trees scorched during burning operations have been retained to provide habitat for the black-backed woodpecker (PF Doc. WL-6). In the event some trees are fire scorched during site preparation activities in the resource area under the Proposed Action, these trees would be retained for black-backed woodpecker foraging habitat.

Although Northern Idaho is below the historic range for burned habitat on the landscape, large fires in Montana in 2002 and 2003 have created a source habitat for black-backed woodpeckers in the Northern Rockies Region; burned habitat is now above historic levels in Montana. A conservation assessment for the black-backed woodpecker in the Northern Region found that viability will be maintained for the next 100 years (PF Doc. WL-R139). An analysis using Forest Inventory and Analysis (FIA) data was done for the Idaho Panhandle National Forest to estimate snag density. This analysis found across the forest snags in the 10-19.9" diameter class is 10.8 per acre. In the larger >20" diameter class there are 2 snags per acre (Bush et.al., 2006, PF Doc. WL-R140; PF Doc. WL-43).

Therefore, the implementation of the Proposed Action Alternative **may impact individuals or habitat, but would not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species.** There would be no impact to the species under the No-Action Alternative.

3.E. Wolverine (Sensitive Species)

Life History of Wolverines

Wolverines are rare inhabitants of montane forests. They are primarily nocturnal, but will also hunt during the day. Their primary food source is big game carrion, but they also eat small mammals such as marmots, gophers, and mice. Males seem to be territorial (Chapman et al. 1982; PF Doc. WL-R12). Wolverines are solitary animals that have large territories. A male's home range may be up to 790 square miles. Their habitat includes mature or younger forests with natural openings, riparian habitats, and high-elevation subalpine fir areas (USDA-Forest Service R1, 1989; PF Doc. WL-R56). Wolverines are particularly fond of marshy areas, and are most at home in regions with snow on the ground during winter. They are most successful in capturing big game in the winter where the snow is deep (Chapman et al 1982; PF Doc. WL-R12) and are often associated with wilderness (Krott 1960 PF Doc. WL-R34; Van Zyll de Jong 1975 PF Doc. WL-R60; Hornocker and Hash 1981 PF Doc. WL-R27; Whitman et. al. 1986; Banci 1994 PF Doc. WL-R3). Female wolverines in Idaho appear to use subalpine cirque basins for natal denning and kit rearing; home ranges in Idaho vary from 80 to over 700 square kilometers (Copeland 1995 in Idaho Fish and Game 1995, PF Doc. WL-R13).

Figure WL-7. Wolverine.
(Source: www.fs.fed.us/r1/cohesive_strategy.

Reference Condition for Wolverines

When Europeans first arrived in the United States, the wolverine's range extended from Maine to Washington, but by the early 1800's its range was greatly reduced. Although wolverines were widespread in presettlement times, they likely occurred at low densities (Banci 1994; PF Doc. WL-R3). Reports from the mid 1930s and 1940s suggest that the wolverines mostly occurred in the inaccessible mountains in the center of the state (Davis 1939; PF Doc. WL-R72). Records in the late 1940s came from the northern panhandle (Pengelley 1951; PF Doc. WL-R73). Nowak reported several animals taken from the central mountains, apparently reflecting a comeback (1973; PF Doc. WL-R40).

Management Recommendations for Wolverines

In the *Habitat Conservation Assessment and Conservation Strategies for Forest Carnivores in Idaho*, Idaho Fish and Game states that habitat connectivity with Montana, Canada and northern Washington most likely provide subpopulations of wolverines interspersion throughout the northern region of Idaho (1995; PF Doc. WL-R13). The Habitat Conservation Assessment (HCA) also emphasizes the importance of dispersal corridors for linking subpopulations and the presence of relatively undisturbed "refugia" areas to protect wolverines from human activities (Copeland 1995; PF Doc. WL-R13). Witmer et al (1998; PF Doc. WL-R64) in the USDA's *Forest Carnivore Conservation and Management in the Interior Columbia Basin: Issues and Environmental Correlates* describe three issues of concern to wolverine conservation and management in the Columbia Basin:

Issue 1: Maintenance of large, remote areas of habitat (including denning habitat).

Issue 2: Prey populations

Issue 3: Incidental trapping and predator control mortality

Affected Environment for Wolverines

Present distribution of the wolverine in the western United States includes Alaska, northern Washington, Wyoming, Oregon, northern California, northern Idaho, central Idaho, western Montana, and along the Idaho-Montana border to approximately Fremont County, Idaho (Nowak 1973, PF Doc. WL-R40; Groves 1987, PF Doc. WL-R19). In the western United States and interior Columbia basin, wolverines occur widely at very low densities, but only in northwestern Montana are wolverine populations considered to be healthy and thriving (Butts 1992 in Witmir et. al. 1998; PF Doc. WL-R9).

The wolverine, with its large home range, would most likely use the Jo-Cat Resource Area periodically during its long distance movements. There is no big game winter range within the resource area so it is unlikely that carrion would be provided as a winter food source.

The Jo-Cat Resource Area provides potential wolverine denning habitat (PF Doc. WL-14), identified through aerial photo interpretation. This habitat is found primarily along the Bitterroot Divide along the Idaho-Montana border.

Maintaining denning habitat is probably the most important factor affecting wolverine in the Jo-Cat Resource Area. There is no designated wilderness within or adjacent to the Jo-Cat Resource Area. A portion of the Jo-Cat Resource Area lies within a roadless area that could function as refugia for wolverines. "Refugia" is defined as large, remote areas of habitat (*Draft Habitat Conservation Assessment for Carnivores in Idaho*, Copeland, 1995; PF Doc. WL-R13). This roadless area totals 6,874 acres. Of this, 369 acres are within the Jo-Cat Resource Area. The remainder of this roadless area is separated from the Jo-Cat Resource Area by a prominent ridge.

Although trapping wolverine is illegal in Idaho, a slight potential of incidental trapping of wolverine exists because trapping of other furbearers still occurs.

The Jo-Cat Resource Area provides some prey, travel, denning, and roadless habitat for wolverines (Figure WL-8). Wolverines are likely a sporadic traveler through the area and may occasionally cross the project area enroute to winter range lower in the Prichard Creek drainage in search of available carrion. There have been nine wolverine sightings in Shoshone County reported between 1960 and 1987 (PF Doc. WL-R89). A wolverine fatality occurred in 1988 in the Big Creek drainage, 15 miles southwest of the Jo-Cat Resource Area. (PF Doc. WL-35). The Maple Peak roadless and the Glidden Roadless area of the Lolo National Forest provide additional refugia for wolverine that may occasionally use this portion of the Coeur d'Alene River Ranger District (PF Doc. WL-14; PF Doc. WL-42).

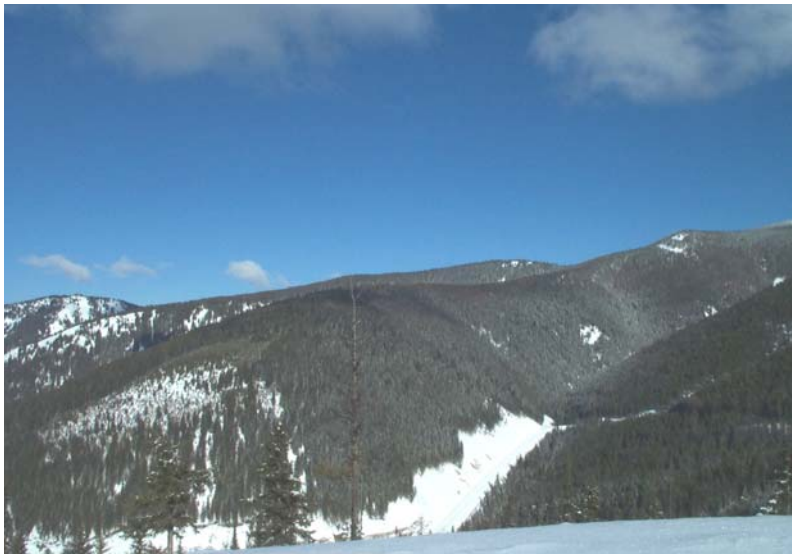


Figure WL-8. Wolverine travel habitat in the Jo-Cat Resource Area.

Environmental Effects to Wolverines

Direct and Indirect Effects to Wolverines: Elevation and other habitat elements were delineated using GIS. Issues of concern for wolverine are evaluated according to Witmer et al (1998; PF Doc. WL-R64) in the

USDA's *Forest Carnivore Conservation and Management in the Interior Columbia Basin: Issues and Environmental Correlates*.

The most likely use of the Jo-Cat Resource Area would be by non-denning wolverines traveling through the area. Since elk populations would be maintained under either alternative, there would be no change in potential food sources for wolverine. No denning wolverines have been documented using any part of the Coeur d'Alene River Ranger District.

There would be no increase in open roads under either alternative, and therefore no increase in access by trappers and no increase in the risk of accidental trapping. Potential stand replacing fires under the No-Action Alternative could decrease cover over the long term.

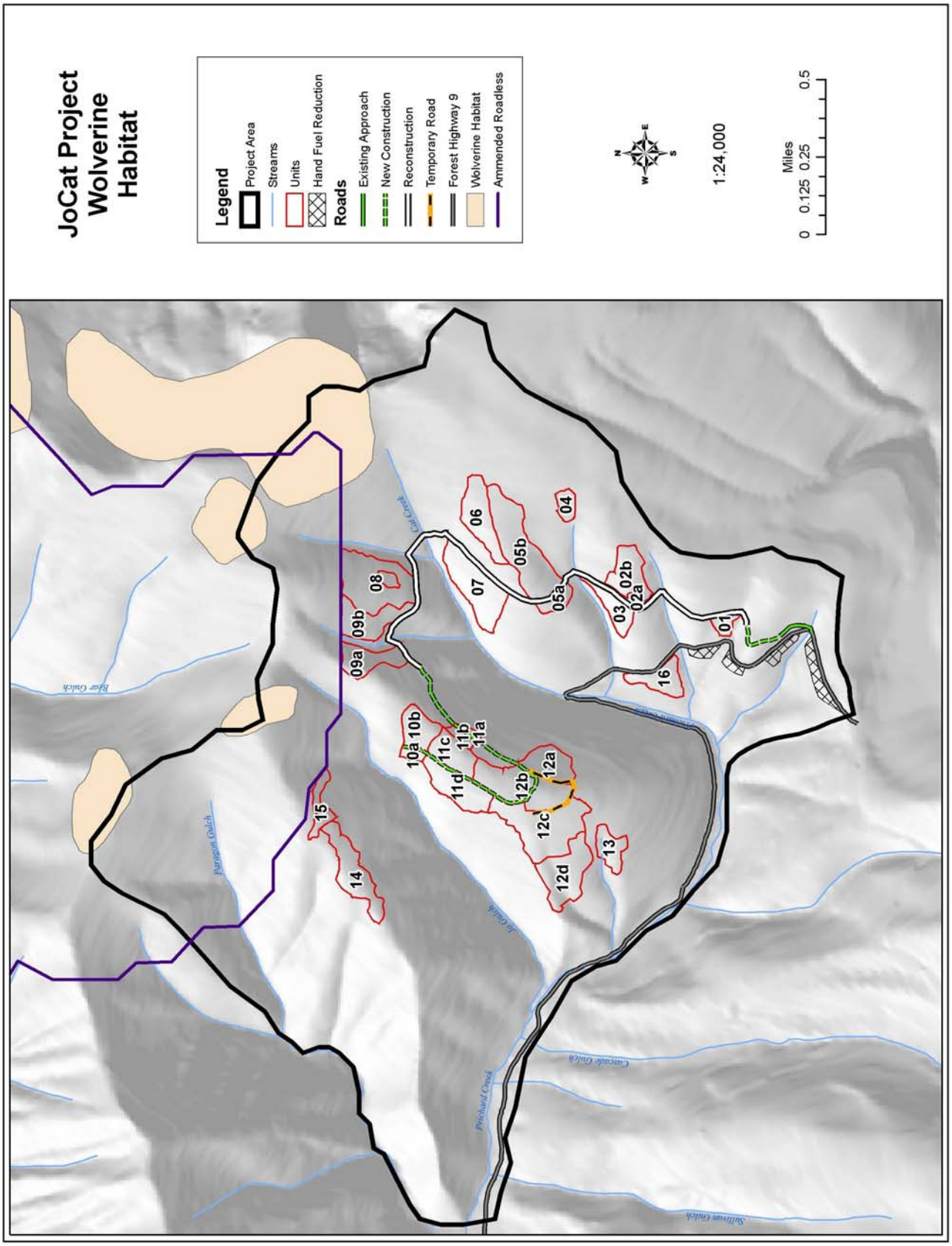
The 369-acre portion of the roadless area that is within the boundary of the Jo-Cat Resource Area would provide security after activities are completed. No treatments are proposed for the roadless area.

Cumulative Effects to Wolverines: An 6,874 -acre roadless area is partially included within the Jo-Cat Resource Area (Figure WL-9). In addition, large patches of unroaded habitat east of the project area (in the Glidden Roadless area on the Lolo National Forest) would continue to provide habitat for wolverines under either alternative (PF Doc. WL-42). These patches are greater than 2,500 acres in size and all are more than one-quarter mile from a road.

Patches of unroaded habitat in the upper Coeur d'Alene River drainage and along the Bitterroot Divide would provides security and travel habitat for the species (Figure WL-9). Other security areas, refugia, and travel habitat for the wolverine and other large-ranging carnivores designated in the Geographic Assessment would maintain some security, refugia, and connectivity for the species. These large patches would also help facilitate movement of wolverine between the Coeur d'Alene River Basin and Montana, where additional refugia is provided. Providing for refugia and movement corridors are consistent with management recommendations by Idaho Fish & Game in the *Habitat Conservation Assessment and Conservation Strategy for Forest Carnivores in Idaho* (Copeland, 1995; PF Doc. WL-R13).

Due to the transitory nature of the wolverine, presence of potential denning habitat and the potential for wolverine to avoid the Jo-Cat Resource Area during activities there could slight possibility of impact to individuals. However, based on past occurrence of wolverine, maintenance of big-game populations and the presence of an 6,874-acre roadless area both inside and outside the project area the Proposed Action **may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species**. Viability would be maintained because security patches in the Coeur d'Alene Mountains are provided and large patches of refugia are available on the Glidden roadless area on the Kootenai National Forest. Prey base would also be maintained. In addition, there is no trapping season in Idaho for the wolverine (Copeland 1995; PF Doc. WL-R13). There would be no impact to wolverines under the No-Action Alternative.

Figure WL-9. Juxtaposition of Roadless Areas, Wolverine habitat, and the Jo-Cat Analysis Area.



3.F. Pileated Woodpecker (Old-Growth Management Indicator Species)

Life History of Pileated Woodpeckers

Pileated woodpeckers nest within their home ranges (usually about 1,000 acres) in mature to old-growth stands of about 50 to 100 acres with greater than 65 percent closed canopies and greater than 20-inch diameter trees (Bull 1986, PF Doc. WL-R76; McClelland 1977, PF Doc. R37; McClelland 1979; PF Doc. WL-R38). They prefer stands with snag densities greater than 7 per acre for feeding (Warren 1989; PF Doc. WL-R75). Nest trees are snags averaging >24 inches in diameter and 60 feet in height (Aney and McClelland 1985; PF Doc. WL-R2). However, pileated woodpeckers can excavate a nest in a live ponderosa pine if heart rot is present (Bull 1975 PF Doc. WL-R5). Both larch and ponderosa pine are preferred nest trees (Bull 1975; PF Doc. WL-R5). They feed mostly on carpenter ants (McClelland 1977, PF Doc. WL-R37; Bull 1986, PF Doc. WL-R76), but also eat other insects and fruits and berries. They usually avoid openings for foraging, and prefer dense canopies with many snags and down logs. Large, continuous habitat blocks are more desirable than more fragmented patches.

Figure WL-10. Pileated woodpecker. (Photo Source: www.fs.fed.us/r1/cohesive strategy.)

Reference Conditions for Pileated Woodpeckers

No historic population information is available for pileated woodpeckers. There is some information on historic forest structure in the area from the Geographic Assessment for the Coeur d'Alene River Basin, the Assessment of Ecosystem Components in the Interior Columbia River Basin and in modeling done based on historic records by the IPNFs (PF Doc. WL-R71). These records and models indicate more old forest habitat existed for pileated woodpeckers historically than exists today. The current amount old forests are believed to be less than under historical conditions due to the amount of timber harvesting done in older stands and the decreased amount of older stands remaining following stand-replacing wildfires on the District in the early 1900s.

Despite the lack of old forest, a conservation assessment for the pileated woodpecker in Region 1 found that high levels of intermediate-sized trees and increases in post-fire insect outbreaks are providing increased forage for the pileated woodpecker across the region. Because of increases in the extent and connectivity of forested habitat since European settlement, the conservation assessment for the pileated woodpecker in Region 1 found viability will be maintained for the pileated woodpecker for the next 100 years. (PF Doc. WL-R139).

Management Recommendations for Pileated Woodpeckers

Adhering to the Region 1 snag management protocol (USDA 2000; PF Doc. WL-R54), and to the snag guidelines developed in association with the Upper Columbia River Basin (UCRB EIS as described in Bull et. al. 1997, UCRB EIS, Appendix K; PF Doc. WL-33 and WL-R52) help to assure snag availability for this species. Warren (1989; PF Doc. WL-R75) recommends that pileated woodpecker habitat be managed to support at least one pair per 2,500 acres. Shelterwood cuts and small group selection cuts are suitable, but not preferred, in feeding areas (McClelland 1979; PF Doc. WL-R38). Often, old growth habitats are found along stream courses in linear patterns. To provide suitable pileated woodpecker habitat, strips should be at least 300 feet in width (McClelland 1979; PF Doc. WL-R38). Habitat components include continuous blocks of 50-100 acres, 65 percent canopy closure and 20-inch diameter or larger trees, high snag density, large down wood, larch and pine preferred, 1,000-acre home ranges.

Affected Environment for Pileated Woodpeckers

Pileated woodpeckers are found in the Pacific Northwest and throughout the Northern Rocky Mountains, including Idaho and Montana. This species occurs throughout the IPNF. Pileated woodpeckers often use ponderosa pine and mixed conifer habitats for nesting and foraging. Evidence of pileated woodpecker use is lacking in the resource area. Ponderosa pine is absent in the resource area. Large-diameter snags are also in short supply due to fires at the turn of the century.

Idaho Panhandle National Forests Scale: Old growth management units (OGMUs) are the land area designated by the Forest Plan to manage old growth across the Forest. Forest Plan guidelines state that 10 percent old growth across the Forest ensures viability of old growth dependent species (Forest Plan, page V-3; PF Doc. CR-02). This will be accomplished by maintaining at least 10 percent of the Forest as old growth and retaining up to 5 percent old growth in each old growth unit to assure adequate distribution. To obtain the desired distribution, the IPNF will be managed to maintain approximately 5 percent of each Old Growth Management Unit (OGMU) as old growth where it exists (IPNF Forest Plan II-5, PF Doc.CR-001; Forest Plan Monitoring report; PF Doc.CR-023). The guidelines require that old growth be well distributed across the Forest. If an OGMU has less than 5 percent existing old growth, more can be allocated in another OGMU to meet the guidelines at the Forest or District scale.

Coeur d'Alene River Basin Scale: The table below (Table WL-7) displays current and historical forest age classes in the Coeur d'Alene River Basin. The table indicates the primary change that has occurred in pileated woodpecker habitat, or mature/old stands. Although the amount of mature age classes are similar to historical conditions, the old component of that age class has been significantly reduced. The old component provides most large diameter, long-lived snags, and down wood that are vital to pileated woodpeckers and many other wildlife species. Fragmentation of old and mature habitats has also occurred over time through urban development, road construction and timber harvest.

Table WL-5. Current and Historic Mature and Old Forests in the Coeur d'Alene River Basin.

	Shrub/Seed/Sapling	Small/Medium	Mature/Old
Percent Historic Mean	21	33	46
Percent Existing in the CDA River Basin	17	52	34
Percent Existing in Jo-Cat Resource Area	1	95	3

Watershed Scale: The Jo-Cat Resource Area is within OGMU 113. The OGMU currently contains 4.3 percent allocated old growth (32 acres of this are within the Jo-Cat Resource Area). Existing allocated old growth and potential stands to be added to the allocated old growth in OGMU 113 were evaluated using stand exams in 2006. Stand data was re-evaluated and additional information gathered over the past year to confirm that the best possible stands were allocated towards old growth. The old growth allocation in the OGMU was changed to reflect current conditions of the stands in the resource area and across the basin. Many of the stands within the OGMU will qualify as old growth over the next 50 to 60 years (refer to the Specialist's Report on Forest Vegetation). In addition, there are two stands in the Jo-Cat Resource Area that do not meet the criteria for old growth, but have an average diameter of >14"dbh and could provide for the needs of the pileated woodpecker (PF Doc. WL-31).

An explanation of the methodology used for the allocated old growth analysis is found in PF Doc. VEG-27. Definitions for allocation of old growth are from the Forest Plan (PF Doc. VEG-28), the Regional Task Force Report *Old Growth Forest Types of the Northern Region* (Green et al, 1992; PF Doc. VEG-R20) and Forest Supervisor letters of direction for implementing Forest Plan old growth standards (PF Doc. VEG-28).

Environmental Consequences to Pileated Woodpeckers

Pileated woodpecker habitat was assessed focusing on stands with an average live tree diameter of 14 inches or greater in Douglas-fir or larch (PF Doc. WL-31). It was also based on old growth allocation on the Coeur d'Alene River Ranger District and the absence of old growth within the Jo-Cat Resource Area. Only 3.5 acres of pileated woodpecker habitat would have harvest treatments under the proposed alternative.

Direct and Indirect Effects to Pileated Woodpecker Habitat Under the No-Action Alternative: No short-term effects or changes would result from the implementation of the No-Action Alternative. White pine component in the resource area would continue to be low. Larch trees would continue to provide forage. Beetle activity and insects and diseases would continue to provide snag recruitment, although the size of snags would not be optimal for pileated woodpeckers. Some stands would trend toward a mature forest component over the next 50 years, improving habitat for the pileated woodpecker. Under the No-Action Alternative, there would be no road construction or reconstruction to decrease habitat quality. The Jo-Cat Resource Area would continue to be inherently low in habitat for the pileated woodpecker and lack a mature and old forest component for the next 50 years.

Direct and Indirect Effects to Pileated Woodpecker Habitat Under the Proposed Action: The Proposed Action Alternative would retain all but 3.5 acres of pileated woodpecker snag habitat in the Jo-Cat Resource Area (PF Doc. WL-31). There would likely be additional snags created under this alternative due to prescribed fire even with measures to protect leave trees. Thinning would benefit the larch component and help it move towards old forest structure over the long term. Existing old relic larch would be favored for retention. Most large diameter larch would survive the fire. However, Douglas-fir and hemlock may experience some mortality as a result of prescribed fire. Snags and scorched trees resulting from prescribed burns would provide additional nesting and foraging habitat. The Jo-Cat Resource Area would continue to be inherently low in habitat for the pileated woodpecker and lack a mature and old forest component for the next 50 years.

Cumulative Effects/Determination of Effects to Pileated Woodpeckers: Over time, either alternative would result in a trend toward more suitable habitat for pileated woodpeckers, since some forested stands would move toward providing an old and mature component in the future. The area would never provide optimal habitat since it lacks the preferred ponderosa pine habitat. As stands increase in age, snags would continue to increase over time. Some trees, particularly larch, would provide large diameter snags in the future. Insects and disease would continue create snags. Large fires at the turn of the century in the Jo-Cat Resource Area have resulted in large expanses of forested land in the immature age category; therefore, they have reduced quality of habitat for pileated woodpeckers. Across the IPNF, past timber harvest has removed seral species and salvage logging has reduced snag numbers.

The Proposed Action is consistent with Forest Plan direction to manage the habitat of sensitive species to prevent further declines in populations which could lead to listing under the Endangered Species Act (USDA 1987, p.II-28 PF Doc. CR-002). In addition, old growth would be maintained at 10 percent across the IPNF (PF Doc. CR-002), and Forest Plan standards for snag retention would be exceeded with adherence to the R1 Snag Protocol (USDA Forest Service 2000; PF Doc. WL-R54 and IPNF 1987, PF Doc. WL-R53). These actions would also be consistent with National Forest Management Act requirements for population viability (36 CFR 219.19). A conservation assessment for the pileated woodpecker in Region 1 found short-term viability (100 years) is not an issue for the pileated woodpecker (PF Doc. WL-R139). **Activities under the Proposed Action may impact individual pileated woodpeckers or their habitat, but would not likely contribute towards federal listing or cause a loss of viability to the population or species.** There would be no impact to the pileated woodpecker or its habitat with the implementation of the No-Action Alternative.

3.G. Pine Marten (Old Growth Management Indicator Species)

Life History of Pine Martens

Pine marten inhabit late successional coniferous forests, preferring mature and old-growth fir or spruce-fir stands (Koehler and Hornocker 1977; PF Doc. WL-R90; Spencer 1981, PF Doc. WL-R50). Pine marten are used by the IPNFs as management indicators of these habitats. An important component for marten is dead trees including snags, stumps, and down logs. These are used for regulating temperature in the winter, resting, hiding from predators and reproducing (Simon 1980, Spencer 1981; PF Doc. WL-R92).

Marten prefer stands with at least 40 percent canopy closure and are usually within close proximity to cover (Koehler and Hornocker 1977; Wildlife PF doc. WL-R90, Spencer1981; Wildlife PF doc. WL-R92).

They prefer spruce-subalpine fir stands with large overstory trees, and many down logs (Patton et al. 1990; Wildlife PF doc. WL-R94). Marten will also use openings for foraging in the summer and winter (Koehler and Hornocker 1977; Wildlife PF doc. WL-R90, Spencer 1981; Wildlife PF doc. WL-R92). They prey upon small mammals, especially voles, but including squirrels, snowshoe hares, etc. They will also occasionally eat insects, berries, and songbirds (Weckwerth and Hawley 1962; Wildlife PF doc. WL-R92).

Reference Condition for Pine Martens

The marten was selected by many National Forests in the Northern Region as a management indicator species. It is used to represent species using mature and old-growth habitats (Patton and Escano; PF Doc. WL-R94).

The marten ranges throughout most of northern North America's late successional stage forests (Patton and Escano in: Warren 1990; PF doc. WL-R94). Marten are found throughout the forested regions of Idaho. In north Idaho, pine marten habitat usually exists above 4,000 feet in elevation, although they are also found in lower elevations, especially along drainages.

Management Recommendations for Pine Martens

Witmer et al (1998; PF Doc. WL-R93) describe the three major issues of concern to marten conservation and management in the Columbia River Basin in "Forest Carnivore Conservation and Management in the Interior Columbia Basin: Issues and Environmental Correlates."

- ***Conservation of late successional forest -*** Over mature stands are found to consistently be preferred habitat for the marten. Martens do not travel far from substantial forest overhead cover. Large-diameter snags, logs, and stumps provide important resting habitat for the marten. Although used as a management indicator species for old growth, in a habitat suitability model developed by Patton and Escano (PF Doc. WL-R94) stands with moist cover types, an average overstory tree size greater than 9 inches in diameter and canopy closure greater than 30 percent provide moderate habitat for the marten (PF Doc. WL-R94). Within the Jo-Cat Resource Area stands of this diameter class include small/medium structural stages.

- ***Maintenance of links between populations -*** Martens will not use habitat with minimal canopy cover. Forested travel corridors are essential for maintaining links among individuals and populations. Patton and Escano (1990; PF Doc. WL-R94) recommend that suitable pine marten home ranges be provided every 1 to 2 square miles in order to maintain viable populations. Marten rarely venture greater than

150 feet from forest cover, especially in winter (Patton and Escano; PF Doc. WL-R94). To ensure that a viable population of marten is maintained across its range, suitable habitat for individual martens should be distributed geographically in a manner that allows interchange of individuals between habitat patches (Patton and Escano, 1990; PF Doc. WL-R94).

- ***Trapping pressure and human disturbance*** - Marten are trapped commercially. Road densities contribute to trapping pressure. Pine marten are very susceptible to trapping; high road densities probably increase vulnerability. They prefer areas with road densities of less than 1 mile per square mile (Patton and Escano, 1990; PF Doc. WL-R94).

Affected Environment for Pine Martens

Pine marten are present in the ecosystem. There are no records of marten sightings within the Jo-Cat Resource Area. Due to stand-replacing fires between 1900 and 1930, low snag and downed log densities have resulted in the current good to marginal habitat capability for martens. Only 32 acres within the Jo-Cat Resource Area currently are allocated as old growth. Cool-moist and cold-moist habitat types may provide optimal spruce-fir habitats for the marten, as stands mature, primarily along the Idaho-Montana border within the resource area (PF Doc. WL-17). Immature stands (stands with overstory trees greater than 9 inches in diameter) within the Resource Area are abundant and are providing good to marginal habitat for pine marten (PF Doc. VEG-16; PF Doc. WL-R94). Stands in the spruce-fir zone will continue to trend towards optimal habitat for the marten; as they age, trees increase in diameter and forested stands succumb to insects and disease and increase the amount of down wood on the ground. All 32 acres of old growth that fall within the spruce-fir zone provide optimal habitat for the marten. There are approximately 895 acres in the Jo-Cat Resource Area on National Forest System lands that provide good to marginal pine marten habitat, as described above (PF Doc. WL-17).

The Bitterroot Divide provides a movement corridor for pine marten to disperse across its range. In addition, the 6,874-acre Maple Peak roadless area that lies partially within Jo-Cat Resource Area provides a secure area for marten populations to avoid trapping. This area could serve as source habitat for marten that could disperse into the Jo-Cat Resource Area (see Figure WL-9 in the wolverine discussion) and provides an area for marten where they are unlikely to be trapped.

Environmental Consequences to Pine Martens

<u>Direct and Indirect Effects Under Either Alternative</u>

Under either alternative, marten habitat within the Jo-Cat Resource Area would continue to be in the good to marginal quality. Immature stands would trend towards mature and in 50 years the basin should provide moderate to high quality habitat for the marten. Both alternatives would continue to provide a large dispersal corridor and secure habitat where marten would avoid trapping within the roadless area that is partially located within the Jo-Cat Resource Area.

<u>Direct and Indirect Effects Under the No-Action Alternative</u>

No change in immature stands (good to marginal habitat) would occur under the No-Action Alternative. The Bitterroot Divide would continue to provide a dispersal corridor for pine marten. If disturbance does not occur stands would provide suitable habitat in 50 years.

<u>Direct and Indirect Effects Under the Proposed Action</u>

Due to harvest there would be a slight reduction in current good to marginal quality pine marten habitat (Table WL-6). This change of 25 acres represents a 2 percent change from the current marten habitat within the Jo-Cat Resource Area. Openings within the resource area as a result of harvest could increase prey for the marten for the short term. Harvested acres would provide marten denning and foraging habitat in 125 years. No activities would occur adjacent to the Idaho-Montana border therefore no change to this travel corridor

would occur. There could be some loss of cover for the short term, but larger trees and canopies would remain allowing marten to disperse along this corridor. No treatments are located in the 32 acres of old growth, which are providing optimal habitat for the marten.

Table WL-6. Changes in habitat for the marten.

	No-Action	Proposed Action
Acres of good to marginal marten habitat	895	870
Acres of optimal marten habitat	32	32

Cumulative Effects/Determination of Effects to Pine Martens

Under either alternative, the current immature forest within the Jo-Cat Resource Area would continue to provide less than optimal marten habitat for the next 50 years until they provide old forest habitat. **There would be no impact to the marten under the No-Action Alternative. The Proposed Action would not contribute to a trend to a loss of viability to the population or species**. Viability for the marten would be maintained under the Proposed Action because movement corridors are available both inside and outside the analysis area to allow for dispersal, Region 1 snag protocol would be implemented (which exceed the 1987 IPNF Forest Plan standards), the roadless area would continue to provide a potential source of habitat for marten, and old growth would be maintained at 10 percent across the Forest (Witmer et al 1998, PF Doc. WL-R64, WL-33; USDA 2000, PF Doc. WL-R54; and IPNF 1987, PF Doc. WL-R33).

3.H. Northern Goshawk (Old Growth Management Indicator Species)

Life History of Northern Goshawks

Goshawks occupy coniferous and mixed forests throughout much of the northern hemisphere (Wattel 1981 in: Warren 1990; PF Doc. WL-R61). Goshawks prefer to nest in mature to over-mature coniferous forests with large trees, and canopy coverages of 60 to 80 percent (Hayward 1983, PF Doc. WL-R24; Saunders 1982 in PF Doc. WL-R47). Other characteristics include a stand size greater than 25 acres, gentle to moderate slopes and small, scattered openings (Hayward 1983; PF Doc. WL-R24). North-facing slopes are often preferred for nesting (Hennessey 1978, PF Doc. WL-R25; Reynolds et al 1982, PF Doc. WL-R46), although ridges and benches are often used in the Coeur d'Alene River Basin, probably due to a shortage of gentler slopes.

Figure WL-12. Photo by Mike Lane (www.nature-photography.co.uk)

The species prefers single-storied to multi-storied stands with open understories for hunting (Hayward 1983, PF Doc. WL-R24). Goshawks use snags for hunting and consuming their prey. Prey species include small mammals, songbirds, and game birds such as grouse and waterfowl (Hayward 1990 in Warren 1990; PF Doc. WL-R22). Preferred home ranges are about 6,000 acres of contiguous forest (Reynolds 1992; PF Doc. WL-R46). Goshawks are sensitive to disturbance, and may leave a nest if prolonged activity occurs nearby.

Reference Conditions for Northern Goshawk

Little historical information is available for goshawks. Urbanization, large fires, road construction and timber harvest have decreased the quality of mature forests and riparian habitat across the IPNF. Losses of nesting habitat and decreased variety and abundance of prey species often tied to riparian areas indicates that goshawks may have historically been more abundant than they are today. Populations appear to be stable in Idaho (Maj 1996; PF Doc. WL-R36). A conservation assessment for the goshawk in Region 1 found

goshawk habitat to be well-distributed and abundant on the current landscape, and that viability for the species will be maintained for the next 100 years (PF Doc. WL-R67).

Although goshawk populations are thought to be stable in Idaho, they are low in many western states, increasing the importance of existing habitat in Idaho.

Management Recommendations for Northern Goshawks

Goshawks are listed as a Sensitive species in Region 1 by the Forest Service. However, populations appear to be stable and the species has a national ranking of G5, globally secure, abundant and widespread (USDA Forest Service, Northern Region, 2004, Sensitive Species changes; PF Doc. WL-2). Region 1 has defined viability for the goshawk as one pair every 10,000 acres (Warren 1990; PF Doc. WL-R61). Recommendations have been established for management of the Northern goshawk in the Southwestern United States (Reynolds et al. 1992; PF Doc. WL-R46). These recommendations suggest goshawk home ranges are about 6,000 acres in size and consist of a nesting area of 20-25 acres, a post-fledgling family area of 400 acres, and a foraging area approximately the size of the home range.

- *Nest Areas - Three suitable and three replacement nest areas (of 30 acres, each for a total of 180 acres) are established for each known pair of nesting goshawks. Nest areas include the stand with an active nest. Other suitable nest stands include alternate or historic nests followed by the best remaining nearby suitable habitat. The three replacement nest areas are established near the stand they are intended to replace and are selected based on the condition of the effective or suitable nest stand and the likely time frame needed to provide for a replacement area.*
- *Post-fledgling Areas – Post-fledgling areas provide cover from predators and sufficient prey to develop hunting skills for newly fledged goshawks (Reynolds et al. 1992; PF Doc. WL-R46). They are described as being about 400 acres in size and correspond to the defended territory of a breeding pair of goshawks (Reynolds et al 1992s; PF Doc. WL-R46).*
- *Foraging Areas – The Southwest Guidelines recommended a vegetative stand structure of 20 percent old forest; 40 percent middle-aged and mature forest; 30 percent seedling, sapling and young forest; and 10 percent grasslands, forbs and shrubs.*

Affected Environment for Northern Goshawks

Northern goshawks occur throughout the western United States and in several northeastern states. Nesting pairs of goshawks have been documented in several areas of the Coeur d'Alene River Basin. Field reviews by wildlife biologists confirmed habitat queries that found the Jo-Cat Resource Area to be low in quality goshawk nesting and foraging habitat (PF Doc. WL-25). Based on field review, prey for goshawks is low but could increase as mountain pine beetles attract insect dependent birds. Field review found large snags to be in short supply throughout the Jo-Cat Resource Area, reflecting the younger age class found there (Northern Region Snag Management Protocol, 2000, pages 6-7; PF Doc. WL-R54; PF Doc. VEG-16). Large diameter, live overstory trees across the landscape are in very short supply in the drainage.

No goshawks have been sighted in the vicinity of the resource area (PF Doc. WL-34). Because of the low amount of suitable habitat no surveys were done for the species (PF Doc. WL-22).

The resource area lacks forage habitat for the goshawk (Table WL-7). The area lacks a mature/old component and the seedling/sapling component. The middle-aged component dominates the forest in the Jo-Cat Resource area (Table WL-7). There are only 32 acres of allocated old growth found in the resource area due to fires in the early 1900s; as a result, the area provides little nesting habitat for goshawk at this time.

Field validation found 32 acres of **suitable** goshawk nesting habitat (allocated old growth) within the Jo-Cat Resource Area (PF Doc. WL-22). Field surveys by the project wildlife biologist verified the low amount of suitable habitat identified by queries to the database (PF Doc. WL-22, PF Doc. WL-25). There are 252 acres of **capable** ("future") nesting habitat in the analysis area (PF Doc. WL-22). There is additional **capable** goshawk nesting habitat outside the Jo-Cat Resource Area. The resource area with the addition of capable habitat to the south could provide a goshawk territory at some point in the future (PF Doc. WL-22). Capable

habitats do not currently provide for the needs of the goshawk, but could over time**.** Capable habitat has been identified in the Resource Area based on forest structure, forest habitat type, and continuity (PF Doc. WL-26).

Table WL-7. Vegetative Stand Structure in Goshawk Foraging Areas of the Jo-Cat Resource Area.

Vegetative Stand Structure	% Desired Composition	% Existing Composition	%After Implementation of Proposed Action
Old	20	1.5	1.5
Mid-aged/Mature	40	96.5	91.5
Seedling/Sapling/young	30	2	6
Grass/Forb/Shrub	10	0	0

Environmental Consequences to Northern Goshawks

The following effects analysis for northern goshawks uses two methods of assessment; 1) comparison to the Southwest Guidelines (Reynolds et al 1992; PF Doc. WL-R46) desired condition for goshawk foraging areas, and 2) modeling to determine the abundance, distribution and characteristics of nesting habitat within each foraging area and show the changes that would occur in nesting habitat based on the alternative management actions evaluated. Both alternatives would maintain the immature/middle-aged component above its historic range (Table WL-13) and beyond the range that is optimal for goshawks.

No-Action Alternative: No short-term effects or changes would result from the implementation of the No-Action Alternative. Over the long term, natural mortality would result in snag and downed log recruitment. Some mature stands would move towards old growth; however, many mature stands would never achieve old growth qualities due to insects, disease and fire. The resource area and surrounding habitat could potentially provide habitat for one nesting pair of goshawks in the next 50 years (PF Doc. WL-22).

Proposed Action Alternative: With the implementation of the Proposed Action, the area would continue to lack nesting habitat for the goshawk. No treatments would occur in capable "future" goshawk habitat (PF Doc. WL-22).

Thinning to promote larch within the resource area could create some stands that could be used by goshawks in the future (25 to 50 years or more). These treatments would trend trees toward a larger diameter over time and result in the necessary large structure component that is currently absent in the Jo-Cat Resource Area. Burning activities proposed in the resource area could enhance forage habitat for goshawks.

Cumulative Effects to Northern Goshawk: The Jo-Cat Resource Area would continue to lack habitat for the goshawk. Proposed commercial thinning in the analysis area would promote a larger diameter tree and, in approximately 25 to 50 years, these areas could provide suitable nesting habitat for the goshawk. Under either alternative, habitat would continue to be low in both quantity and quality. The area would provide some forage habitat and nesting habitat in the future (Goshawk Habitat Map, PF Doc. WL-22).

There is little suitable habitat, goshawks are not known to nest in the vicinity, activities would not preclude goshawks nesting with the resource area in the future, viability across Region 1 is assured for the short term (PF Doc. WL-R139). However, there is a slight chance an undetected nest could be lost during activities. Therefore, since a slight chance an undetected nest could be in the resource area, **the Proposed Action may impact individuals, but would not likely contribute to a trend towards federal listing or cause a loss of viability to the population or the species.** There would be no impact to goshawks under the No-Action Alternative.

The Region 1 viability criteria of one goshawk nesting pair for each 10,000 acres (Warren 1990, PF Doc. WL-R61) would continue to be met with the implementation of either alternative. Adhering to Region 1 snag protocol (which exceed standards of the IPNF 1987 Forest Plan), maintaining 10 percent old growth across the forest (IPNF 1987, PF Doc. CR-002; 2004 Forest Plan Monitoring Report, pp. 66-74, PF Doc CR-026), and implementing the design features detailed in this report and highlighted in the EA (Part 3) would ensure the viability of the goshawk within the Jo-Cat Resource Area and across the IPNFs.

3.I. Rocky Mountain Elk (Big-Game Management Indicator Species)

Life History of Rocky Mountain Elk

Elk are tolerant of diverse environments and originally had a widespread distribution over much of North America. During the fall elk in Idaho generally can be found in denser cover, in response to hunting pressure. In the spring elk seem to prefer open areas where grasses and forbs provide succulent, nutritious forage.

Reference Conditions for Rocky Mountain Elk

Early records indicate that Rocky Mountain elk occurred throughout most of Idaho; however, large herds were apparently absent from the panhandle. Settlement led to exploitation of the species, causing elk to be reduced to a few isolated herds in the state. A translocation program initiated in 1915 and continuing for the next 30 years restocked elk in northern Idaho. Today, elk exceed their population level of a century ago. However, high road densities in elk habitat in northern Idaho have increased hunter success and have led to changes in hunting regulations. Ages of elk are younger with fewer experienced old cows and bulls. Winter range for the species has been greatly impacted by urban development and agriculture, and noxious weeds can have high impact on forage in some areas.

Figure WL-13*. Rocky Mountain Elk (Photo source: National Image Library; http://images.fsw.gov).*

Management Recommendations for Rocky Mountain Elk

The Forest Plan directs that forest management for elk should be coordinated with the Idaho Department of Fish and Game. The plan recommends using "Guidelines for Evaluating and Managing Summer Elk Habitat in Northern Idaho" (IDFG 1984; PF Doc. WL-R78) to evaluate elk habitat potential. Elk Habitat Units (EHUs) are the land area recommended for tracking elk habitat potential in the Forest Plan. EHUs consist of several compartments used for database management of timber stand information. Compartments are groups of stands topographically delineated and used for tracking current condition and land management activities. Road miles, road status, forage, cover, security areas and other factors that could affect elk habitat are considered in the model. A detailed report on the status of each road within the resource area is available in the project files and in the Roads Analysis for this project (refer to the Transportation Report in the Project Files). Information includes miles of each road, whether it is open year long, open seasonally or closed, the type and effectiveness of the closure device, and the condition of the road (whether it is brushed in or drivable).

Figure WL-14. Map displaying the boundaries of the Jo-Cat Resource Area (shaded) and Elk Habitat Unit 3 (Wehu3).

Affected Environment for Rocky Mountain Elk

White-tailed deer, moose and elk inhabit the Jo-Cat Resource Area, which comprises about 3% percent of Wallace Elk Habitat Unit 3. EHU 3 is comprised of 13 compartments. Major land features in the EHU are the Bitterroot Divide, Eagle Creek, Maple Peak and Pritchard Creek. The EHU is bounded by the North Fork of the Coeur d'Alene River on the west and Idaho-Montana state line on the east. Within the EHU there is a mix of ownership that includes National Forest System lands, BLM-managed lands, and private lands. Each EHU has a habitat goal developed in the forest planning process. Elk habitat values are also calculated for each compartment. However, the Forest Plan does not identify elk habitat potential goals at the compartment level. It is believed that the model is most accurate at the compartment level of analysis (communication with Idaho Fish and Game; PF Doc. WL-40).

The current elk habitat potential for EHU 3 is 56 percent, which is below the Forest plan goal of 65 percent (Forest Plan Appendix B, Summer Range Elk Management Plan; PF Doc. WL-R78). Compartments 154, 192, 197, 151, 152, 153, 155, 193, 194, 195, 196, 198 and 199 are found within the EHU. The low elk habitat potential reflects the reduction of security areas due to trail use by full sized motorized vehicles and ATVs across the EHU. The elk population target for EHU 3 is 602. Even though EHU 3 does not currently meet the Forest Plan goal for elk habitat potential, the existing average elk habitat potential for the eastern half of the Coeur d'Alene River Ranger District (formerly the Wallace Ranger District) is currently 56 percent (PF Doc. WL-39). This is above the Forest Plan goal (which is 52 percent) for this area on the eastern half of the District.

Almost 16% of EHU 3 is managed as winter range. None of this winter range falls within the Jo-Cat Resource Area. There is another 7,000 acres of high quality elk summer range (1987 IPNF Forest Plan Management Area 6) within the EHU. Mid-elevation habitat may provide transitional spring range for elk. Brush fields on south-facing slopes in the northern portion of the EHU, resulting from fires in the early 1900s, continue to provide forage habitat for big game).

The Resource Area provides an abundance of hiding cover (>90%) (PF. Doc. VEG-16). Roughly two thirds of the hiding cover stands also provide thermal cover. Thermal cover modifies climate extremes and helps animals to regulate body temperature during both the summer heat and winter cold. Snow depths are reduced beneath thermal cover canopies because conifer branches intercept snow. Most of the stands providing cover also provide some forage opportunities.

Security: Large secure areas are important for big game. These secure areas are used for calving and fawning and rearing of young. In addition, they provide places for elk to escape from hunting pressure. The recommended minimum security is 20% in an area the size of EHU3. EHU3 is below the recommended security with 16% of the EHU providing security. However, after buffering roads and motorized trails, the Resource Area has security on 18% of the area. The 421 acres of security within the project area is part of a larger 559-acre block (PF Doc. WL-19). Current open road densities within the project area are one mile per square mile (due to Highway 9).

Cover: Cover is not a limiting factor within the area. Large fires in 1910 in the Jo-Cat Resource area have resulted in ample cover throughout the project area. Cover values are incorporated into the elk habitat effectiveness model.

Environmental Consequences to Rocky Mountain Elk

As discussed, the methodology presented in *Guidelines for Evaluating and Managing Summer Elk Habitat in Northern Idaho* (Leege 1984; PF Doc. WL-R78) was used to evaluate current elk habitat potential. Changes in this potential are used to evaluate potential effects to elk habitat. The elk habitat potential model determines a numerical value for habitat suitability using factors such as the length of road, type of road, whether the road is open or closed and the distribution of forage and cover. When all habitat factors are optimal in abundance and distribution, elk potential is 100 percent. The Idaho Fish and Game recommends a minimum value of 50 percent or greater for general elk summer range (IDFG 1984; PF Doc. WL-R78).

Table WL-8. Percent Elk Habitat Potential During and After Project Activities.

Analysis Area	Goal	Existing/No-Action	Proposed Action	
			During Activities	Post Project
Elk Habitat Unit 3	65%	56%	55%	56%
Compartment 198	NA	58%	56%	58%

Table WL-9. Acres of Elk Security.

Analysis Area	Existing/No-Action	Proposed Action	
		During Activities	Post Project
Compartment 198	421 acres	312 acres	421 acres

Direct and Indirect Effects Under the No-Action Alternative: No short-term vegetative effects or changes would result from the implementation of Alternative 1. There would be a loss of forage habitat over time, as existing immature stands continue to move towards mature forest structure and vigor of brush continues to decline. As mature stands decline, there would be a reduction in thermal cover. Where mortality in lodgepole pine occurs as a result of insects, small openings would be created, providing some forage. Potential catastrophic stand-replacing fires could convert cover to forage.

Direct and Indirect Effects to Elk Under the Proposed Action: The elk habitat potential for the Resource Area would be reduced during activities because of reductions in security during implementation. This security reduction results from both new road construction and reconstruction of currently closed roads. Post sale, after all newly constructed roads and reconstructed roads are closed, the elk habitat potential for EHU3 would return to the existing EHP. Within compartment 198 the elk habitat potential would also return to the existing level. The elk habitat model gives a lower value to gated roads than the same road with an earth barrier, brush or partial obliteration. A gated road is considered less secure.

Security would be reduced slightly during sale activities with the implementation of Alternative 2. Security would return to existing levels after permanent closures (re-contour of entrance) on roads are implemented after activities.

Cumulative Effects to Rocky Mountain Elk: The District has developed a new Travel Plan that will restrict motorized use (ATVs and motorcycles) to designated trails across the District. This will improve the effectiveness and size of the elk security areas within EHU 3 by reducing ATV access into portions of the EHU where there currently are no restrictions.

Because the Forest Service has no jurisdiction over management of private lands, for modeling and analysis purposes it is not considered habitat for wildlife. However, the area may provide some values for wildlife.

Implementation of either alternative would result in the same road densities, because the District Travel Plan would be implemented under either alternative. Since the model is primarily sensitive to changes in roads densities, the implementation of the Travel Plan would result in similar post-sale Elk Habitat Potential values for either alternative.

The elk habitat model used is a cumulative effects model that includes past, current and proposed activities. Elk habitat potential was calculated for both EHU 3 and the Jo-Cat Resource Area (Compartment 198). Tables WL-8 and WL-9 display the percent elk habitat potential prior to, during, and after post-sale activities (including road closures) are complete, and the acres of elk security prior to, during and after sale activities. The Proposed Action would result in a slight increase in big-game forage. Forage is generally not considered a limiting factor for elk in the Coeur d'Alene Mountains at this time. Idaho Fish and Game, who manage elk as a hunted species and monitor their populations, insure elk viability.

4. Consistency with Forest Policy and Legal Mandates Related to Wildlife

Both alternatives would be consistent with Forest Plan management direction, goals, objectives, standards and guidelines for the management and protection of wildlife and species, as described below.

A. Elk

1. (a) Coordinate with the Idaho Fish and Game Department to allocate the distribution of habitat potential.

Idaho Fish and Game participated in the allocation of Elk Habitat Units and goals during the Forest Planning process, which is consistent with this standard.

1. (b) Identify and delineate existing and potential winter range for each elk habitat unit and establish goals for forage production suitable to support desired population levels, including such tools as designation of permanent forage areas, scheduling of timber harvest, and habitat movement.

There is no winter range within the Jo-Cat Resource Area. The Forest Plan delineated winter range as a Management Area. Forage goals were identified during the development of the elk habitat suitability model. Permanent forage areas, scheduling of timber harvest and habitat shifts are analyzed with each proposed project.

1. (c) Utilize the "Guidelines for Evaluating and Managing Summer Elk Habitat in Northern Idaho" (Wildlife Bulletin No. 11, 1984, Idaho Department of Fish and Game) for evaluation of effects of proposed activities on elk habitat (Appendix Y, Idaho Panhandle National Forests Plan).

These guidelines have been incorporated into the elk suitability model.

1. (d) Include lands of all cooperators for habitat analysis where mixed ownership is within Elk Habitat Units.

There are no specific cooperators for habitat analysis in the Jo-Cat Resource Area.

B. Threatened and Endangered species

2. (a) Management of habitat and security needs for threatened and endangered (T&E) species will be given priority in identified habitat. Results of research regarding habitat of T & E species will be incorporated into management direction as it becomes available.

Habitat conservation strategies for Threatened and Endangered species address the habitat and security needs for these species. These are identified and analyzed in the Biological Assessment. Current and ongoing research information is used in the Biological Assessment.

2. (b) Biological evaluations will be done on any project likely to have an adverse effect on identified habitats or threatened or endangered animals.

A Biological Assessment and Biological Evaluations have been completed for all Threatened, Endangered and Sensitive species.

2. (c) Current direction for management of T & E species will be amended or revised to ensure conformance with Species Recovery Plans.

All current management direction for Threatened and Endangered species, including recovery plans and strategies, have been incorporated into the Biological Assessment.

C. Bald Eagle

5. (a) Nesting, feeding and roost areas will be protected in accordance with the Pacific States Bald Eagle Recovery Plan (Appendix W, Idaho Panhandle National Forests Plan).

There are no known nest, roost areas, or feeding areas within the resource area. If any such area were identified in the future, it would be and protected from disturbance in compliance with the Pacific States Bald Eagle Recovery Plan.

5. (b) Develop site specific bald eagle nest management plan for each located eagle nest on National Forest land as outlined in the Montana Bald Eagle Management Plan (Appendix II, Idaho Panhandle National Forests Plan).

There are no known nest sites on National Forest Land of the Coeur d'Alene River District. However, measures are implemented to provide protection when forest management activities could impact an active nest on adjacent lands under other ownership. There are no known nest sites near or adjacent to the resource area.

5. (c) Cooperate in research and surveys involving bald eagles on the Forest.

District biologists participate in annual winter surveys for bald eagles.

D. Gray Wolf

6. (a) In areas of reported occurrence, consider maintenance of a high number of prey species (deer, elk) and maintenance of security through road management.

The analysis of the gray wolf was based on maintenance of prey and security. Please refer to the Biological Assessment for further information.

6. (b) Forward information on reported sightings to the Wolf Recovery Team.

All information regarding possible wolf sightings are forwarded immediately to the Wolf Recovery Team.

6. (c) Cooperate in research and data collection involving wolf and wolf habitat.

District biologists cooperate with all wolf relocation efforts and report all possible sightings.

E. Other Wildlife

7. (a) Maintain at least minimum viable populations of management indicator species distributed throughout the Forest.

Viability analysis has been done for these species. Viability thresholds have yet to be developed at the Regional Level. For additional discussion, please refer to the analysis of sensitive and management indicator species in this report.

7. (b) Maintain habitat for cavity nesting species and foraging substrates by implementation of the IPNF Snag and Woody Down Timber Guidelines (Appendix X, Idaho Panhandle National Forests Plan).

Snag requirements for this assessment are described in this report (Features Designed to Protect Wildlife Habitat"). Based on these features, snag management would meet or exceed the requirements identified in the Forest Plan and in the Regional Snag Retention Protocol (USDA 2000; PF Doc. WL-R53, WL-R54). No snags are proposed for removal as a result of this project unless they pose a hazard to forest workers.

F. Sensitive species

9. (a) Manage the habitat of species listed in the Region 1 Sensitive species List to prevent further declines in populations, which could lead to Federal listing under the Endangered species Act.

All alternatives would comply with the Endangered species Act of 1973 as amended (ESA). Forest Plan standards (Forest Plan, Chapter II, pages II-26 through II-29; PF Doc. WL-R53), in compliance with NFMA (219.20 Ecological sustainability), were incorporated into both alternatives. These standards addressed elk and elk goals, threatened and endangered species, sensitive species and old growth management indicator species. Both alternatives are consistent with Forest Plan standards regarding allocated old growth. No harvest is proposed in allocated old growth or recruitment old growth under either alternative.

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Specialist's Report on Wildlife - Appendix A
Specific TES Wildlife Species Not Addressed in Detail

Threatened and Endangered species

Bald eagle: None of the proposed harvest units would affect potential bald eagle habitat. There is no bald eagle habitat within 10 miles of the project area. Based on these features, this project would have no effect on the bald eagle.

Grizzly bear: The project does not lie within a grizzly bear recovery area. No grizzly bears have been sighted in or within 10 miles of the project area in over 10 years. Based on this, the project would have no effect on the grizzly bear.

Woodland Caribou: The only habitat for the woodland caribou is on the Priest Lake District near the Canadian border. There would be no effect upon the woodland caribou.

Sensitive Species

Flammulated owl and Pygmy Nuthatch: Jo-Cat source area lacks dry-site habitat and ponderosa pine habitats preferred by the flammulated owl and pygmy nuthatch. There is no habitat for the flammulated owl and pygmy nuthatch within the resource area. Therefore no further analysis for these species is necessary.

Boreal toad: Boreal toads require shallow water in ponds, lakes or slow-moving streams for breeding sites. This species does not require much aquatic or emergent vegetation in its breeding habitat. After the brief spring breeding season, adult toads leave aquatic habitats and travel to a variety of upland habitats. Radiotelemetry research on boreal toads in southern Idaho found that toads can travel up to 2 kilometers (about 1 mile) from their natal ponds; it also showed that toads avoided crossing openings (Bartelt, 1994). Boreal toads in Colorado have been documented traveling up to 2.5 miles away (Loeffler, 1998).

Boreal toads hibernate in the winter in habitats with a high humidity and above-freezing temperatures. Areas that provide shelter for hibernating toads include rodent burrows, beaver dams and slash piles. It is important that toads be able to move among their seasonal habitats. According to Nussbaum et al., optimal habitat probably has moderate to dense undergrowth in more humid regions. The biggest potential barrier to their movements is roads. Steep roadcuts can be a barrier to toads moving between seasonal habitats. Juvenile toads are vulnerable to being killed by motorized vehicles when they are dispersing from their natal ponds. Preliminary analysis shows that inland Native Fish Strategy guidelines concerning riparian habitat conservation areas within 150 feet of the edge of wetlands would prevent sedimentation of toad breeding habitat. Road removal or improvement would benefit toads by eliminating a potential sediment and mortality source near the wetlands. It was determined that there were adequate design criteria to protect boreal toads and their habitat.

In addition, the closest potential breeding ponds are over 2 miles away from the Jo-Cat Resource Area. Boreal toads may travel up to 2.5 miles away from breeding habitat. However, no logical travel corridor for the toads leading from the breeding ponds to the resource area exists. Travel would require toads crossing the Idaho-Montana border.

Common loon: Loons are large, heavy-bodied birds with their legs and feet positioned far to the rear. This allows them to propel quickly under water but renders them unable to walk well on land or to take off without a long expanse of water. They require lakes of at least 10 acres in order to gather enough speed to take off. Lakes suitable for nesting are 10 acres or larger with emerging shoreline vegetation and secluded areas for nesting and brood rearing (USDA Forest Service, 1989). Loons have been sighted on Coeur d'Alene Lake and Fernan Lake. Since loons are located on lakes, the proposed actions would not affect habitat for loons. No further analysis and discussion is necessary for this species.

Harlequin duck: Harlequin ducks were sighted on the Coeur d'Alene River and the North Fork of the Coeur d'Alene in 1991. No harlequin ducks were found on the Coeur d'Alene River District during two years of surveys. Most recently, a pair of harlequin ducks were spotted in Fern Creek during the summer of 1999. In 1982, harlequin ducks were seen in Tepee Creek. In 1987, there was a pair seen on the east end of the district, northeast of Cathedral Peak in the Coeur d'Alene River. There are no suitable streams for harlequin ducks within or adjacent to the Jo-Cat Resource Area. Therefore, no further analysis or discussion is warranted.

Northern bog lemming: The northern bog lemming is listed as a sensitive species on the IPNF. There are no known observations of this species on the Coeur d'Alene River Ranger District. The range of the northern bog lemming is not thought to extend south of the Kaniksu Forest on the IPNF (Reichel and Beckstrom, 1993). For these reasons activities in the Jo-Cat Resource Area would have no effect on this species. Due to the absence of the species from the District and the resource area, no further analysis of this species is warranted.

Peregrine falcon: Peregrine falcons are seasonal migrants nesting in northern temperate regions and wintering southward. Peregrines typically nest on cliffs higher than 100 feet with overhanging ledges and a vertical surface that provides protection from predation. Foraging areas are associated with nest sites and can include wooded areas, marshes, grasslands, and open water. There are no known historic eyries (nest sites) or potential nesting habitat in the Jo-Cat Resource Area. Peregrines have been observed around the Rathdrum Prairie in fall as they are migrating to winter range, and one individual was reported north of I-90 in 1993. Based on lack of suitable or potential habitat, and that there are no known occurrences of the species in the watershed, no further analysis is warranted.

Black swift: The black swift is a long-distance neotropical migratory bird that breeds in western North America in close association with mountain waterfalls or sea-side cliffs (Knorr 1961, Foerster 1987, Dobkin 1994 all in Schultz et al 2001). Known breeding populations are disjunct and are associated with highly specialized habitat characteristics (Schultz 2001). There are five known black swift nests near a waterfall approximately 20 miles south east of the Jo-Cat Resource Area. This habitat is very specific and no similar habitat is found within the Jo-Cat Resource Area. Based on lack of suitable or potential habitat, and that there are no known occurrences of the species in the watershed, no further analysis is warranted.

Coeur d'Alene salamander: Coeur d'Alene salamanders are restricted to cool, damp aquatic habitats that have stable temperatures and moisture levels. The species has been found in three main types of habitat in northern Idaho; springs seeps, the spray zones of waterfalls and along stream edges between 1,800 and 3,500 feet in elevation. There are no past sightings of Coeur d'Alene salamanders within the Jo-Cat Resource Area. Elevations in the project area are high and above the preferred elevation for the Coeur d'Alene salamander. Therefore, now further analysis is warranted.

Townsends big-eared bat and fringed myotis: Townsend's big-eared bats use caves and cave-like structures for hiberncula in winter and for summer roosts by nursery colonies. They occasionally use bridges and old buildings for roosting and in some places have been known to use building attics as nursery sites.

Fringed myotis use caves, mines, and buildings as hibernacula and maternity roosts (Montana Animal Field Guide, PF Doc. WL-R100; Schmidt 2003; PF Doc. WL-R101). Snags, especially those sloughing bark, are important day roost habitat for the fringed myotis (Schmidt 2003, PF Doc. WL-R101). The species habitat consists of low elevation old growth or ponderosa pine (Rasheed et. al. 1995; PF Doc. WL-R138).

There is one adit on the western boundary of the Jo-Cat Resource Area. However, the closest activity will occur over ½ mile away from this adit. No disturbance would occur around or near the adit. The project area is located at higher elevations, lacks ponderosa pine and old growth habitat. Harvest activities would occur in lodgepole pine which does not provide the type of sloughing bark required by this species. Bats may forage in the Resource Area however, roosting habitat is only provided by the adit that is located ½ mile from any activities. Therefore, no further analysis is warranted.

Fisher: Fishers are associated primarily with northern coniferous forests (Powell 1982 in Arthur 1989; PF Doc. WL-R42). These species inhabit late successional coniferous forests preferring old growth or spruce-fir stands (Powell 1994, PF Doc. WL-R88). Fishers den in hollow logs, under rocks, and in holes in trees. They are mostly arboreal and hunt in the trees. However, they also forage on the ground.

Today, the range of the fisher in the United States includes portions of the Appalachian Mountains from New England south to West Virginia, northern Wisconsin, Minnesota, Michigan, northern Idaho, western Montana, and as far south as northern California along the West Coast (Allen 1983 in: Washington Department of Wildlife 1990; PF Doc. WL-R1). They are generally found at lower elevations.

There is no suitable fisher habitat within the Jo-Cat Resource Area. In addition, the area lacks riparian old growth and low elevation riparian habitat. Therefore, no further analysis is warranted for this species.

Nongame and Neotropical Migrants: The habitat needs of these species are addressed through the analysis for the goshawk, pileated woodpecker, marten and black-backed woodpecker. Analysis for these species focuses on old forest structure and snags.

Report on Recreation Related to the Proposed Jo-Cat Resource Area Project

Prepared by Jack Dorrell
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February 2007

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SPECIALIST'S REPORT ON RECREATION IN THE JO-CAT RESOURCE AREA

1. Regulatory Framework

Idaho Panhandle National Forest Plan: Recreation goals and objectives identified in the Forest Plan (Forest Plan, Chapter II) are to provide for the projected use of developed recreation areas with development of new sites as budget becomes available, to provide for a variety of dispersed recreation opportunities (both motorized and non-motorized), to pursue opportunities to increase and improve the recreation trail system, and to continue to increase cooperative trail programs with organizations, clubs and other public agencies.

The Forest Plan allocated different management prescriptions to Inventoried Roadless Areas. Some areas were allocated to prescriptions that retain unroaded characteristics (Management Areas 10 and 11). Other roadless areas were allocated to prescriptions that retained semi-primitive characteristics that allow timber harvest and road construction.

Roadless Area Conservation Final Rule: On January 12, 2001, the Department issued a final rule accompanied by a FEIS and Record of Decision (published as part of the final rules, 36 CFR 294, Special Areas, Roadless Area Conservation, on January 12, 2001, at 66 FR 3244). On May 10, 2001, the Idaho District Court enjoined the Forest Service from implementing all aspects of the Roadless Area Conservation Rule as well as a section in the Forest Planning Rule that addresses the inventory and evaluation of the roadless areas during Forest Plan revision. On July 10, 2001 the Forest Service issued an advance notice of proposed rulemaking and request for comments in the Federal Register (Volume 66, Number 132).

Interim Directive No. 7710-2001-2: Reserves to the Chief of the Forest Service the authority to approve certain proposed road construction or reconstruction projects in Inventoried Roadless Areas until revision of a land management plan or the adoption of a plan amendment that has considered the protection or other management of Inventoried Roadless Areas as defined in FSM 7712.16a.

Interim Directive No. 2400-2001-3: Reserves to the Chief of the Forest Service the authority to approve or disapprove proposed timber harvest in Inventoried Roadless Areas (FSM 7712.16a), except for those listed in section 2404.15, paragraph 13.

Wilderness Act of 1964: The Wilderness Act defines four requisite attributes of wilderness: natural integrity, apparent naturalness, outstanding opportunities for solitude and opportunities for primitive recreation. These attributes are applied to the conditions inside the boundaries of the wilderness. Although the experience of wilderness visitors might be affected by activities outside the wilderness boundary, the Wilderness Act does not require that adverse effects associated with those activities to be mitigated.

2. Methodology

Determination of the existing conditions for recreation activities, facilities and opportunities is derived from facility inventories, facility maintenance work, observation by recreation specialists and technical personnel, and contact with recreation user groups and individuals. Guidance for management of recreation resources is provided in various National Forest manuals and handbooks, as well as professional publications and documents.

Forest Service Recreation Planners also make use of the Recreation Opportunity Spectrum (ROS) as a framework for understanding recreation facilities, opportunities and settings to meet the visitor's needs for a desired set of outdoor recreation experiences.

Each Inventoried Roadless Area is described in detail in the Idaho Panhandle National Forests Plan (FEIS, Addendum to Appendix C, Roadless Area Evaluation). The effects analysis area is the individual Inventoried Roadless Area. Effects on Inventoried Roadless Areas only occur within that area.

The following seven wilderness-like attributes are the basis for evaluating the effects of the alternatives using proximity and qualitative descriptions.

- ***Natural integrity*** *(the extent to which long term ecological processes are intact and operating)*
- ***Apparent Naturalness*** *(means the environment looks natural to most people)*
- ***Remoteness*** *(perceived condition of being secluded and inaccessible)*
- ***Solitude*** *(personal, subjective value defined as isolation from sights, sounds and human development)*
- ***Special Feature*** *(unique geological, biological, ecological, cultural or scenic features)*
- ***Manageability and boundaries*** *(ability to manage a roadless are to meet minimum size criteria, which is 5,000 acres for wilderness)*
- ***Special Places*** *(what it is about the area that causes one to visit the area?)*

3. Existing Conditions

The Jo-Cat Resource Area contains only one recreational development. Approximately 2.5 miles of the Stateline Trail, (Forest Service System Trail # 7), lies within the resource area. This trail is a component of the Idaho Centennial Trail system that begins in the Teton Mountains and follows various trails north to the Canadian border. Some of this trail system is incomplete and some by necessity follows segments of low standard roads, as does a portion of Trail 7. This trail combined with several others in Idaho and Montana forms a route that straddles the high divide of Idaho and Montana that runs from Lookout Pass, north, to Idaho Point. It is 33 miles in length. In a few places the trail uses some low standard roads to avoid shear geographic features. The trail is open to motorized trail bikes at a very difficult level and is also difficult for horse riding. It is best suited for hikers looking for a trail that features high country vistas and desire a physical challenge.

Within the Resource Area the trail is a single tread route that is located west of the state line divide. This segment of trail runs from Thompson Pass, 4860 feet elevation, north to the Maple Peak Roadless Area, 6100 feet elevation. The trail is in dense timber though most of this segment. There are infrequent views to the west through gaps in the tree and brush cover. Other trails near, but not inclusive in the Jo-Cat Resource area are the Revett Lake Trail and the Blossom Lakes Trail, (Montana).

Thompson Pass features a large turnout area where many travelers pull off Forest Highway 9. The view to the west that includes the Jo-Cat Area is very pleasing. The pass also serves as trailhead parking for the Blossom Lakes Trail.

The Maple Peak Inventoried Roadless Area, number 01141, lies along the north boundary of the Jo-Cat Resource Area. The IRA is 8,674 acres in size. Approximately 369 acres of the IRA is within the boundary of the Jo-Cat Resource Area. The IRA boundaries are established by the Idaho Panhandle National Forest Plan. The Forest Plan direction for management of this area is to provide an opportunity for semi-primitive recreation. Alterations to the IRA boundary can only be approved by the Forest Supervisor (36 CFR. 219.10) and occur during the forest planning or Forest Plan revision process.

4. Environmental Consequences to Recreation

No Action Alternative

Travel along the Stateline Trail would continue as presently managed. Centennial Trail status is unaffected. There is some risk of large scale fire burning over the trail. In 2006 the Ulm Peak Fire approximately 20 miles to the north of the Jo-Cat area burned over Trail 7. Due to the widespread beetle mortality the fire risk in the Jo-Cat Resource Area may be increasing. The opportunity for semi-primitive recreation remains the same in the Maple Peak IRA.

Cumulative Effects under the No Action Alternative:

There are no long or short term cumulative effects to recreation opportunities, settings or facilities. The Maple Peak IRA is unaffected.

Action Alternative

Direct and Indirect Effects under the Action Alternative: The proposed activities are mostly temporary in nature. Harvest activities and burning of woody debris would be of short duration and have only a short-term effect on the recreational setting of the area. The harvest and burning combined would have a minor effect on the community recreation and tourism plans but could, through the temporary effects of short term trail closures and smoke during burning operations, cause people to avoid the area for a short time. Hunting in the area may be disturbed in and near logging and burning operations. Log haul would increase traffic on roads, warranting additional care for travelers during the operational period, however this would be limited to the junction with Forest Highway 9 since Road 6006 would not be opened to public motorized use. There would be some noise disturbance with the logging activity, especially helicopter operations. However, some noise disturbance from vehicles is already common in the area due to trucks ascending and descending the steeply graded Forest Highway. There would be no effect on winter season travel by snowmobiles other than the remote possibility that an operator might plow snow from Forest Highway 9, for a short period, immediately after the Shoshone County Highway Division terminates plowing for the season.

Timber harvest in proposed unit numbers 2, 4, 5 and 6 would have a direct effect on the Stateline Trail. The trail will be kept open during the majority of the timber harvest and burning operations, but would be closed on a temporary basis when operations make it unsafe to be on the trail. Units 4 and 5 are proposed for lodgepole pine removal and will be largely cleared of trees, except for scattered residuals. The effect to the trail would be to create some open areas in otherwise dense timber. These points will afford the trail user an opportunity to get some long distance views. Three to four hundred feet of the trail would be so affected in each location. Units 2 and 6 would be partial cut harvests. Trees will remain adjacent to the trail but thinned out when compared to the surrounding forest. Unit 5 is scheduled for ground-based yarding. Harvested timber would be skidded across the trail in one or two locations. The trail tread will be required to be restored in these locations and any logging slash removed from the trail. A machine fireline is planned to be constructed between units 5 and 6. This machine fireline will not be extended across the trail. If needed, hand fireline will be utilized above the trail location. See Features Designed to Protect Recreation Trail Facilities (EA, Chapter 2) for more details.

Maple Peak Inventoried Roadless Area:

None of the proposed actions are within the boundaries of the Maple Peak Roadless Area. There is a good possibility that burning operations for units 8 and 15 would affect the IRA. There will be no fire lines constructed along the top of these units which also happens to be the boundary of the IRA (the location of which was established on the ground using GIS technology, current mapping resources, aerial photos and compass). Some low intensity fire could enter the IRA. It is expected that light fuels and natural fuel breaks would limit fire incursion to less than 200 feet distance. Fire and fuels management is fully compatible with management direction for an IRA. None of the seven wilderness-like attributes would be affected.

Cumulative Effects under the Action Alternative:

Cumulative effects of the actions proposed for the Jo-Cat Resource Area on Recreation facilities, opportunities and settings are negligible. Temporary disruption of the use of Trail 7 is the only measurable effect which in turn would have no measurable effect on recreation activities in other locations.

Roads within the area will not contribute to incursion of ATV's and other vehicles into or near the IRA, because public motorized use would be prohibited in accordance with CFR regulations during sale activities and reinforced with a gate. After activities, road recontouring in two places will physically block access.

During operations within the Jo-Cat area, recreation trail hiking opportunities will be available on the Revett Lake Trail 7 and the Blossom Lakes Trail 404. Both are immediately south of Thompson Pass. Trail riding opportunities for motorcycles remain available at the Granite Peak Trail 140 located 5 miles west on Forest Highway 9.

5. Consistency with Forest Plan and Other Legal Mandates

The Forest Plan identifies specific goals and objectives related to providing a variety of recreation opportunities and settings (Forest Plan, pages II-1 and II-3). The following standards apply to recreation management in the Jo-Cat Resource Area:

1. The Forest will continue to provide a share of recreation opportunities and diversity in relation to other public and private entities; recreation planning and operations will be coordinated with other federal, state, local and private recreational managers.

Both alternatives would continue to provide a diversity of recreation opportunities. Trail density in the inventoried roadless area is low and would not be changed under any alternative. Coordination with other recreation managers is done on an ongoing basis throughout the Coeur d'Alene River Ranger District. Based on this information, all alternatives would meet this standard.

2. Forest Service recreational programs will be complementary with other public and private programs where possible.

Recreational programs on the Coeur d'Alene River Ranger District are complementary with other recreational programs provided by county, state, and private facilities. The activities proposed under the action alternative would not change this situation; therefore all alternatives would meet this standard.

3. Consult with recreational users and other recreational suppliers to coordinate public needs.

Consultation occurs with recreational organizations on an ongoing basis, and with the recreating public at large through project scoping. Recreation needs in the Jo-Cat area have been considered and will be provided under all alternatives. Based on this information, all alternatives would meet this standard.

7. Provide a broad spectrum of dispersed and developed recreation opportunities in accord with identified needs and demands. Enhance user experience by on and off-site interpretation.

A broad spectrum of dispersed and developed recreation opportunities are provided in the Jo-Cat Resource Area in response to public needs and demands. The Recreation Opportunity Spectrum (ROS) classification system has identified the area as having a "roaded natural setting." Geography of the Jo and Cat Creek drainage limits development to trail developments and limited dispersed recreation. Trail user education can be provided as necessary. Based on information all alternatives would meet this standard.

8. On proposed developed sites treat and maintain timber stands in a manner compatible with recreation objectives prior to development.

Current recreation objectives would be maintained under all alternatives, and potential for future recreation developments would be unaffected. Based on this information, all alternatives would meet this standard.

9. Trailhead facilities in dispersed areas will be minor and limited to resource protection. Off-site interpretation is encouraged.

At this time, no expansion of trailheads in the area is warranted. It is expected that this may change over time due to the trend of increasing use. At that time, trailheads would be improved to protect natural resources. Improvements normally include informational signing. This trend and the resulting improvements would occur under any alternative; all alternatives would be consistent with this standard.

10. Trails will be managed in accordance with management area requirements as identified in a more site-specific analysis of needs.

The No-Action Alternative would not have any affect on area trails. Under the action alternative, standards for trails would be met. Forest Plan management direction for inventoried roadless lands adjacent the Jo-Cat Area is *semi-primitive, motorized.* This remains unchanged by the proposed activities.

12. Maintain the free flowing characteristics of rivers identified as eligible for consideration as part of the National Wild and Scenic Rivers System pending suitability. Identified rivers will not be modified to the degree that eligibility or classification would be affected.

This standard is not applicable to the Jo-Cat Resource Area.

6. References Cited

State of Idaho, Department of Parks and Recreation, Statewide Comprehensive Outdoor Recreation & Tourism Plan,2003-2007

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Specialist's Report on Scenic Resources in the Jo-Cat Resource Area

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February 2007

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Appendix A - Photos

SPECIALIST'S REPORT ON SCENIC RESOURCES IN THE JO-CAT RESOURCE AREA

1. Regulatory Framework and Methodology for the Scenic Resources Analysis

Scenery management direction is provided by the Forest Plan and is described in terms of Visual Quality Objectives. The objectives are based on the area seen from sensitive travel corridors and on other features that result in a high visual sensitivity level. The visual management system was revised in 1995, and is now known as the Scenery Management System. The revised guidelines are provided in "Landscape Aesthetics: A Handbook for Scenery Management," (USDA Forest Service, 1995). Computer simulation and photography is often used to assist in determining the effects to scenery from the proposed management. (Consult the Resource Area analysis process file).

2. Existing Scenic Resource Conditions

The Jo-Cat Resource Area is visible from Forest Highway 9 which is identified in the Idaho Panhandle National Forest Plan as a visual sensitivity level 2 travel way and location. The Resource Area that can be observed from the Forest Highway and Thompson Pass parking area forms a middle-ground view and a back-ground view as well. Of most concern is the parking stop at Thompson Pass where many people enjoy the long range vistas to the west. The Jo-Cat Resource Area makes up a part of this view. The Stateline Trail # 7 is a Forest Service trail that runs for about 2.6 miles in the Resource area. The trail is also considered as sensitivity level 2 for visual quality standards.

A sensitivity level 2 rating means that observed portions of the National Forest be retained as *partial retention* for foreground views and as *modification* for middle-ground and background views.

The present Forest Plan was developed in 1987. Since that time Forest Highway 9 was reconstructed, paved and a large turnout created at Thompson Pass. Traffic on the highway has increased significantly, in particular tourism travel. Because of this it was decided that views from Thompson Pass be regarded with extra sensitivity than provided for in the Forest Plan.

3. Environmental Consequences to Scenic Resources

A. No-Action Alternative

With no proposed activities, there would be no direct or short-term effects to the scenic condition of the area. However, beetle mortality is evident with numerous large patches of red trees. This red appearance is an "eye-catcher" in terms of not the expected green background appearance when looking across the forest terrain. This will likely continue for several years. Eventually, as mortality declines and needle shed occurs, the green background vegetation becomes more apparent. Large concentrations of dead trees may give the general appearance of unhealthy forest conditions. Over the long term, increasing vulnerability to wildfire in the area may bring detrimental changes to the scenic conditions (such as blackened landscape, loss of vegetation, etc.).

B. Proposed Action Alternative

The location where scenic integrity is of greatest concern is the view of the landscape to the west of the Thompson Pass parking area. From this stopping point on Forest Highway 9, Cat Creek and surrounding ridges are highly visible. The Jo-Cat Resource Area forms part of this scene as a middle-ground view. The remainder of the views includes Prichard Creek valley and the slopes of Maple Peak and Round Top forming background views. The view is pleasing but not spectacular. There is much evidence of human development, the most obtrusive being the large highway road-cut in Cat Creek. Also visible is the natural gas pipeline corridor in Prichard Creek valley.

Table REC-1. Visual effects of proposed units in the Jo-Cat Resource Area.

Unit	Effect
1	This commercial thinning unit would not be easily noticeable from Thompson Pass or Trail #7, and only briefly noticeable when on Highway 9. Standards for the *partial retention* visual quality objective would be met.
2	This unit is a thinning treatment that would enhance the variety of the scenery along Trail #7 by creating a more open stand of forest, as opposed to the other dense stands that surround this trail. *Partial retention* visual quality objectives along the trail would be met.
3	This commercial thinning unit would not be easily noticeable from Thompson Pass or Trail #7, and only briefly noticeable when on Highway 9. Standards for the *partial retention* visual quality objective would be met.
4	This unit would have cleared openings that would detract from the foreground view for a period of about 3 years, but over time would provide more scenic diversity by creating views out of the dense timber.
5	From Thompson Pass, the unit would be partially seen as an opening in the tree line to the northeast of the highway cut and switch-backing road grade. From Trail #7, this unit would have cleared openings that would detract from the scenic view for a period of about 3 years, but over time would provide more scenic diversity by creating views out of the dense timber.
6	Thinning in the unit would enhance the variety of the scenery along Trail #7 by creating a more open stand of forest, as opposed to the other dense stands that surround this trail.
7	This commercial thinning unit would not be easily noticeable from Thompson Pass, Highway 9, or Trail #7, and would meet standards for the *partial retention* visual quality objective.
8	The unit would be very visible from Thompson Pass. The unit would form a new opening in the timber cover, with 90% of the trees removed. The top of unit 8 runs adjacent to the Maple Peak Roadless Area boundary, but no harvest would occur within the roadless area. Adhering to the roadless boundary would result in a straight mid-slope line edge, although somewhat lessened by a finger ridge crown in the middle. Over time, this edge would soften as trees killed by beetles begin to fall in the roadless area. Some fire encroaching into this area during burning operations may also help to expedite the softening of this timber edge. The unit would still meet the standards for the *modification* visual quality objective because it would appear as a natural opening and is in scale with other human developments in the area.
9	The unit would be very visible from Thompson Pass. The unit is a lodgepole pine salvage, which would leave enough trees in the unit to create only a subtle change in the vegetative cover.
10	The unit runs along the crown of the divide ridge between Jo Creek and Cat Creek drainages. Portions of the unit are visible from Thompson Pass. As a salvage harvest, this unit would barely be noticeable.
11	The unit runs along the crown of the divide ridge between Jo Creek and Cat Creek drainages. Portions of the unit are visible from Thompson Pass. Unit 11 would appear as an opening that is in scale with and mimics other natural openings in the visible landscape, *modification* visual quality standards would be met. A portion of the unit would also be visible from a short section of Highway 9 traveling eastbound. The road would be visible within Unit 11 as enough ground would be exposed to reveal it. The visual effects would be largely mitigated by the gentle slope over which the road would be built.
12	The unit runs along the crown of the divide ridge between Jo Creek and Cat Creek drainages. Portions of the unit are visible from Thompson Pass. Unit 12 would be thinned and blend in well with larger natural openings in the immediate background and foreground. The unit would also be visible from Highway 9, but would not likely be very noticeable to travelers. The road constructed to access the unit would be visible as small breaks in the tree cover.
13	The unit runs along the crown of the divide ridge between Jo Creek and Cat Creek drainages. Visible from Thompson Pass, Unit 13 would be mostly cleared of trees but would fit in well with natural-appearing openings surrounding the unit. The unit would also be visible from Highway 9, but the view is mitigated by natural openings just to the south of the unit. Visual quality standard of *modification* would be met or exceeded.
14, 15	These units would appear as distant background openings that would blend in with the large rock fields and openings on the high ridge southwest of Maple Peak. The size and shape of the unit openings and partial cut units collectively would easily meet the Forest Plan VQO Standard of *modification.* Care was taken in the layout and sizing of the units, with irregular shaped boundaries, so they would meet the higher visual standard of *partial retention* at the landscape level.
16	This thinning unit would be noticeable primarily from side views. The harvest treatment would met *partial retention* visual quality objectives.

The Jo-Cat units which are visible from the Thompson Pass viewpoint fall within the Forest Plan visual quality object of *modification*. With this designation, management activities may visually dominate the original landscape features. However, activities of vegetative and landform alteration must borrow from naturally established lines, form and color at such a scale that the managed areas mimic the surrounding landscape character.

Vegetative management units visible from Thompson Pass are: Unit 5 that can be partially seen as an opening in the tree line to the northeast of the Forest Highway 9 road grade. Units 8 and 9 are very visible. Unit 8 will form a new opening in the timber cover with 90% of the trees removed. Never the less the units will meet *modification* VQO standards because they appear as natural opening and are in scale with other human development in the area. Due to the elevated sensitivity of the Thompson Pass viewpoint these units were designed to actually meet *partial retention* visual quality standards. Unit 9 is a lodgepole pine salvage treatment which will leave enough trees in the unit to create subtle change in the vegetative cover.

Units 10, 11, 12 and 13 run along the crown of the divide ridge between Jo Creek and Cat Creek. Portions of these units are visible from the Pass. Unit 10 as a salvage cut will be barely noticeable. Unit 11 will appear as an opening that is in scale with and mimics other natural openings in the visible landscape. Unit 12 is a unit that will be thinned and blends in very well with larger natural opening in the immediate backround and front ground. Unit 13 is another unit that will be mostly cleared of trees but it does fit well with substantial natural appearing openings surrounding the unit.

Units 14 and 15 will appear as distant background openings that will blend in with the large rock fields and timber free openings on the high ridge southwest of Maple Peak.

The size and shape of the unit openings and partial cut units collectively will easily meet the Forest Plan VQO Standard of *modification.* Care was taken in the layout and sizing of the units, with irregular shaped boundaries, so they would meet the higher visual standard of *partial retention*.

Of lesser concern is the view that some units present for vehicles traveling Forest Highway 9, eastbound. In this case the vehicles are moving at an average highway speed of 45 miles per hour. In order of appearance, a portion of unit 11 will be visible, with its more open character, for a short period. The partial harvest of Unit 12 will be visible for a longer period of time but is expected to not be that noticeable to the traveler. Unit 13 will appear as an opening that is mitigated by natural openings just to the south. Unit 16, a thinning unit, would be barley noticeable if the drivers or passengers cared to crane their necks in an uncomfortable position to look up the slope.

Units 8 and 9 are probably of the greatest impact to observers traveling east. These units will appear in the windshield for about 30 seconds to a vehicle ascending the steep grade up Cat Creek. Unit 9 will have some thinned timber within it and unit 8 will be an opening in the tree cover. *Modification* VQO will still be met because the shape and size of the opening resemble natural forms existing in the area, with one exception. The top of unit 8 runs adjacent to the Maple Peak roadless boundary. No harvest will occur in that area. This will result in a straight mid-slope line edge, although somewhat lessened by a finger ridge crown in the middle. Over time, this edge is expected to lessen as the beetle mortality within the roadless area begins to fall. Some fire encroaching into this area during burning operations may help to expedite the softening of this timber edge.

The road constructed to access units 10, 11, and 12 is visible as small breaks in the tree cover. The road will visible within unit 11 as enough ground will be exposed to reveal it. The visual effects are largely mitigated though by the gentle slope over which the road will be built. The result of road construction on lesser slopes is that most of the road cut is not visible. A good example of a visually dominant and immediately noticeable road cut on very steep land is the highway cut in the Cat Creek drainage (Scenery Appendix A).

Many of the units can be seen in part by motorists on the Highway but the sight duration, angle of view and partial cut treatments will not attract attention and are indistinguishable from natural features.

One other point of scenic concern is the views presented by logging and fire line construction for units 4, 5 and 6 upon the Stateline Trail # 7. The reader here should consult the Recreation and Features sections in this document for proposed mitigations to the impact to the trail. The units present a foreground view from points on the trail that are within or near them. The VQO for these viewpoints is *partial retention*

Units 2 and 6 are thinning treatments that will enhance the variety of the scenery by creating a more open stand of forest as opposed to the dense stands that surround this trail everywhere else. Units 4 and 5 will be cleared openings which for a short period of less than three years will detract from the scenery, but over time the clearings bring some scenic diversity by creating views out of the dense timber. Of the 2.6 miles of the trail within the Jo-Cat Resource area approximately ¼ mile is affected by adjacent treatment and this is scattered over 3 separate locations.

C. Cumulative Effects in the Action Alternative

The collective scenic effects of the proposed action are negligible. Most of the management is unseen by visitors traveling open routes in the area. An ample amount of heavily forested lands will be retained in the Jo-Cat Resource Area. The landscape in the vicinity has features similar to that of the Resource Area. There is no shortage of natural landscapes in the Bitterroot Mountain Range. There are no outstanding scenic features within the Resource Area that are anything more than common in vegetative cover and geologic features.

4. Consistency with the Forest Plan and Other Legal Mandates for Scenic Resources

The Forest Plan identifies specific goals and objectives related to protection of visual (scenic) quality (Forest Plan, pages II-1 and II-4). The following standards (Forest Plan, pages II-25 and II-26) apply to visual management:

1. Meet adopted visual quality objectives (VQO's). Exceptions may occur in unusual situations; these will be identified through the project planning process involving an interdisciplinary team…Mitigation measures should be developed for areas when VQO's are not met.

All alternatives would be consistent with this standard. The No-Action Alternative would have no short-term visual effects because no openings would be created by timber harvest. The Proposed Action would affect the scenic condition in the area as observed from Sensitivity Level 2 locations. VQO's would be met if harvest areas that are under burned maintain a living stand of trees at about 15 trees per acre.

2. The visual resource has been evaluated based on visual sensitivity levels assigned to travel routes, use areas, and water bodies in and adjacent to the IPNF. Adjustments in VQO boundaries based on project level analysis will conform to principles in FSM 2380.

There would be no adjustments to VQO boundaries under either alternative; therefore both alternatives would be consistent with this standard.

Specialist's Report on Scenery - Appendix A

Photo #1 – Existing view from Thompson Pass toward Resource Area

Photo #2 – Visual interpretation of view with Proposed Action

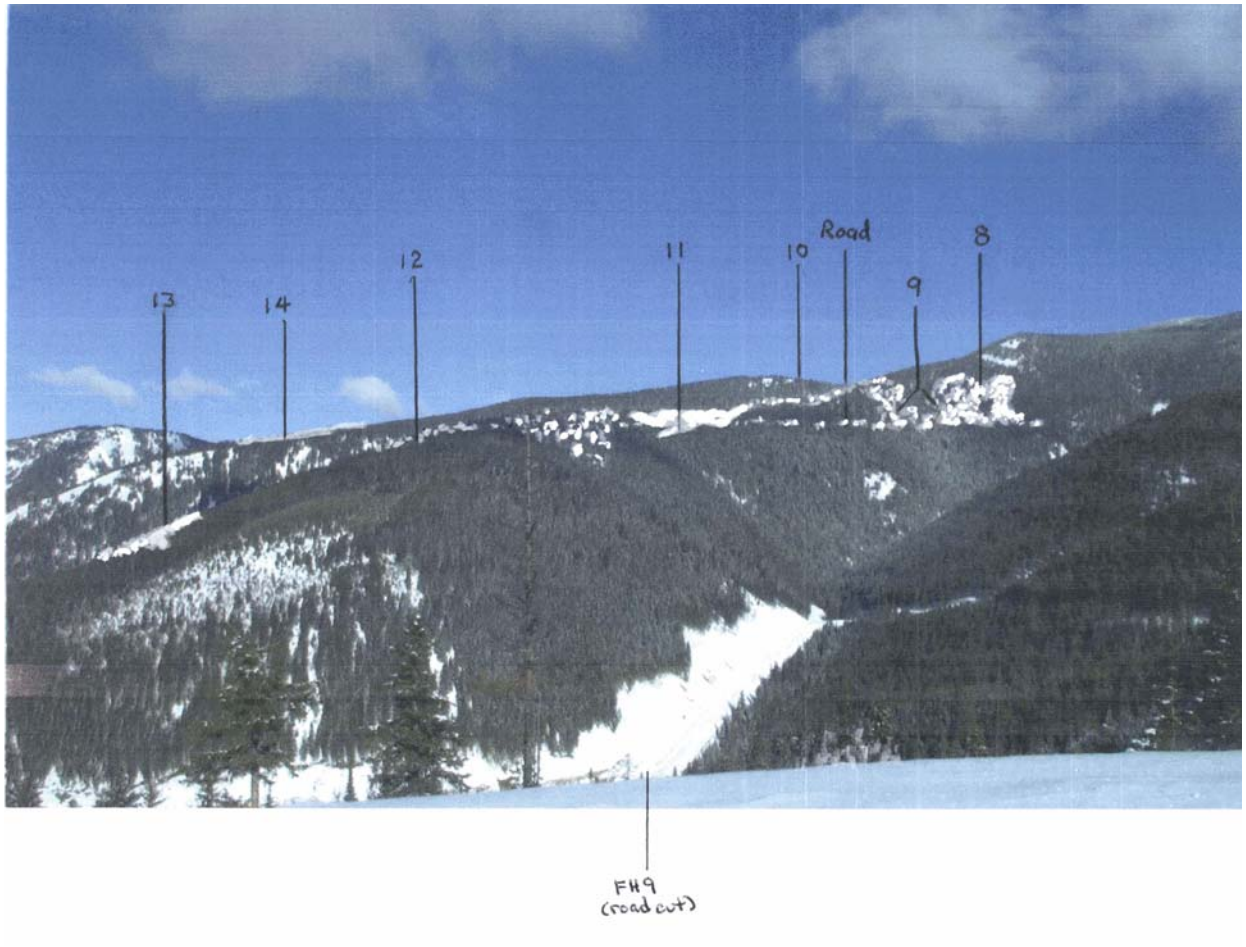
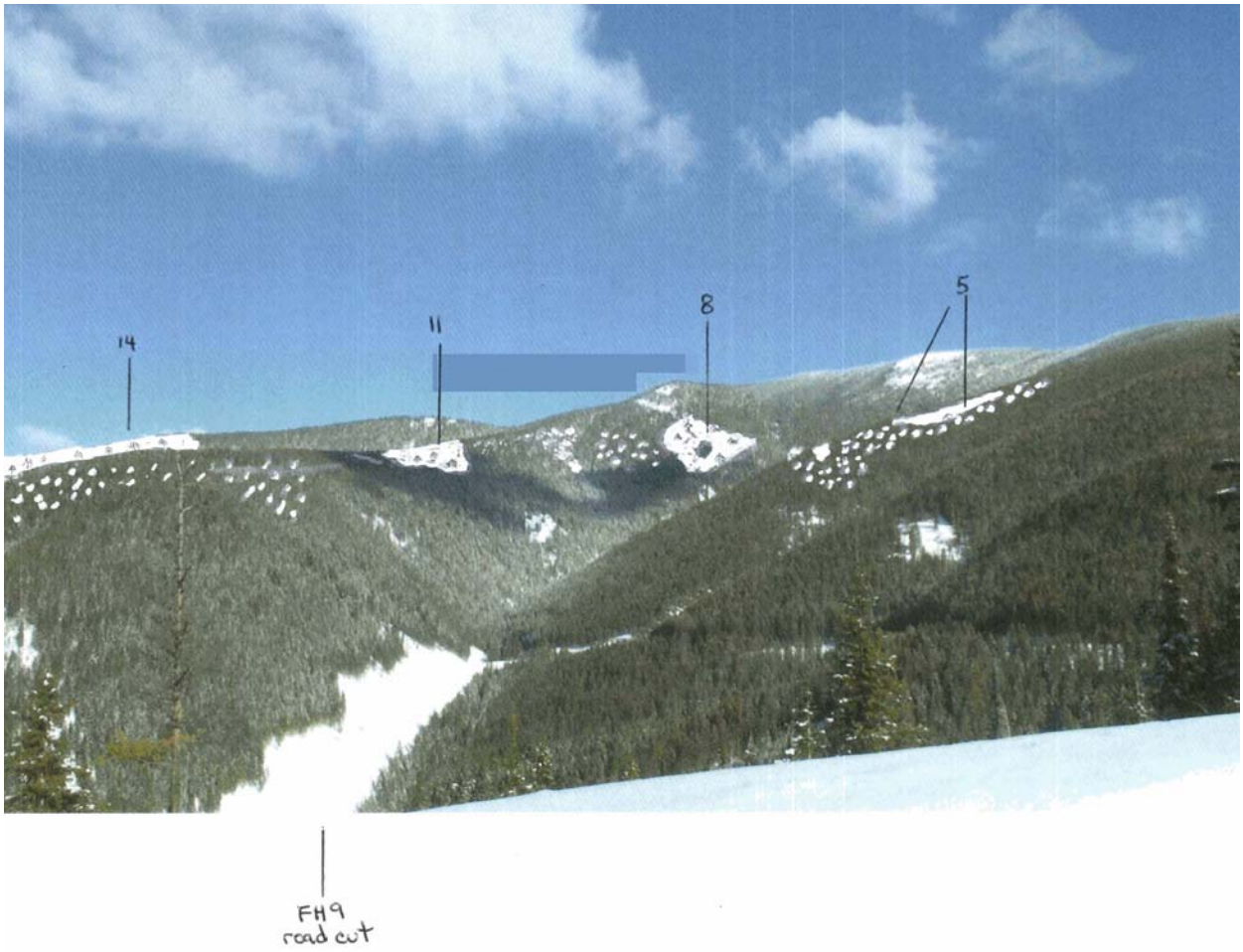


Photo #3 – Existing view 2 from Thompson Pass toward Resource Area

Photo #4 – Visual interpretation of view 2 with Proposed Action



Report on Finances Related to the Proposed Jo-Cat Resource Area Project

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February 2007

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SPECIALIST'S REPORT ON FINANCES IN THE JO-CAT RESOURCE AREA

1. Introduction

The management of the Idaho Panhandle National Forest (IPNF) has the potential to affect local economies. People are an important part of the ecosystem. Use of resources and recreational visitation to the Forest generate employment and income in the surrounding communities and counties and generate revenues that are returned to the federal treasury.

This section presents concepts used to delineate an affected area and methods used to analyze the economic effects of the project, including the project feasibility, financial efficiency, and economic impacts.

2. Regulatory Framework Related to Finances

NEPA requires that consequences to the human environment be analyzed and disclosed, based on issues. NEPA does not require a monetary benefit-cost analysis. If an agency prepares an economic efficiency analysis, then one must be prepared and displayed for all alternatives [40 CFR 1502.23]. The preparation of NEPA documents is also guided by CEQ regulations for implementing NEPA [40 CFR 1500-1508].

The development of timber sale programs and individual timber sales is guided by agency direction found in Forest Service Manual (FSM) 2430. Forest Service Handbook (FSH) 2409.18 guides the financial and, if applicable, economic efficiency analysis for timber sale. The level of timber harvest is important not only in providing jobs in the timber industry, but also through indirect and induced impacts on other business sectors as well (Forest Plan, page IV-47). One of the seven major issues for the Forest Plan was community stability (Forest Plan, pages 1-8).

3. Affected Environment

The combination of small towns and rural settings, larger towns such as Coeur d'Alene, Idaho, and the urban area of Spokane, Washington create a diverse social environment for the geographical region around the Idaho Panhandle National Forest. Local residents pursue a wide variety of life-styles, but many share a common theme, an orientation to the outdoors and natural resources, especially within the smaller communities. This is evident in both vocational and recreational pursuits including employment in logging and milling operations, outfitter and guide businesses, hiking, hunting, fishing, camping and many other recreational activities.

Timber, tourism and agricultural industries are important to the economy of local areas. Despite the common concern for, and dependence on, natural resources within the local communities, social attitudes vary widely with respect to their management. Local residents hold a broad spectrum of perspectives and preferences ranging from complete preservation to maximum development and utilization of natural resources.

Timber management activities within the project area have the potential to impact the economic conditions of local communities and counties. Counties were selected based on commuting data suggesting a functioning economy and where the timber is likely to be processed (log flows). The zone of influence for this project is comprised of Kootenai and Shoshone counties in Idaho and Sanders and Mineral counties in Montana.

A comprehensive socio-economic analysis and social assessment was completed during the revision of the forest plan. See the social and economics section of Chapter 2 of the Analysis of the Management Situation for the revised Forest Plan (March 2003) and the Social Assessment for the Idaho Panhandle National Forests (Parker et al, 2002) for a description of the employment, income and social composition of the counties comprising the analysis area and the impact on each county from management of the IPNF. These assessments indicate the counties within the analysis area are affected by timber management on the forest.

4. Methodology Used in the Financial Analysis

Project salability: Different revenues and costs are associated with the management activities under the action alternative. To arrive at the expected stumpages a computer program was used to determine the potential stumpage (i.e. gross bid values) of timber harvested. The program runs a regression equation called the Transactions Evidence (TE) appraisal model, used for appraising actual timber sales. The TE appraisal method predicts the value of timber (referred to as stumpage) through the use of several independent variables developed from recent similar sales within Region 1 of the Forest Service (northern Idaho and western Montana). Since the information used is from actual bidding, current local market conditions and production costs for logging and milling are reflected in the predicted rate.

Actual District costs were used for fuel reduction, site preparation, planting, new road construction, reconstruction, temporary road construction, maintenance, and erosion control. (See project file, Finances, for all unit information, logging systems and costs.) These direct costs are deducted from the expected stumpage value.

A limited roading alternative, as suggested by the public, was considered but eliminated from further analysis (Jo-Cat Environmental Assessment, Chapter 2, Alternatives Considered but Eliminated from Further Consideration). It was eliminated from further analysis because it was not economically feasible. The limited roading alternative was run through the same economic analysis as the proposed action. (See project file, Finances, for appraisal information of that alternative.) The results are provided in Table FIN-1.

Financial efficiency considers anticipated costs and revenues that are part of Forest Service monetary transactions. The financial efficiency of a timber sale is considered separate from other costs associated with NEPA analysis, sale preparation, sale administration and activities outside of the timber sale.

Economic efficiency uses the cost and revenue estimates included in the financial analysis and adds other economic costs and benefits that are not part of Forest Service monetary transactions. This analysis considers the quantifiable market and non-market benefits and costs associated with implementing each alternative. An example of a non-market benefit or cost is an increase or decrease in recreation. A value for recreation visitor use would be derived from local or regional studies. An economic efficiency analysis is not required (FSH 2409.18, 30), and would only be included in this analysis it if was a public issue and there are predicted changes to quantifiable non-market benefits or costs from the project.

Many of the costs and benefits associated with a project are not quantifiable. For example, the benefit to wildlife from habitat improvement or the cost associated with the degradation of visual quality from a project is not quantifiable. These costs and benefits may be described qualitatively, in the individual resource sections of this document. Title 40 Code of Federal Regulations for NEPA (CFR 1502.23) indicates "For purposes of complying with the Act, the weighing of the merits and drawbacks of the various alternatives need not be displayed in a monetary cost-benefit analysis and should not be when there are qualitative considerations." Management of the forest is expected to yield positive benefits, but not necessarily financial benefits.

5. Financial Consequences

Direct and Indirect Effects

Under the no action alternative, there would be no timber harvest, road construction or reconstruction, fuels reduction and site preparation burning, planting, or hand fuelbreak treatments. There would be no monetary costs or revenues associated with this alternative outside of preparation of the NEPA document.

Table 1 provides a summary of the financial appraisal for the proposed action and the limited roading option. Pulp and roundwood (trees less than 7 inch diameter) material were not added to the table since they do not carry much value. The predicted high bid uses the stumpage value of timber removed (based on size, species and volume, planned yarding methods such as helicopter, skyline, tractor, and hauling distance), then deducts the contractual costs (fuel treatment, road costs, erosion control) from the value of the timber. A roll back factor is subtracted to lower rates to improve the likelihood of sell. The minimum bid is then determined by

adding in the cost of reforestation. This is the minimum that would be accepted for the timber so that the costs of reforestation are protected by the value of the timber.

Table 1 portrays the following items: First, the timber value for the proposed action is over $20/ccf higher than the limited roading alternative. Second, once the roll back factor is added, both alternatives have a negative value. This means both alternatives are economically borderline at best. Third, minimum rates and advertised value are higher under the limited roading alternative than the proposed action. This is because some of the reforestation areas have higher costs (15% higher) due to limited access. This was also a factor with fuel treatment costs, the higher (15%) burning cost absorbed more of the timber value. Fourth, and most important to note, is the predicted high bid for the proposed action is over $10/ccf above the minimum rate needed for reforestation. This means that if the TE appraisal system is predicting correctly, the bid value of the timber (including all costs against it) would more than pay for the needed reforestation work. Hence, a positive viable sale. Under the limited roading alternative, the predicted high bid is still well below the amount needed to protect reforestation and likely means that no bids would be received. Hence, the sale is not viable. Efforts could be made to find other sources to pay for reforestation, however these funding sources are often not available.

Another very large factor in sale viability that the TE appraisal system is not reflecting is the differences in yarding distances between the two alternatives. Under the proposed action, the average helicopter yarding distance is 2400 feet. Under the limited roading alternative, the average helicopter yarding distance is 3300 feet. This is a 35% increase in yarding distance. Given the cost per hour for helicopters and the current high price for jet fuel, this would result in significantly higher quotes for purchaser's attempting to contract helicopter operations. Timber felling quotes would also be higher because of the limited access. This coupled with the 76% helicopter yarding by volume under the limited roading alternative versus the 40% helicopter yarding by volume under the proposed action, make the limited roading alternative not viable under current and expected market conditions.

Table FIN-1. Predicted high bids, value and timber volume.

	No Action	Proposed Action	Limited roading
Total estimated CCF (sawlog)	$0	3266	3116
Predicted High Bid ($/CCF)	$0	$26.15	$3.91
After roll back factor	$0	$-5.55	$-27.79
Minimum rates	$0	$15.05	$16.92
Minimum advertised value	$0	$49,819	$53,302

Table FIN-2. Projects Funded by Other than a Timber Sale

Projects	No Action	Propose Action	Limited roading
Fuels reduction burning units 1,3,16	$0	$10,904	$10,904
Hand fuels treatments below FH 9	$0	$15,000	$15,000

Costs associated with the prescribed burning of units 1, 3, and 16 would be funded with hazardous fuels reduction (HF) dollars due to their proximity to Forest Highway 9 under either alternative. These areas are within the Secondary Resource Protection Zone identified in the Shoshone County Fire Mitigation Plan. These dollars are not tied to the timber sale, but will use appropriated HF dollars that are available to the District every year. The funding for the hand fuels treatments below Forest Highway 9 would also come from HF dollars.

Another alternative that was dismissed from further analysis was the non-commercial treatment suggested by the public (Jo-Cat Environmental Assessment, Chapter 2, Alternatives Considered but Eliminated from Further Consideration). The results of such treatment would be uncertain and the treatments would be expensive. Based on the appraisal data, burning cost alone would exceed $150,000 (PF-FIN-15). Slashing costs in order to provide more predictability to the outcome would approximate $100/ac over the treatment acres. Less expensive burning methods, such as helitorch operations, could be utilized to reduce the expense,

however the uncertainty factor would greatly increase to the point that maintaining the existing healthy larch may be in jeopardy from a hot burn.

In order to achieve the purpose and need for this project, a viable timber sale proposal is the best financial solution. A timber sale can place treatments where they would have the most benefit, harvest can recover the value of dead and dying timber, meet forest product demands, reduce stocking levels, and reduce long term fuel loads. This can be accomplished using the value of the timber to finance the activity.

An indirect effect of the proposed action is that jobs and income associated with the alternative may bring the local economy some increased relative stability during the life of the project.

Cumulative Effects

Many factors influence and affect the local economies, including changes to industry technologies, economic growth, international trade, and the economic diversity and dependency of the counties. This analysis focuses on the direct and indirect effects of proposed activities. Past, present and reasonably foreseeable activities on National Forest, Bureau of Land Management and other lands within the local area would probably not have an effect on the economics issues for the alternatives. However, slightly lower helicopter yarding bids might be possible if helicopter yarding is occurring nearby. One possible cumulative effect of this project may be improved financial viability of projects in the Resource Area in the future. By extending the road under the proposed action, more economically feasible vegetative treatment options may be possible if needs arise in the future.

6. Consistency with Forest Policy and Legal Mandates for Finances

Forest-wide goals, objectives and standards for finances are not specifically addressed in the Forest Plan. This issue was addressed indirectly in the discussion of community stability. Chapter II of the Forest Plan states, "management activities will continue to contribute to local employment, income, and lifestyles. The Forest will be managed to contribute to the increasing demand for recreation and resource protection while at the same time continuing to provide traditional employment opportunities in the wood products industry." (Forest Plan, p. II-11.) The proposed action would meet this direction.