KLAMATH NATIONAL FOREST
Draft MIS Project Level Assessment Part II of II
Effects of Project on MIS Habitats

PROJECT NAME: ___Mount Ashland LSR Habitat Promotion and Fuels Reduction Project

RANGER DISTRICT: ___Oak Knoll Ranger District_____

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1. INTRODUCTION

The purpose of this report is to evaluate and disclose the impacts of the Mt. Ashland LSR Habitat Restoration and Fuels Reduction Project (Project) on the Management Indicator Species (MIS) identified in the Klamath National Forest (NF) Land and Resource Management Plan (LRMP) (USDA 1995) which was developed under the 1982 National Forest System Land and Resource Management Planning Rule (1982 Planning Rule) (36 CFR 219). The current rule applicable to project decisions is the 2004 Interpretive Rule, which states "Projects implementing land management plans…must be developed considering the best available science in accordance with §219.36(a)…and must be consistent with the provisions of the governing plan." (Appendix B to §219.35). This report documents the effects of four alternatives (No Action and three action alternatives) on the habitat of selected MIS. Detailed descriptions of the Project Alternatives are found in the Draft Environmental Impact Statement (USDA May 2007).

1a: Direction Regarding the Analysis of Project-Level Effects on MIS

The Monitoring Requirements in Chapter 5 of the Klamath National Forest Land and Resource Management Plan (LRMP) do not require population monitoring or surveys on MIS with the exception of steelhead trout and rainbow trout. For MIS listed on LRMP Page 4-38 to 4-41, project-level MIS effects analyses are informed by project- and landscape-scale habitat analysis alone. Project-level effects on MIS are analyzed and disclosed as part of environmental analysis under the National Environmental Policy Act. This involves examining the impacts of the proposed project alternatives on MIS habitat by discussing how direct, indirect, and cumulative effects will change the quantity and/or quality of habitat in the landscape and project area (LRMP Page 4-39). The MIS analyzed for the Project are summarized in Part I of the MIS Report. Adequately analyzing project effects to MIS, involves the following steps:

- Identifying which MIS have habitat that would be either directly or indirectly affected by the project alternatives; (LRMP Standards and Guidelines (S&G) 8-21 through and including 8-34). This information is documented in Part I of the MIS Report.

- Identifying the LRMP forest-level monitoring requirements for this subset of forest MIS (LRMP Chapter 5, Table 5-1). This information is documented in Part I of the MIS Report.

- Analyzing landscape- and project-level effects on habitats for which the MIS was selected as an indicator in the LRMP.

- Relating project-level impacts on MIS habitat to habitat and population trends for fish MIS, per the LRMP.

The Management Indicator Species (MIS) Report Parts I and II document application of the above steps to select and analyze MIS for the Project.

1b: Direction Regarding Monitoring of MIS Population and Habitat Trends at the Forest Scale.
Forest scale monitoring requirements for the Klamath National Forest (KNF) MIS are found in Table 5-1 of Monitoring Plan by Resource of the LRMP.

Habitat Status and Trend.

The requirement to evaluate landscape and project-level impacts to habitat conditions associated with the Species Associations and related MIS is identified in the LRMP on Page 4-39. Habitat monitoring requirements are summarized in the MIS Report Part I. "Habitats" are the vegetation types (e.g. mixed conifer forest) and/or ecosystem components (e.g. river and ponds) and special habitat elements (e.g.snags) as identified in the LRMP. "Habitat status" is the current amount of habitat on the KNF. "Habitat trend" is the direction of change in the amount of habitat between the time the LRMP was approved and the present. The methodology for assessing habitat status and trend is:

1. Use the GIS vegetation layers to describe the location of habitat for non-fish MIS within a project area.

2. Determine the distribution of fish MIS species using the KNF GIS layer for fish distribution,

3. Consider the reason the MIS habitat was selected as an Indicator, and determine the potential effects to that habitat for which an MIS was selected.

4. Identify the indicated habitat using habitat relationships data or models in the LRMP Appendix I and California Wildlife Habitat Relationship (CWHR) System (CWHR 2005). The CWHR System is considered "a state-of-the-art information system for

California's wildlife" and provides the most widely used habitat relationship models for California's terrestrial vertebrate species (ibid).

5. Detailed information on the habitat relationships for MIS on the KNF and on the CWHR System can be found in the Klamath National Forest MIS Report Part I.

6. MIS habitat trend is monitored using ecological and vegetation data for the KNF and stream surveys. These data include spatial ecological and vegetation layers created from remote-sensing imagery obtained at various points in time, which are verified using photo-imagery, on-the-ground measurements, and tracking of events that change vegetation and stream conditions (for example, vegetation management, floods, and wildland fires).

Population Status and Trend.

"Population status" is the current condition of the steelhead trout and rainbow trout. "Population trend" is the direction of change in that population measure over time. Population monitoring data are collected and/or compiled at the stream scale rather than the project scale because site specific monitoring or surveying of a proposed project or activity area is not required" (36 CFR 219.14(f) and the actual treatment areas of an action may not contain streams, but may affect streams through sediment delivery or flow changes.

2. LRMP Monitoring Requirements for MIS Selected for Project-Level Analysis

2a: MIS Monitoring Requirements

MIS are animal species identified in the Klamath National Forest (KNF) LRMP, which was developed under the 1982 National Forest System Land and Resource Management Planning Rule (1982 Planning Rule) (36 CFR 219). Guidance regarding MIS set forth in the KNF Land and Resource Management Plan (LRMP) directs Forest Service resource managers to: (1) at the landscape and project scale, analyze the effects of proposed projects on the habitats of each MIS listed in LRMP Standards and Guidelines 8-21 through8-34; and (2) assess presence of goshawk in suitable habitat and determine the number of pairs of northern spotted owls in Late Successional Reserves, and to conduct implementation monitoring to determine population trends and relationship to habitat changes for steelhead trout, and rainbow trout.

2b: How MIS Monitoring Requirements are Being Met

Project level assessment of northern spotted owls and goshawks as MIS is not required per LRMP S&Gs 8-21 through 8-34. . Impacts to northern spotted owls and northern goshawks are evaluated in a biological assessment/evaluation in compliance with the Endangered Species Act and Forest Service Sensitive species direction (FSM 2672.42; USDA Forest Service 1991).

At the Forest level, there are several ways that spotted owl populations are being monitored: 1) Surveys have been conducted in LSRs in coordination with the US Fish and Wildlife Service, 2)

Habitat evaluations have been conducted by USDI Fish and Wildlife Service (in coordination with the Forest Service Research Station) to predict northern spotted owl presence, 3) Habitat loss and potential Take throughout the Forest is reported to USDI Fish and Wildlife Service annually, and 4) Monitoring is accomplished through the formal monitoring programs of the Northwest Forest Plan area. (http://www.reo.gov/monitoring/trends/index.htm and http://biology.usgs.gov/s+t/SNT/noframe/pn172.htm, and http://www.reo.gov/monitoring/nso/index.htm). The monitoring results can be used to adapt management practices, as coordinated with the Fish and wildlife Service. (http://www.fws.gov/news/newsreleases/showNews.cfm?newsId=2E89B871-9B9F-78A7-9593E1997BB12FD2). Chapter 5 of the LRMP indicates the Standard requiring further action will be set by the Recovery Plan (which is in development).

Chapter 5 of the LRMP states that goshawk occupancy in suitable habitat will be determined. Surveys are done at the project level where a potential for impacts (to habitat or noise disturbance) may be significant. Goshawk Management Areas have been identified throughout the KNF, with a specific S&G (8-20) to project goshawks.

Population trend data for steelhead trout is collected and consolidated by the KNF in cooperation with State, tribal, and Federal agency partners such as the California Department of Fish and Game, Karuk Tribe, USDI Geological Survey, the USDI Fish and Wildlife Service, and other conservation partners such Universities and watershed restoration councils. Fish presence data for steelhead trout and rainbow trout are collected using a number of direct and indirect methods, such as stream surveys and fishing results (creel census). The KNF's MIS monitoring program for species typically hunted, fished, or trapped (such as steelhead and rainbow trout) was designed to be implemented in cooperation with California Department of Fish and Game (CDFG), consistent with direction in the 1982 Planning Rule to monitor forest-level MIS population trends in cooperation with state fish and wildlife agencies to the extent practicable (36 CFR 219.19(a)(6)). To be biologically meaningful for wide-ranging MIS, presence data are collected and tracked not only at the forest scale, but also at larger scales, such as range-wide (range of the northern spotted owl), state, province (Northern California), or important species management unit (for example, Klamath River Basin). In 2006, available data on steelhead and rainbow trout were analyzed to determine the population trends of these species.

Steelhead Trout:

In the Klamath River basin, natural steelhead trout spawning historically extended into the upper Klamath basin. Their current distribution in the basin is now limited to downstream of Iron Gate Dam, although remnant steelhead runs now reside upstream the dam. South of Cape Blanco, Oregon, steelhead are known to occur in the Rogue, Smith, Klamath, Trinity, Mad, and Eel Rivers, and in Redwood Creek (Busby *et al.* 1996).

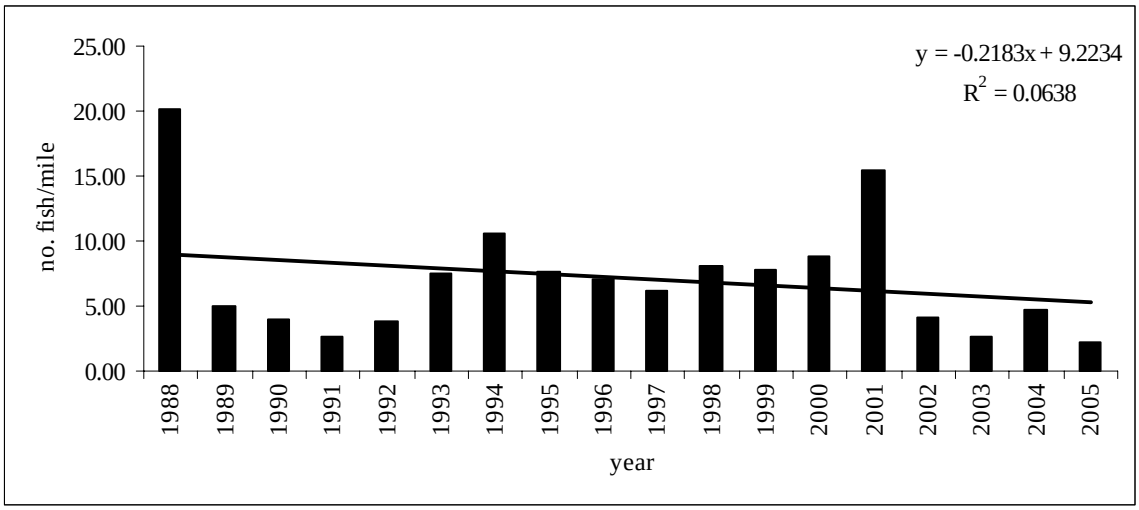
KMP steelhead trends In 2006, Rebecca Quinones of the Klamath National Forest worked with the US fish and Wildlife Service to complete a status review of current survey data. The following information is from that effort.

In 2001, NMFS reconsidered the status of KMP steelhead under the ESA (66 FR 17845, April 4, 2001) and determined that KMP steelhead do not warrant listing as threatened or endangered at this time. However, abundance trends since 1970 have declined to the point that some stocks particularly that of summer steelhead, are considered to be at risk of extinction (Busby et al. 1996).

Our trend analysis was based on instream adult survey data, primarily for summer steelhead adults, because we found no abundance estimates for winter steelhead. However, we separately analyzed escapement estimates of hatchery (Iron Gate Hatchery) and natural populations. We used least-squares regression to describe trends in escapement numbers and two-tailed t tests to test whether the trends were significantly different from zero at a level of significance of 0.05. A line with a slope of zero depicted a trend that was neither increasing nor decreasing over time.

Escapement numbers collected in the Salmon River for summer steelhead adults and half-pounders were regressed on year (1988 to 2005). Estimates of escapement were collected by continuous and concurrent direct observation (snorkel) surveys in the South Fork, North Fork and mainstem Salmon River (KNF 2006, Figure 2). Summer steelhead escapement did not significantly vary throughout the sampling period ($p = 0.31$, $r^2 = 0.06$). Regression of the natural log of escapement against year yielded similar results ($p = 0.32$, $r^2 = 0.06$).

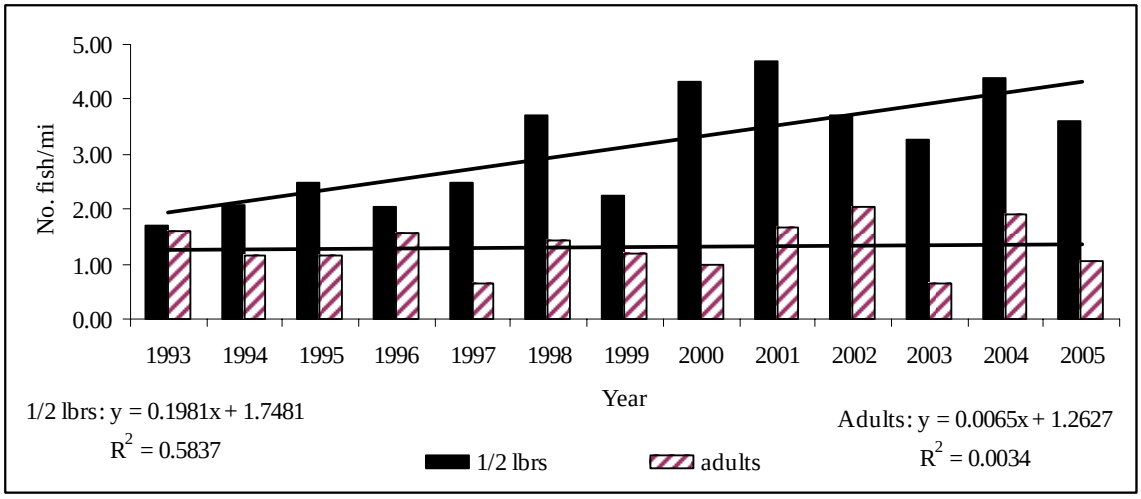
Figure 1. Escapement of summer steelhead trout (1988-2005), Salmon River, California (KNF 2006).



Because adult and half-pounder steelhead were reported separately since 1993, we were able to analyze each age class separately (Figure 3). We found a significant increase in the number per mile of half-pounders found in the North and South Forks of the Salmon River from 1993 to 2005 ($p = 0.0024$, $r^2 = 0.58$). In comparison, adult numbers showed no significant increase or decrease ($p = 0.85$). However, the trend line for adults had a

very poor fit to the data ($r^2 = 0.0034$). Also, our trend analysis may reflect numbers of large resident trout that were sometimes incorrectly identified as half-pounders.

Figure 2. Number per mile of summer steelhead half-pounders and adults, North Fork and South Fork Salmon River, California, 1993 to 2005.



Although the abundance of steelhead adults in the Salmon River appeared to be unchanging, the numbers of summer steelhead adults returning to Iron Gate Hatchery decreased significantly since 1967 (Figure 4; $p = 0.00038$, $r^2 = 0.29$). Hatchery escapement numbers were assumed to reflect the total run for each year because the fish ladder, allowing access into the facility, was open throughout the duration of the run (Rushton 2006). Hatchery estimates of summer steelhead numbers include numbers of "fall-run" steelhead as in Busby et al. (1996).

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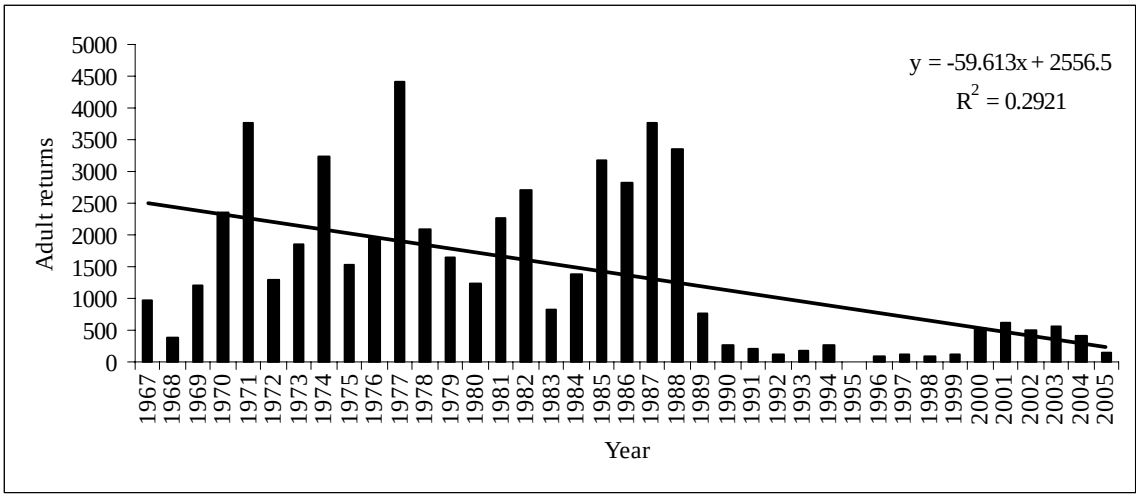
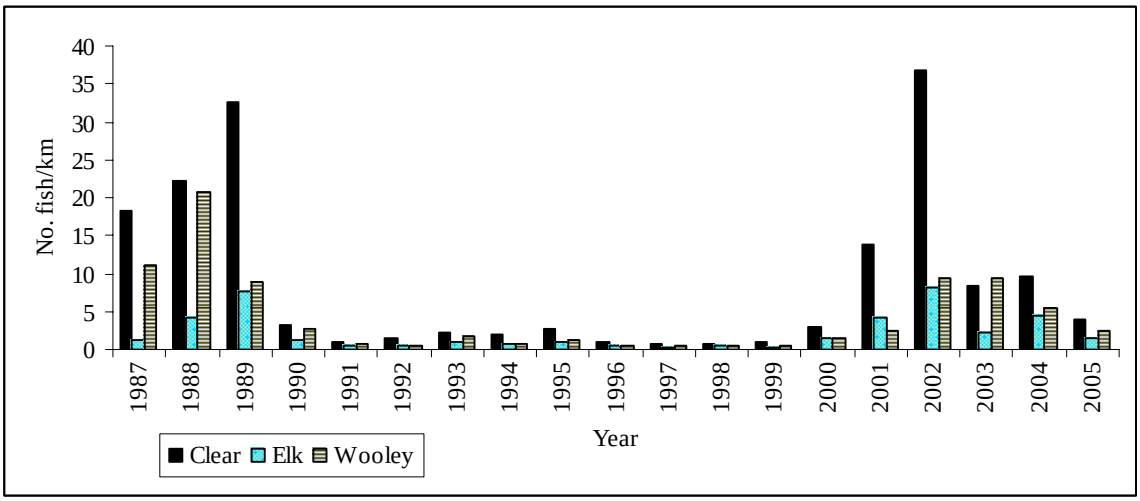
Figure 3. Adult steelhead returns to Iron Gate Hatchery, Klamath River, California, 1967 to 2005 (Rushton 2006).



We also analyzed escapement estimates for summer steelhead adults returning to three creeks: Clear Creek, Elk Creek and Wooley Creek (Figure 4). Clear Creek and Elk Creek are tributaries to the Klamath River near Happy Camp. Wooley Creek is a tributary to the mainstem Salmon River, approximately 4.8 km (3 miles) upstream from the mouth. Escapement data from these creeks were collected through direct observation (snorkel surveys) of index reaches.

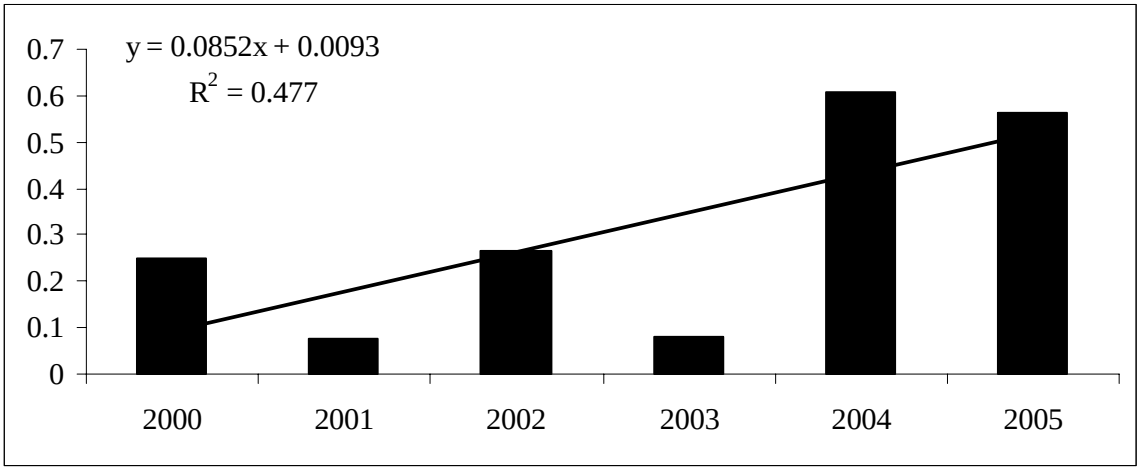
Numbers of summer steelhead adults returning to Clear Creek ($p = 0.62$, $r^2 = 0.015$), Elk Creek ($p = 0.66$, $r^2 = 0.012$), and Wooley Creek ($p = 0.26$, $r^2 = 0.073$) did not exhibit any apparent increasing or decreasing trends (Figure 4). Instead, the data suggested that adult numbers from 1987 to 2005 had a bimodal distribution, where the peaks were separated by low numbers throughout the 1990s.

Figure 4. Abundance indices (no. fish/km) of adults and half-pounders observed in Clear Creek, Elk Creek and Wooley Creek, Klamath River basin, California, 1987 to 2005.



Lastly, we analyzed data collected by the Smith River Alliance from 2000 to 2005 (Figure 56). We standardize the data to the number of summer steelhead trout counted per miles of stream surveyed, so that numbers could be directly compared. The abundance trend for summer steelhead in the Smith River was not significantly different from zero ($p = 0.13$, $r^2 = 0.48$). Therefore, the abundance of summer steelhead in the Smith River did not significantly change from 2000 to 2005.

Figure 5. Number of summer steelhead adults per miles of stream surveyed from 2000 to 2005, Smith River, California.



Based on our analysis of the data with the longest time series (escapement to Iron Gate Hatchery), we concluded that summer steelhead abundance is significantly declining in the Klamath River basin. Our conclusions reflected similar conclusions drawn by Moyle (2002) and Busby et al. (1996).

Moyle (2002) concluded that Klamath Mountains Province winter steelhead were widely distributed and fairly common, although in largely reduced numbers. In comparison, summer steelhead were in danger of extinction, with population estimates at less than 10% of historic levels. He cited dam construction, poor watershed management, decreased flows (resulting in increased temperatures and changes to stream channel morphology/composition), and interactions with hatchery produced steelhead as contributing factors to the decline in Klamath Mountains Province steelhead abundance.

Rainbow trout

Rainbow trout are native to Pacific slope drainages from the Kuskokwim River in Alaska to Baja California, Mexico (Moyle 2002). However their distribution has expanded significantly, including previously fishless streams and lakes, due to introductions. Rainbow trout is a Management Indicator Species (MIS) in all three Forests: Klamath National Forest, Shasta-Trinity National Forest and Six Rivers National Forest.

Rainbow trout inhabit a wide variety of habitats. However, stream dwelling rainbows tend to prefer waters with a higher percentage of riffles than pools (Moyle 2002). In the summer, they

prefer habitats with water temperatures between approximately 10 and 20°C (50 and 68°F) and will move to deeper, cooler water at temperatures above 21°C (70 ^{o}F) (Froese and Pauly 1999, WDFW 1991). Optimal habitat conditions include a high saturation of dissolved oxygen (up to 80 percent saturation), pH between 7 and 8 and temperatures between 7 and 17 ^{o}C (Van Dam 1938 in Moyle and Cech 2000). Temperatures above 28 ^{o}C are known to be lethal to rainbow trout.

Adult forage and dispersal patterns appear to vary with local conditions, environmental factors, and the presence of other fish species (Meehan 1991, Moyle 2002). Rainbow trout are typically diurnal, opportunistic feeders. They are carnivores that feed in a rover-predator style. The majority of their diet consists of aquatic insects, although they will eat crayfish, grasshoppers, winged bugs, worms, salamanders, and other fish (including other trout). They occasionally feed on benthic invertebrates when the benthic food supply is great and/or when there is increased competition for prey form the water column (Behnke 1992).

Rainbow trout usually spawn between the ages of 2 to 4 years old. Age of first spawn can vary greatly depending on size and genetics (Behnke 1992). Female fecundity ranges from 1,200-3,200 eggs per kilogram of body weight (Behnke 1992). Rainbow trout spawning behavior typically begins during the spring but can begin as early as in December and varies due to temperature and water flow conditions. Temperatures of 3-6°C often initiate spawning behavior, although actual spawning does not usually occur until temperatures reach 6-9 ^{o}C (Behnke 1992). In lakes, this often means moving from the lake into their natal stream. If the lake is not stream-fed, rainbow trout will move into near-shore shallow waters (Moyle and Cech 2000). In rivers, rainbow trout will migrate from feeding areas into smaller, cool-water tributaries (Moyle and Cech 2000). Both rainbow and steelhead trout are iteroparous, meaning that they can spawn more than once throughout their lifetime.

Rainbow trout trends

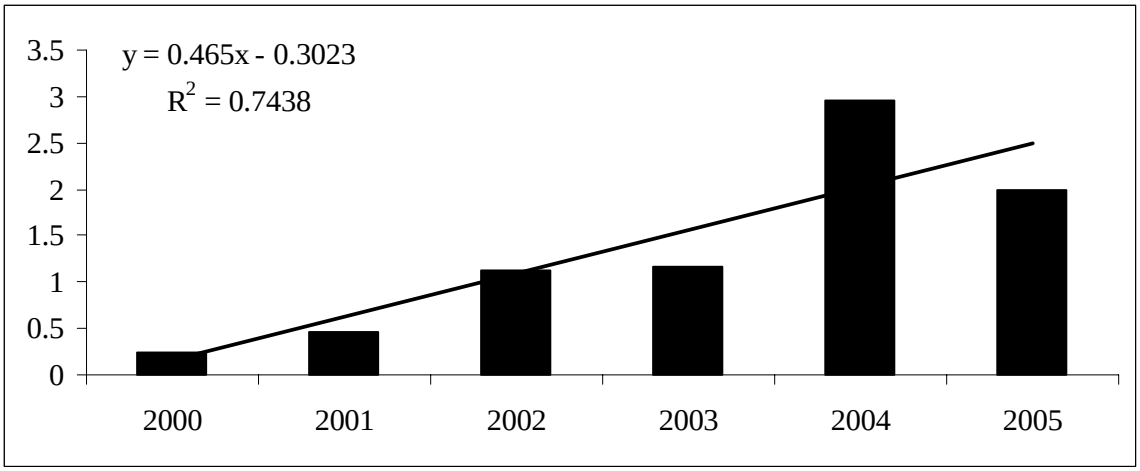
Only one data set that met the criteria for data analysis done in the 2006 Quinones-USFWS report. The criteria was that abundance data had to be collected for a minimum of six continuous years using the same methods, similar to the criteria set by the Biological Review Teams conducting status reviews for the National Marine Fisheries Service. Least-squares regression was used to describe trends in numbers and two-tailed t tests to test whether the trends were significantly different from zero at a level of significance of 0.05. A line with a slope of zero depicted a trend that was neither increasing nor decreasing over time.

The Smith River Alliance has been conducting adult fish surveys since 2000 in order to record annual abundance and distribution of salmonids in the Smith River (Reedy 2005). Surveys are conducted through direct observation (snorkel dives) in reaches of the mainstem, and Middle and South Forks of the river. The data was standardize data as the number of rainbow trout counted per miles of stream surveyed, so that numbers could be directly compared.

Based on the Quinones analysis, in the Smith River, the number of resident rainbow trout per mile significantly increased from 2000 to 2005 ($p = 0.03$, $r^2 = 0.74$; Figure 6). During the sampling period, numbers of rainbow trout ranged from 2 (2000) to 46 (2005). However, the

number of rainbow trout counted per mile peaked in 2004, with a total of 39 individuals counted that year.

Figure 6. Number of rainbow trout counted per miles surveyed from 2000 to 2005, Smith River, California (Reedy 2005).



Because of the paucity of data on rainbow trout abundance in the Klamath, Shasta-Trinity and Six Rivers National Forests, we were unable to conclusively determine the status of this species. However, data collected in the Smith River and conclusions drawn by Moyle (2002) suggest that rainbow trout abundance is on the increase throughout most of its range. The interpretation of abundance trends may also be confounded by the common practice of introducing rainbow trout into many of the rivers and lakes within these three Forests.

3. Description of Proposed Project

The Mount Ashland LSR Habitat Promotion and Fuels Reduction Project is located on the Oak Knoll Ranger District; the legal location is Township 40S, Range 1W, Sections 25, 26, and 34-36; Township 40S, Range 1E, Sections 19-21, and 28-32; Township 41S, Range 1W, Sections 1-3 and 10-15; Township 41S, Range 1E, Sections 5-8 and 18; and Township 48N, Range 8W, Sections 15-17, 20-22, and 28; Mount Diablo Meridian. For a map of the proposed Project area and a detailed description of the location and each of the Alternatives, refer to the Mount Ashland LSR Habitat Promotion and Fuels Reduction Project Environmental Impact Statement (USDA 2007).

The Project has been designed to 1) promote the development of late successional habitat and 2) create a landscape that is more resilient to harmful effects of wildfire. To promote the development of late successional habitat the project proposes to thin overstocked early- and mid-seral stands that are healthy and vigorous enough to respond when competition is reduced, while retaining important structural components such as snags and coarse woody debris. By reducing the amount and connectivity of surface and ladder fuels the project is intended to create a landscape that is more resilient to uncharacteristic wildfire. Activities proposed in the Project to

meet the above objectives include commercial and pre-commercial thinning; underburning, hand piling and burning, or masticating existing and/or activity-generated fuels; temporary spur road construction, road maintenance and road decommissioning.

Habitats for MIS that occur within the Project area on Forest Service land (as defined by the LRMP, CWHR, GIS database, field and photo verification) include: early seral vegetation (8%), mid seral forest (25%), mature fir (22%), mature mixed conifer (34%), chaparral/brush (5%), and stream/riparian, alder and wet meadow (6%).

4. Selection of Project Level MIS

Management Indicator Species (MIS) for the KNF are identified in the LRMP S&G 8-21 through 8-34. A review was conducted using the MIS Report Part I - Project Level Assessment Checklist to determine: 1) if the project is within the range of any MIS, 2) if habitat for which the species is an indicator is present within or adjacent to the proposed treatment areas, and 3) if there are potential direct, indirect or cumulative effects on habitat components.

The following associations and MIS will not be further discussed because the habitats for which these species were selected are not in or adjacent to the project area as documented in **Project Level Assessment Part I.** Therefore, the project will not directly or indirectly affect the habitat for these species and will, therefore, have no impact on forest-level habitat or population trends for these species:

Hardwood Species Associations

Acorn woodpecker
Western gray squirrel

Grassland/Shrub-Steppe Species Association

Pronghorn
Montane vole
Loggerhead shrike
Swainson's hawk
Sage thrasher
Burrowing owl

Mature Ponderosa Pine Species Association

Flammulated owl
White-headed woodpecker
Pinyon jay

Snag Species Association

Downy woodpecker

River/Stream Species Association

Cascade Frog

(While lentic environments suitable for Cascade frogs occur in the Project area, streams in the Project area are characterized by steep gradients and fast currents and do not provide breeding and hibernating habitat for this species.)

The following species associations and MIS were selected for analysis for the **The Mt Ashland LSR Habitat Promotion and Fuels Reduction Project** due to the presence of suitable habitat that may be impacted by the project activities, as described in the **MIS Project Level Assessment Part I.** Species associations and MIS associated with habitats that may be affected by project activities are analyzed below.

River/Stream Species Association

Rainbow trout
Steelhead trout
Tailed frog
American dipper
Northern water shrew
Long-tailed vole

Marsh/Lake/Pond Species Association

Northern red-legged frog
Western pond turtle

Snag Species Association

Red-breasted sapsucker
White-headed woodpecker
Vaux's swift
Pileated woodpecker
Black-backed woodpecker
Hairy woodpecker

5. MIS ENVIRONMENTAL BASELINE AND EFFECTS OF THE PROJECT

Information on species natural history, including general habitat requirements, is found in the "Species Natural History Summary for MIS" and the EIS Wildlife Specialists Report (USDA Forest Service 2007a) found in the project file. Rationale for designation of MIS is found in the EIS for the Forest Plan (USDA 1995) and on the "LRMP MIS Selection Summary" in the project file.

RIVER/STREAM SPECIES ASSOCIATION

Rainbow trout, steelhead, tailed frogs, and American dippers were selected as indicators for water quality, in-stream woody debris, substrate, flows, and channel conditions within rivers and streams. Northern water shrews and long-tailed voles were selected as indicators of riparian vegetation along rivers and streams.

Standards and Guidelines from the Klamath National Forest Land and Resource Management Plan (USDA Forest Service 1995) that are related to river/stream dependent species, and that are being implemented as part of the Project include a 340-foot buffer on both sides of fish bearing streams and a 170-foot buffer on both sides of permanently flowing non fish-bearing streams and intermittent streams (Forest Plan page 4-133).

Rainbow Trout/Steelhead Trout

Refer to the Mt. Ashland LSR Habitat Promotion and Fuels Reduction Project Fisheries Biological Assessment and Evaluation (Fish BA) (USDA Forest Service 2007c) and Fisheries Specialist Report (USDA Forest Service 2006a) for the Project for direct, indirect, and cumulative effects to these species. The information contained below is a brief summary of that information.

Indicator for which steelhead and rainbow trout were selected for, descriptions of the amount of potentially affected habitat

Resident rainbow trout and steelhead trout are indicators of perennial montane streams with dense vegetation. Specifically, these species are an indicator for water quality, bottom substrate, stream flow, in-stream woody debris, and channel condition. There are about 18.3 miles of rainbow trout habitat and about 9.5 miles of steelhead trout habitat within the Mt. Ashland Habitat Promotion and Fuels Reduction Project analysis area that could potentially be affected by the project.

Environmental Baseline

Steelhead trout habitat in streams emanating from the Project area totals about 9.5 miles (Long John, West Branch Long John, Grouse, Cow and Beaver Creeks). Rainbow trout habitat in these same five streams totals about 16.1 miles. Deer Creek contains an additional 2.2 miles of rainbow trout habitat. Checklists within the Project Fisheries Biological Assessment document the stream condition in each of the six Project area streams. Hereafter, Long John, West Branch Long John, Grouse, Cow, Beaver and Deer Creeks, are referred to as the six streams.

Important habitat components include gravel, cobbles, and boulders in the streambed. Large woody debris in the stream channel and frequent pools with sufficient depth, and riffle and cascade habitats. These components provide cover and protection from predators for adults and juveniles, rearing habitat for juveniles, and the gravel provides important spawning habitat.

In general, summer water temperatures are very suitable for salmonid rearing in all six streams. In general, sediment loads are high, large woody debris (LWD) levels are low, and pools are infrequent and shallow in each of the six streams. As a result of the preceding, carrying capacity and anadromous and resident salmonid production is likely lower than encountered during a period portraying more “historical habitat” conditions.

Effects of the Project
Alternative 1 - No Action

Water quality parameters (such as stream temperatures, nutrients, turbidity, etc.) and substrate condition (e.g., sediment fines within gravels, pools, etc.) will likely be unaltered in the short-term, however, these same parameters will significantly decline in quality in the short to mid term if a large, stand-replacing fire would occur within any of the Project area subwatersheds.

High intensity fire alters stream nutrients in the short-term (increased nitrogen and phosphorus) but these are not usually at levels harmful to fish. However, intensively burned riparian areas alter the nutrient recycling capabilities of the RRs for years into the future. Extensive surface erosion would occur in the short-term (1-3 years) and extensive landsliding would likely occur in the short-term to mid term (5-15 years) after a significant fire event. Debris torrents that remove riparian vegetation (and fish populations temporarily) would be a likely result. Both processes (surface erosion and landsliding) contribute mass amounts of sediment to channels and in the short to mid term, pools and spawning gravels fill with "fines" (small grain sized sediment that fills interstitial spaces between gravels, etc.). Spawning and rearing for salmonids is likewise negatively impacted during the same timeframe. The amount of impact and the rate of habitat recovery are dependent on fire size and intensity.

Action Alternatives (Alternatives 2, 4, and 5)

Thinning activities "bridge-over" from Beaver/Grouse Creek 7th field watershed to Headwaters Cottonwood Creek 7th field watershed. There are 153 acres of thinning activities on a ridge in Headwaters Cottonwood Creek. PEs will not affect steelhead trout, resident rainbow trout or their habitat within Cottonwood Creek because:

Cottonwood Creek: Only 153 acres will be thinned as part of the proposed action and it occurs 150 feet from the headwaters of four intermittent streams that are the headwaters of Cottonwood Creek. The buffer of 150 feet from the headwaters of these intermittent streams creek is sufficient to prevent changes in stream shading and sediment delivery (Spence et al 1996); and the closest habitat occupied by steelhead trout and resident rainbow trout is 1.2 miles downstream from Project activities.

There are no water drafting sites present and two landings will be used in this 7th field. Neither of these landings are hydrologically connected to any stream channel. One temporary road will be constructed in this 7th field and decommissioned after completion of Project activities. This temporary road is not hydrologically connected to any stream channel. I conclude that Project Elements (PE's) in the Cottonwood Creek drainage will not affect steelhead trout and resident rainbow trout in Headwaters Cottonwood Creek 7th field watershed and Cottonwood Creek 5th field watershed because of the distance between the activities (The units are located on a ridge top and the closest habitat occupied by steelhead trout and resident rainbow trout is 1.2 miles downstream) and steelhead trout and resident rainbow trout habitat in Cottonwood Creek.

Direct Effects

The only instream activity in steelhead trout habitat is water drafting for dust abatement. Two water drafting sites are located in steelhead trout habitat. The sites located in steelhead trout habitat are in Beaver Creek and Cow Creek. Any affected flow will not be reduced from levels otherwise naturally occurring at the point of diversion by more than 10% (USDC NMFS 2001).

Juvenile steelhead trout are unlikely to be present at the water drafting sites. Steelhead trout juveniles that might occupy the water drafting sites could become impinged against the intake screen, or become stranded due to water withdrawal. However, impingement is not likely

because NMFS water drafting guidelines will be followed. Juvenile fish that might be present could be momentarily startled by the drafting operation, but would be expected to escape from the area, successfully avoiding impingement on intake screens. The volume of water withdrawn during each drafting event will be discountable compared to the water volume of Beaver Creek and Cow Creek, making the potential for fish stranding in these streams discountable.

Water drafting will be done in accordance to NMFS's *Water Drafting Specifications* (USDC NMFS 2001), which limits the amount and rate at which water can be withdrawn during pumping.

By following these specifications and considering the mobility of fish in these streams, the effects of water drafting in anadromous fish bearing reaches will have only minimal direct effects to steelhead trout or their habitat. Water drafting from the site not within steelhead trout or resident rainbow trout habitat (upper Long John Creek) will not affect either species.

In addition to the water drafting sites mentioned above, there are two water drafting sites in Grouse Creek 7th field watershed are located in streams which contain resident rainbow trout (USDA Forest Service 2006a). One is in Grouse Creek and the other is in a tributary to Grouse Creek. Direct effects to resident rainbow trout from water drafting are minimized due to implementation of BMPs and Resource Protection Measures.

These BMPs and Resource Protection measures restrict the rate and amount of water withdrawal in fish habitat and screening minimizes entrainment of fish.

Except for water drafting, no direct effects to resident rainbow trout or their habitat are anticipated from this project because there are no other instream project activities in fish-bearing streams.

During drafting there will be intermittent reductions of stream flow up to 10%. These intermittent reductions in stream flow may cause minimal short-term reductions in resident rainbow trout holding and rearing habitat. This minor change in stream flow is not expected to kill fish and therefore, there will be no change in the resident rainbow trout population.

Indirect Effects

Some PE's are expected to have a neutral impact on habitat indicators. Neutral activities contained within the post-restoration PE are: pre-commercial thinning (PCT), seedling planting (reforestation), and grubbing. Neutral activities contained within the fuels reduction PE are: hand piling and pile burning. Hand piling and pile burning does not involve substantial ground disturbance, causes only localized disturbance to soil/ground cover, and rarely mobilizes sediment that can be borne to a stream course. All five neutral impact activities cause only minor and localized ground disturbance. Based on comparable RR conditions assessed by Spence et al. (1996), Project RRs widths are considered adequate to buffer these no effect or low intensity ground disturbing elements, since additional sediment that might be mobilized will not be delivered to streams. Therefore, these activities will have no effect on steelhead and resident

rainbow trout or their habitat.

Forest Restoration PE

Thinning

The maximum amount of stand acreages (thinning <9" diameter at breast height (DBH)) within RRs in the three of the four 7th field watersheds in the Beaver Creek 5th field watershed are: Beaver/Grouse Creek (261 acres), Long John Creek (174 acres), and Deer-Beaver Creek (9 acres). No stand acreages in Upper Cow Creek 7th field watershed are within RRs. Thinning will occur within the second site potential tree height of the stand acreages within RRs listed above. Within the first site potential tree height of the stand acreages within RRs, only pre-commercial thinning will occur. The width of intact, functioning RRs within the Project area is 340 feet on each side of fish bearing stream channels and 170 feet on each side of perennial non-fish bearing and intermittent stream channels.

For the thinning activities in units containing RRs, the intact, functional and buffering capability of RRs in the first site potential tree height between these units and the stream channel will minimize the probability of any mobilized sediment reaching stream channels. Therefore the likelihood of adverse effects to steelhead trout, resident rainbow trout or their habitat resulting from thinning trees <9" DBH within the second site potential tree height of RRs in the Project area is very low. No adverse effects to steelhead trout, resident rainbow trout or their habitat are expected from thinning trees <9" DBH within the second site potential tree height of RRs (USDA Forest Service 2006a).

Yarding

The width of intact, functioning RRs within the Project area is 340 feet on each side of fish bearing stream channels and 170 feet on each side of perennial non-fish bearing and intermittent stream channels. The distance from the closest stands to steelhead trout and resident rainbow trout habitat ranges from approximately 0.06 miles to 1.2 miles. The intact, functional and buffering capability of RRs between the stands and streams in the Project area will minimize the probability of any mobilized sediment reaching stream channels.

Helicopter yarding is the least ground disturbing harvest method, with the majority of disturbances originating from falling and choking logs together for transport (Klock 1975). The minimal amount of ground disturbance associated with helicopter logging, the buffering capacity of intact and functioning RRs, and Project design features and BMPs all serve to minimize the likelihood of sediment reaching a stream by this harvest method. There is a small but insignificant potential for mobilized sediment to cause increased turbidity in streams that would in turn affect steelhead trout or resident rainbow trout habitat.

Tractor yarding and Tractor endlining. No tractor yarding equipment will enter any RR buffer, which are in intact condition and 340 feet wide on either side of fish bearing stream channels and 170 feet on either side of perennial non-fish bearing streams and intermittent streams. Only 11

tractor yarding stands and one tractor endlining stand are located adjacent to steelhead trout habitat. An additional three tractor yarding stands are located adjacent to resident rainbow trout habitat only. The distance of these stands from the stream channel ranges from 0.1 to 0.7 miles. The remaining 20 tractor yarding stands and two tractor endlining stands are located 0.4 to 2.2 miles upstream of steelhead trout or resident rainbow trout habitat. Existing skid trails will be used whenever possible within the tractor logging stands. Full-bench skid trail construction will be avoided wherever possible (BMP 1.10). End lining will be used wherever possible to keep equipment on the main skid trails. KNP LRMP Soil Cover Standards will be followed to protect disturbed soil, since skid trails that exceed 35% will be mulched with on-site fine slash, chips or weed-free straw, where necessary. Skid trails will be waterbarred after use to control runoff and to prevent off-site sedimentation (BMP 1.17). Recent BMP monitoring of skid trails on the Klamath National Forest determined that waterbars were 96-100% effective (T. Laurent 2003) in controlling erosion and preventing sediment from reaching a stream course. Some sediment may reach stream channels by this method but this amount is expected to be insignificantly small, and will be further diluted during transport downstream.

Mechanical Harvester. In addition to regular skyline, helicopter, and tractor logging, there will be a maximum of 219 acres of mechanical harvester logging. The slopes of these stands are at least 35% but less than 50%. These stands will experience ground disturbance more closely associated with ground-based yarding. Project design features and BMPs for these areas are the same as those described under tractor yarding. Only one stand is located adjacent to steelhead trout and resident rainbow trout habitat. This stand is about 0.1 miles from Long John Creek. The other five stands are located 0.5 to 1.7 miles upstream or upslope of steelhead trout and resident rainbow trout habitat. Some sediment may reach stream channels by this method but this amount is expected to be insignificantly small, and will be further diluted during transport downstream.

Combination Ground-Based Systems. These stands (maximum of 555 acres) are a combination of mechanical harvester and tractor. There are flatter areas within these stands where the slopes are <35%, which will permit a tractor to operate. These stands will experience ground disturbance similar to that described above under Mechanical Harvester. Project design features and BMPs for these areas are the same as those described under tractor yarding. Only four of these stands are located adjacent to steelhead trout and resident rainbow trout habitat. One stand is located adjacent to resident rainbow trout habitat only. The distances of these stands from the stream channel ranges from 0.06 to 0.3 miles. The other fourteen stands are located 0.2 to 1.9 miles upstream or upslope of steelhead trout and resident rainbow trout habitat. Some sediment may reach stream channels by this method but this amount is expected to be insignificantly small, and will be further diluted during transport down stream.

Skyline cable yarding will cause small, localized soil displacement in yarding corridors resulting from dragging logs. This can result in increased rates of erosion and sedimentation. When properly waterbarred (BMP 1.11) and covered with slash/mulch (BMPs 1.14 and 1.17), past monitoring has confirmed that no significant surface erosion leaves skyline harvest units (Mt. Ashland LSR Forest Restoration and Fuels Reduction Project Soils Report (USDA Forest

Service 2006b)). Yarding corridors will be placed in natural openings when possible, to minimize the felling of trees and to maintain ground stability provided by adjacent tree roots.

Use of cable yarding systems in the four 7th field watersheds will not increase sediment delivery to streams to a degree that alters the functioning of existing aquatic habitat. Project design standards, including properly functioning RR buffers adjacent to harvest units, BMPs, and compliance with S&Gs during project execution, is expected to result in insignificantly small amounts of sediment mobilization out of skyline stands.

The probability of adverse affects resulting from project-related yarding to steelhead trout or resident trout habitat is highly unlikely. Yarding will not occur during wet weather conditions. Soils will be dry down to 12 inches or greater in depth during the aquatic period of operation (APO) or any periods of operation approved for outside of the APO. Water barring of skid trails will reduce greatly the potential for sedimentation as described below under Tractor Yarding. Riparian Reserves will not be affected, thus their sediment filtering capacity will be fully retained. Riparian buffers of 100 feet or greater have been documented to prevent adverse affects to salmonid eggs and aquatic insects when harvest activities occurred adjacent to fish-bearing streams (Spence et al 1996).

The proximity of the nearest harvest units are far enough away from steelhead trout or resident trout habitat to minimize the probability of adverse affects from occurring.

In summary, the probability of significant adverse affects to steelhead trout, resident rainbow trout or their habitat by turbidity increases in these reaches downstream resulting from the three kinds of yarding is discountable due primarily to proximity. The forest restoration PEs will likely have an insignificant effect to steelhead trout or resident rainbow trout habitat. No adverse effects to steelhead trout, resident rainbow trout or their habitat are expected.

Fuels Reduction PE

Mastication (hand piling and pile burning were already described as having neutral effects at the beginning of this section) has no probability of measurably affecting turbidity, suspended sediment loads, and stream substrate. Mastication will involve ground disturbance in treatment areas outside of RRs. This disturbance will remain localized, however, and the masticator will create a bed of mulch on which it operates. This mulching will protect any soil disturbed during mastication operations. Masticated mulch is expected to prohibit sediment mobilization from masticated areas down slope towards stream channels. If any mobilized sediment were to actually reach a stream course, it would be diluted to insignificantly small amounts by increasing tributary flows downstream through the reaches containing steelhead trout or resident rainbow habitat.

Underburns will be conducted at low intensity and soil cover requirements will be met on site to minimize erosion. Burning outside RRs is not likely to affect anadromous fish in their habitat. There is a low probability of effects to suspended sediment, turbidity, and stream substrate from underburning since no underburning will occur in RRs, though fire will be allowed to back down

into RRs from ignition points higher on the hillslopes. (Mt. Ashland LSR Watershed Report, USDA Forest Service 2006c))

Firelines constructed by hand will be constructed outside of RRs. The intact and fully functioning RRs will buffer any sediment generated from fireline construction. If any mobilized sediment were to actually reach a stream course, it would be diluted to insignificantly small amounts by increasing tributary flows downstream through the reaches containing steelhead trout habitat or resident rainbow trout habitat.

The potential effects are considered insignificant (Pre-commercial Thin and Release Actions and Fuel Hazard Reduction Actions Programmatic BA/BE. 2001. Klamath National Forest) with long term benefits to watershed conditions. This PE will therefore have no adverse affects on steelhead trout or resident rainbow trout habitat.

Road Related Activities PE

Landings

Two existing tractor landings are within RRs. Each is within 170 feet of a perennial non fish-bearing stream. These landings are located on road 40S15. One is located at the east end of stand 337 and the other is located on the south end of stand 234. Both landings are adjacent to an unnamed perennial non fish-bearing stream that is a tributary to Long John Creek. These landing are 1.0 and 1.4 miles upstream of steelhead trout habitat and 0.15 and 0.7 miles upstream of resident rainbow trout habitat, respectively.

These landings will require clearing and minimal shaping. The Project hydrologist concluded that use and maintenance of these landing could elevate local surface erosion, but sediment delivery to streams would be minimal (USDA Forest Service 2006c). The leveling, blading and use of these three existing landings is expected to have insignificant negative effects on sediment delivery to adjacent streams and steelhead trout habitat and resident rainbow trout habitat further down stream. This is due to directing landing surface drainage patterns away from channels, and the intact and functioning condition of RRs that will buffer effects from landing maintenance and use. These RRs will provide sediment interception and filtration zones. Finally, the distance of landings from steelhead trout and resident rainbow trout habitat, will result in no adverse effects to steelhead trout or resident rainbow trout habitat from any sediment that is mobilized.

There are 5 other existing landings, all of which are located outside of RRs and will require maintenance grading for drainage. There will also be 40 new Project landings constructed, all of which will also be located outside of RRs. The distance of these landings from steelhead trout and resident rainbow habitat ranges from 0.15 to 2.7 miles. All newly constructed landing fill slopes will be seeded, fertilized, and mulched with certified weed-free straw, as needed, prior to the first winter rain. This will minimize surface runoff and sediment mobilization. Mulching will replace lost soil cover. Soil quality standards, Project design features, and BMPs will be met to minimize erosion risk (USDA Forest Service 2006b). Intact and functioning RRs will buffer effects from the construction and/or use of landings located outside of RRs, since they will

provide sediment interception and filtration zones, resulting in neutral sediment delivery effects to nearby stream channels.

Landing construction could elevate local surface erosion, but sediment delivery to streams would be minimal, because of size and location. Riparian buffers would filter sediment and landing runoff would not enter road drainage systems (USDA Forest Service 2006c).

Construction of 40 new landings and the use of and leveling and blading of the remaining existing landings will have a neutral effect on steelhead trout and resident rainbow trout habitat because the activity is of low intensity and confined to specific areas outside of RRs and away from steelhead trout and resident rainbow trout habitat.

Haul Road Use/Maintenance

All Project-related roads will receive maintenance when necessary to accommodate safe haul operations (e.g. dust abatement, spot rocking, etc.). Pre and post-haul maintenance will occur in the form of grading, outsloping, armoring and/or adding surface aggregate, adding drainage dips, and either closing or adding waterbars if the road remains open.

Potentially adverse affects resulting from truck haul traffic will be avoided or minimized by implementing all of the related BMPs. An APO will be enforced. WWO restrictions will apply whenever conditions may be met to permit operations outside of the APO (USDA Forest Service 2002). Quantities of sediment that could otherwise conceivably enter a stream will be reduced through these dry season condition restrictions. When/if mobilized during the first fall season precipitation events, the soil material will be largely filtered by vegetated ground cover occurring between road segments and the nearest stream channels**.**

The probability of a sufficient quantity of sediment affecting steelhead trout or resident rainbow trout habitat resulting from road maintenance is discountable due to the aforementioned BMPs, guidelines and the dilution discussion found in the Fish BA (USDA Forest Service 2007c) under 'Yarding Summary' regarding proximity.

Upgrading unauthorized roads, construction/decommissioning of 22 temporary roads, and decommissioning of 29 existing unauthorized roads)

With the exception of decommissioning one existing unauthorized road (# 41S15.1) at the mouth of Long John Creek, the locations of temporary road work, road decommissioning, and road upgrading work, in the Project 7th field watersheds are outside of RRs within steelhead trout and resident rainbow trout habitat or are well above steelhead trout and resident rainbow trout habitat. These road-related activities are expected to have only localized sediment mobilization impacts. BMPs associated with road crossing work, grading, outsloping, and waterbarring will minimize sediment delivery to stream channels, especially during the first storm events in the fall. These benefits should accrue through design features such as using smaller fill volumes, larger sized fill material, and reducing the likelihood of stream capture capability ('pirating') by the adjacent roadbed. All road improvements will create intermediate to long-term benefits to

water quality by reducing sediment delivery to nearby channels. No adverse effects and long-term positive effects on steelhead trout and resident rainbow trout habitat due to a reduction in suspended sediment from these road-related activities are expected.

There are eleven stream crossings within the identified segments of roads, both existing authorized (1 road), unauthorized (5 roads) and new temporary roads (2), that will be decommissioned following project completion. Nine of these stream crossings are in intermittent watercourses that are tributaries in Long John Creek (7), and Cow Creek (2)

One stream crossing (unauthorized road # 41S15.1) within steelhead trout and resident rainbow trout habitat will be decommissioned. This road crosses the mouth of Long John Creek. The crossing is a low water ford so no culvert will be removed, therefore no work will occur in the stream channel.

There are two new temporary roads proposed in Riparian Reserves. One crosses an unnamed perennial tributary to Long John Creek in the SW ¼ of Section 31. This road (T401) begins where road 40S15 crosses this stream and accesses units 401 and 252. The other road (T206B) crosses an RR at the headwaters of an unnamed intermittent tributary to West Branch Long John Creek and connects to the new skyline landing in stand 206. These roads are 2.3 and 1.5 miles upstream of steelhead trout and resident rainbow trout habitat, respectively.

The effects of decommissioning unauthorized road #41S15.1, the two temporary roads, and the removal of culverts over perennial and intermittent streams will be minimized by Project Design Features, including scheduling Project decommissioning activities during the NOS of April 15 through October 15, and complying with WWOS (USDA Forest Service 2002). Any activities taking place within or near flowing channels at these crossing sites will include dewatering and diversion of the streamflow in conformance with applicable BMPs. Specific dewatering methods (e.g., pipe, pump, cofferdam, etc.) at these two sites will be determined by the District and/or Forest engineer in consultation with either the district fish biologist or hydrologist. Project Design Features including (1) dewatering and diverting flows around stream crossing sites during construction activities; (2) stabilization, mulching, and seeding of treated areas; (3) long-term reduction of fine fill material; (4) armoring of unstable channel banks; and (5) reestablishment of natural drainage patterns will minimize erosion and sedimentation. Because the base of restored stream beds at the culvert removal sites will approximate natural channel elevations (Elder 2003), inconsequential streambed elevation adjustments will likely occur, thereby mobilizing only small amounts of fine sediment. No adverse effects and long-term positive effects on steelhead trout and resident rainbow trout habitat due to a reduction in suspended sediment from these road-related activities are expected.

Construction and subsequent decommissioning of the remaining twenty temporary roads and seventeen unauthorized roads will not occur within RRs, so these activities will not be hydraulically connected to any stream course.

Sedimentation from road maintenance management activities and road improvement/decommissioning activities will be localized and of limited duration, following

BMPs, Project Design Features, RR standards and guidelines, and decommissioning procedures (Elder 2003). A beneficial effect to downstream steelhead trout and resident rainbow trout habitat will occur from the reduction in sediment delivery to the stream channels resulting from decommissioning twenty two temporary roads and twenty two existing unauthorized roads, including eleven crossings.

Tree removal due to road crossing decommissioning and hazard tree removal in RR's is the primary means by which loss of LWD could occur. It is expected that only a few trees, if any, will be felled within RRs during hazard tree removal, or during the other road-related activity PE of road decommissioning at eleven crossings. Since any portions of hazard trees felled in RRs will routinely be left on site to provide for LWD recruitment, there is a very low probability that hazard tree or other tree felling in RRs for any of these activities will result in reductions in LWD. Therefore, the probability of adverse effects to steelhead trout and resident rainbow trout habitat is discountable and insignificant.

Water Drafting PE

Dust abatement will require water drafting from two established sites within steelhead trout and resident rainbow trout habitat. One site is located on Beaver Creek about 100 yards upstream of the Hungry Creek confluence and the other is located on Cow Creek about 150 yards upstream of where Forest Service road #40N16 crosses the stream. Drafting site maintenance will include erosion control at drafting site access points and/or main roads, to prevent water spillage from initiating sediment movement to adjacent streams. Straw bales, rocking, and containment dikes will be used as needed at the sites to capture any spilled water and prevent runoff to adjacent streams. No new access roads will be built (see RR section below). There are two other water drafting sites in Beaver/Grouse Creek 7th field watershed within resident rainbow trout habitat. These sites are located 1.3 miles upstream from steelhead trout habitat. There is one site in Long John Creek 7th field watershed that is located 2.5 miles upstream of steelhead trout habitat and 1.7 miles upstream of resident rainbow trout habitat.

Dust abatement will require water drafting from streams at established sites (see project maps), located upstream from anadromous fish range. Maintenance, such as rocking the entry/exit area, will occur if required to minimize the input of sediment to the stream. Straw bales, rocking, and containment dikes could be used as needed at this site to capture any spilled water and prevent runoff to the stream. Additional sites may be needed if water can be pumped up to the road from the stream and held in a water tank, but they have not yet been identified on the ground.

Any affected flow will not be reduced from levels otherwise naturally occurring at the point of diversion by more than 10% (USDC NMFS 2001).

Sediment disturbance and mobilization from water withdrawal at the these sites is expected to be minimal, due to flows in Beaver, Cow, and Grouse Creeks that dilute suspended sediment concentrations to levels undetectable from background conditions. No adverse effects to steelhead trout and resident rainbow trout habitat from water drafting are expected.

Cumulative Effects – Cumulative effects were discussed in the Fish BA (USDA Forest Service 2007c). Within the Project area, there are approximately 550 acres of private land which contain approximately 3.5 miles of steelhead trout and resident rainbow trout habitat. Reasonably foreseeable future actions on these private lands include small scale timber harvest around 1.5 miles of stream that provide potential habitat. Theses actions have the potential to increase sedimentation into these streams, possibly impacting habitat for these species. However, these timber harvest activities only include partial cuts and will retain all trees within 20 feet of the high water mark, which will limit erosion impacts. Additionally, all understory vegetation will be retained within 10 feet of the high water mark. Thus, impacts to steelhead trout and resident rainbow trout habitat are not expected to be significant.

In-stream woody debris will not be significantly affected by the project. RR canopies and sediment filtration buffers will be intact at Project completion and they will maintain existing habitat conditions (water quality) in the six streams. Water temperatures will remain cool and suitable for salmonid life processes. The risk of increased flow effects, as measured by ERA/TOC, show potential but mostly minor increases in all four 7th fields (USDA Forest Service 2006c). Post-project flow regimes in all four subwatersheds are not expected to be different from pre-project flow regimes. Watershed improvement projects, such as road decommissioning actions, may result in a short-term minor increase in sediment to streams but overall, the process will result in long-term reduction in sedimentation. It should be noted that sediment modeling (USLE, GEO) predict Project-related "sediment savings" will result with the completion of road improvement and decommissioning, resulting in improved substrate and turbidity condition in the mid to long-term (next 10-20 years). There are no expected long-term cumulative effects to habitat or populations. It is expected that habitat quality will be improved in the long-term as a result of implementation of the Project.

Tailed Frog

Environmental Baseline

Tailed frogs frequent clear, cold, rocky streams that contain large stones, stable boulders, and riffle and cascade microclimates (Stebbins 2003). General stream surveys were conducted in Grouse Creek in 2005 and no tailed frogs were detected (Thomas, pers. comm. 2005). The climate within the Project area is characterized by cool and wet winters and hot and dry summers, receiving approximately 30 inches of rain annually in its lower elevations and approximately 75 inches of precipitation at their highest elevations in the form of snow. The likelihood that tailed frogs are present within the Project area is low due to the results of past surveys and the prevailing climate. However, because potential habitat exists within the Project area their presence cannot be completely ruled out. Potential habitat for tailed frogs in the Project area occurs in narrow fast moving headwaters of perennial streams (an estimated 35.8 miles).

Effects of the Proposed Project

Alternative 1 – No Action

Water quality parameters (such as stream temperatures, nutrients, turbidity, etc.) and substrate condition of streams in the Project area will likely be unaltered in the short-term. However, water quality would likely experience a significant decline if a large, stand-replacing fire would

occur within any of the Project area subwatersheds. While some tailed frog habitat components such as LWD and grass vegetation may be promoted by a large fire, other important habitat components, such as water temperature and dense streamside vegetation will decline for variable amounts of time. Additionally, the long term recruitment of LWD into streams could be impacted for decades.

Action Alternatives (alternatives 2, 4 and 5)
The action alternatives will have similar effects to tailed frogs and will be discussed together.

Thinning and Fuels Reduction

Thinning and fuels reduction treatments in upland stands are not expected to impact to tailed frog habitat. In riparian reserves, thinning and fuel reduction prescriptions are designed to maintain the existing stream shading. Thus, riparian reserves are expected to be intact after project completion. Following thinning and fuels reduction activities, the turbidity in some streams may elevate slightly in the short-term during initial large storms, but no significant adverse impacts are expected to water quality or substrate condition. Potential flow effects from Project actions are described above under Steelhead/Rainbow trout and substantial change from existing conditions is not expected. In the short-term (3 years), affects to tailed frog habitat is expected to be minimal. By maintaining or increasing stream shading and by promoting the development of large trees and potential recruitment of LWD into streams, habitat quality for tailed frogs is expected to be promoted over the long-term.

Temporary Road and Landing Construction

Although there are two temporary roads proposed within riparian reserves, only one of these riparian reserves contains habitat suitable for tailed frogs. By incorporating Project design features such as diverting flows around stream crossings during construction activities; stabilizing, mulching, and seeding of treated areas; armoring unstable channel banks; and reestablishing natural drainage patterns, erosion and sedimentation will be minimized. Also, less than one acre of riparian vegetation is expected to be removed during temporary road construction. Thus, impacts to water quality are expected to be minimal. While the diversion of flows would be expected to impact tailed frogs and their habitat, this impact would be limited to the localized area where temporary road construction is proposed. Additionally, impacts from this activity are expected to be short term as natural drainage patterns will be restored when temporary roads are decommissioned.

Road-Related Activities

Water drafting and road decommissioning are also proposed within the wetted perimeter of streams that contain tailed frog habitat. Any disturbance to stream substrates from these activities would be restricted to the localized area where these activities occur. Additionally, water drafting will not reduce naturally occurring flows by more than 10 percent and drafting equipment will be screened. Road decommissioning is expected to remove up to one acre of riparian vegetation. Thus, effects to tailed frogs and their habitat from water drafting and road decommissioning are expected to be minimal.

Summary of Effects

Important water quality parameters such as temperature and turbidity will not be measurably impacted. Diversion of one stream during temporary road construction will affect a short segment of potential tailed frog habitat but the stream will be reestablished to its natural drainage pattern when the temporary road is decommissioned. Therefore, habitat for tailed frogs is not expected to be reduced and population trends for this species are not expected to be adversely affected at the Project or Forest level.

American dipper

Environmental Baseline

American dippers *(Cinclus mexicanus)* are associated with fast-moving, clear, unpolluted streams with cascades, riffles, and waterfalls (Kingery 1996). Streams containing suitable habitat for American Dippers occurs throughout the Project area, totaling approximately 43.5 miles. Potential habitat exists along Beaver, Deer, Cow, Grouse, Long John, and West Branch Long John creeks and several unnamed perennial tributaries to these streams. American dippers have been observed in the Project area (David Johnson, personal observation).

Effects of the Proposed Project

Alternative 1 - No Action

In the absence of large-scale natural disturbance it is unlikely that the amount or quality of American dipper habitat would change in the near future. However, Fire and Fuel Extension (FFE) modeling indicates general patterns of fire behavior in the Project area over time that include an increase in surface fire intensity and constantly high or increasing tree mortality (USDA Forest Service 2006d). Following high intensity fire, surface erosion is expected to occur and the potential for landslides increases. These processes would likely contribute sediment to streams potentially impacting turbidity and stream substrate. High intensity fire also has the potential to significantly impact the long term recruitment of LWD into streams. The extent of these impacts is dependent upon fire intensity and size.

Action Alternatives (**Alternatives 2, 4, and 5)**

The action alternatives will have similar effects to American dippers and will be discussed together.

Thinning and Fuels Reduction Treatments

Stream substrates, instream woody debris, streamside boulders, and existing channel condition will not be affected by proposed thinning and fuels reduction treatments. LRMP S&Gs and Project design features for thinning and fuels reduction in riparian reserves are designed to ensure that riparian reserves are intact and functioning post treatment and that existing stream shading is not reduced. Additionally, only trees <9 inches DBH will be felled within 150 feet of a stream. Although the turbidity in some streams may elevate slightly during initial storm events following treatments in riparian reserves, these impacts are not expected to be significant. The retention of functioning riparian reserve buffers around streams will also minimize the probability of any mobilized sediment originating from stands outside of riparian reserves from reaching the stream channel. Thus, habitat quality for the American dipper is not expected to decline or be reduced in volume. By maintaining or improving the function of riparian reserves

and by increasing potential recruitment of LWD into streams, habitat quality for American dippers is expected to improve over the long-term.

Temporary Road and Landing Construction

Proposed temporary road and landing construction will not occur within habitat suitable for American dippers, although two segments of temporary road are proposed in riparian reserves that flow into streams containing American dipper habitat. The construction of temporary roads is expected to remove less than 1 acre of riparian vegetation. Additionally, LRMP BMPs and Project design features for temporary road construction (see Rainbow trout/Steelhead trout section above) ensure that sediment delivery to streams from this activity is minimized. Thus, no adverse effects to water quality are anticipated.

Road-Related Activities

Road-related activities, including water drafting and road decommissioning, have the potential to impact American dipper habitat. Culvert removal during road decommissioning would likely remove only 1 acre of riparian habitat remove and would be subject to the same LRMP BMPs as temporary road construction in riparian reserves. Thus, this activity will have minimal impacts to in-stream habitat components and stream quality. There are five potential water drafting sites identified within the Project area. Water drafting will not reduce naturally occurring flow by more than 10 percent. Thus, impacts to stream water quality are expected to be negligible.

Summary of Effects

Instream habitat components such as LWD, rocky substrates, and riffles and pools will not be impacted. Up to 2 acres of riparian habitat may be removed with Project implementation. Impacts to riparian habitat would occur along approximately 0.1 mile or 0.2 percent of the total stream miles that provide habitat for American dippers in the Project area. By maintaining functioning riparian reserves and applying LRMP BMPs to activities in riparian reserves impacts to water quality are expected to be negligible. Thus, the proposed Project is not expected to negatively impact populations of American dippers at the Project or Forest levels.

Long-tailed vole and Northern water shrew

Environmental Baseline

Long-tailed voles inhabit montane riparian vegetation, forests with herbaceous understories, wet meadows, and grasslands (CDFG 1990; Csuti 1997). Suitable habitat for long-tailed voles is scattered throughout the Project area but is most predominate in the upper tributaries of Long John and Grouse Creeks. Northern water shrews are closely associated with streams and ponds and inhabit riparian vegetation and coniferous forests adjacent to riparian areas (CDFG 1990; Csuti 1997). Streams containing habitat for northern water shrews are widely distributed throughout the Project area. Other potential habitat for northern water shrews includes a 0.5 acre pond.

Alternative 1 - No Action

In the absence of large-scale natural disturbance it is unlikely that the amount or quality of long-tailed vole or northern water shrew habitat would change in the near future. However, FFE modeling indicates general patterns of fire behavior in the Project area over time that include an

increase in surface fire intensity (USDA Forest Service 2006d). High intensity fire has the potential to remove riparian vegetation. The extent of these impacts is dependent upon fire intensity and size.

Action Alternatives (Alternatives 2, 4, and 5)
The action alternatives will have similar effects to long-tailed vole or northern water shrew and will be discussed together unless specifically stated otherwise.

Thinning and Fuels Reduction Treatments

LRMP S&Gs and Project design features for thinning and fuels reduction in riparian reserves are designed to ensure that riparian reserves are intact and functioning post treatment. Additionally, only trees <9 inches DBH will be felled within 150 feet of a stream. Thus, no measurable impacts to riparian habitat from thinning activities are expected.

Underburning in riparian reserves may remove herbaceous vegetation, shrubs, and LWD. Underburning is proposed in only one riparian reserve that is approximately six acres, although underburns will be allowed to back into riparian reserves from adjacent upland stands. Although the number of acres within riparian reserve to be underburned is dependent upon environmental conditions, it is estimated that up to 200 acres of riparian reserve habitat will be underburned in this manner. However, because prescriptions for underburns are designed to imitate low intensity fire, impacts to riparian habitat expected to be minimal or short term.

Temporary Road and Landing Construction

Under proposed alternatives 2 and 5, two temporary roads are proposed in riparian reserves. The construction of temporary roads in riparian reserves would remove <1 acre of riparian habitat. Landing construction is not proposed in riparian reserves.

Road-Related Activities

Road decommissioning, including culvert removal could remove up to one acre of riparian habitat. Other road-related activities are not expected to impact riparian habitat.

Summary of Effects
Some habitat suitable for long-tailed voles and northern water shrews will likely be impacted by Project activities. However, the amount of riparian habitat (approximately 2 acres) expected to be removed is insignificant at the Project scale and impacts to riparian reserves from underburning are expected to be minimal or short term. Thus, population trends for these species are not expected to be affected.

Cumulative Effects (tailed frog, American dipper, long-tailed vole, and northern water shrew)
Streams within the Project area have been and continue to be subject to natural erosion. Although the exact extent is unknown, activities such as mining, railroad construction, rail road logging, and road construction, have likely resulted in significant disturbance of instream habitat structure and riparian vegetation.

Within the Project area, there are approximately 550 acres of private land which contain approximately 3.5 miles of potential tailed frog, American dipper, long-tailed vole, and northern water shrew habitat. Reasonably foreseeable future actions on these private lands include small scale timber harvest around 1.5 miles of stream that provide potential habitat. Theses actions have the potential to increase sedimentation into these streams, possibly impacting water quality. However, these timber harvest activities only include partial cuts and will retain all trees within 20 feet of the high water mark, which will limit erosion impacts. Additionally, all understory vegetation will be retained within 10 feet of the high water mark. Thus, impacts to riparian habitat suitable for long-tailed vole and northern water shrew habitat are not expected to be significant. Other federal projects or activities expected to occur within the Project area include pre-commercial thinning, grazing, and dispersed recreation. On-going pre-commercial thinning in plantations is not expected to impact habitat for these species because these actions are not likely to affect the function of riparian reserves. Historically, intensive grazing within the Project area impacted riparian vegetation and increased erosion which likely impacted water quality. Although grazing still occurs within the Project area, the reduced level of current grazing has allowed some of the riparian areas to recover from past grazing related impacts. The current level of grazing is believed to result in only minor erosion impacts (USDA Forest Service 1996b). Recreation is not expected to impact the river/stream species associates.

Cumulative effects to tailed frog, American dipper, long-tailed vole, and northern water shrew habitat are expected to be minimal because functioning riparian reserves will buffer sediment delivery to streams, thinning and fuels treatments will not impact instream habitat structure, and Project design features and LRMP BMPs will ensure that activities within riparian reserves will have minimal impacts. Additionally, at the scale of the Project area, the amount of riparian habitat that may be removed or degraded on both federal and private lands is expected to be insignificant. Thus cumulative effects are not expected to impact the population trends for these species.

MARSH/LAKE/POND SPECIES ASSOCIATION

Western pond turtles and northern red-legged frogs were selected as indicators for their sensitivity to physical aquatic conditions and coarse woody debris. LRMP S&Gs that are related to the marsh/lake/pond associated species include managing to promote emergent vegetation and large woody debris.

Western pond turtle and Northern red-legged frog

Environmental Baseline

Western pond turtles are a highly aquatic species that require basking sites (Nussbaum et al. 1983; Stebbins 2003). Northern red-legged frogs are mainly associated with ponds but can be found in marshes, slow moving streams, or lakes where dense riparian vegetation exists (Leonard et al. 1993; Stebbins 2003). Aquatic habitat for western pond turtles and northern red-legged frogs is limited to one 0.5 acre pond on the southern edge of the Project area. Streams within the Project area are characterized by steep gradients and fast currents and do not provide suitable habitat for these species. Both western pond turtles and northern red-legged frogs are highly terrestrial during certain times of the year (Leonard et al. 1993; Holland 1994; Reese and Welsh 1997; Stebbins 2003). These species have not been documented to occur in the Project area.

Effects of the Proposed Project
Alternative 1 - No Action
In the absence of large scale natural disturbance it is unlikely that the amount of western pond turtle or northern red-legged frog habitat in the Project area will significantly change in the future. However, in the event of a fire start within the Project area, FFE modeling indicates that surface fire intensity and resulting tree mortality will increase over time (USDA Forest Service 2006d). Following a stand replacing fire, stream flows would likely proliferate following storms, increasing the likelihood of a flood event which could impact the limited aquatic habitat in the Project area. Additionally, stand replacing fire would likely remove suitable habitat for nesting and overwintering western pond turtles and reduce the long term recruitment of coarse woody debris which may provide potential basking sites.

Action Alternatives (Alternatives 2, 4, and 5)
The action alternatives will have similar effects to western pond turtles and northern red-legged frogs and will be discussed together

Thinning and Fuels Reduction Treatments
Thinning and fuels reduction treatments will have no effect on aquatic habitat for western pond turtles and northern red-legged frogs. Thinning prescriptions also ensure that impacts to terrestrial habitat will be minimal by incorporating canopy closure and large tree retention standards and by leaving a minimum of 15 percent of each stand unthinned. Additionally, proposed underburns adjacent to the pond are designed to imitate low intensity fire. Although proposed thinning and fuels reduction activities are not expected to significantly impact terrestrial habitat, the approximately 12 acres of thinning and fuels reduction treatments proposed within 600 feet of the holding pond, have the potential to kill or injure overwintering or nesting western pond turtles and dispersing red-legged frogs.

By promoting the development of late-successional habitat and recruitment of large LWD, the action alternatives would likely increase the recruitment of potential basking sites into the pond over time and improve dispersal habitat for northern red-legged frogs.

Temporary Road and Landing Construction
Proposed temporary road and landing construction will have no effect on the aquatic and terrestrial habitat for western pond turtles and northern red-legged frogs.

Road-Related Activities
Proposed road-related activities will have no effect on the aquatic and terrestrial habitat for western pond turtles and northern red-legged frogs.

Summary of Effects
The proposed alternatives would not remove aquatic or terrestrial habitat for western pond turtles and northern red-legged frogs. Thus, the amount of existing habitat for these species at the Project and Forest level would not change. Thinning and fuels reduction treatments may injure or kill western pond turtles and northern red-legged frogs when they occur adjacent to the

existing pond habitat. However, because no activities are planned within 150 feet of the pond and potential impacts would be limited in both time and space, long term population trends at the Project and Forest scale should not be affected.

Cumulative Effects

Since the holding pond was constructed in the early 1990s, there have not been any natural events or federal or private actions that have had a significant impact to the pond or adjacent terrestrial habitat. Privately owned lands exist approximately 500 feet south of the pond but no reasonably foreseeable future actions are planned. Other reasonably foreseeable future actions on private lands occur >0.5 mile from the pond and are not expected to have any impacts to the pond environment. Other reasonably federal actions or activities in the Project area include pre-commercial thinning in plantations and grazing. These actions are not expected to impact western pond turtle or northern red-legged frog habitat. Cumulatively, the above actions would have no effect on the aquatic habitat and negligible effects on terrestrial habitat for these species. In the short term, during project implementation, local populations of these species may be reduced. However, due to the limited scale of potential impacts, population trends at the scale of the Forest are not expected to be significantly affected.

SNAG SPECIES ASSOCIATION

Pileated woodpeckers, white-headed woodpeckers, Vaux's swifts, hairy woodpeckers, red-breasted sapsuckers, and black-backed woodpeckers were selected as indicators of snags as a habitat element within mature fir and mature conifer habitats within the Project area. Standards and Guidelines from the Mount Ashland Late-successional Reserve Assessment (MLSRA) (USDA Forest Service 1996a) that are being implemented as part of the Project include the retention of an average of two to eight snags per acre across the landscape depending on forest community type. This level of snag retention exceeds the LRMP S&Gs for snag associated species. Additionally, Project design features for thinning in habitat promotion stands requires the retention of trees greater than 20 inches and that a minimum of 15 percent of each stand remain unthinned. Thus, Project prescriptions will maintain existing snag habitat and areas of snag recruitment.

Pileated woodpecker, White-headed woodpecker, Hairy woodpecker, and Vaux's swift

Environmental Baseline

In addition to snags, large diameter trees and LWD are important habitat components for the pileated woodpecker, white-headed woodpecker, hairy woodpecker, and Vaux's swift (Bull and Cooper 1981; Raphael and White 1984; Bull 1991; Mellen et al. 1992; Bull and Holthausen 1993; Boleyn 1997; Weikel and Hyaes 1999; Buchanan et al. 2003). Closed canopy has also been shown to be important habitat component for pileated woodpeckers and Vaux's swifts (Bull 1987; Bull and Cooper 1981). In the Project area there are approximately 1,200 acres of potentially suitable habitat for these species. Both pileated and hairy woodpeckers have been observed in the Project area (David Johnson, personal observation). White-headed woodpeckers and Vaux's swifts have not been observed or documented in the Project area.

Effects of the Proposed Project

Alternative 1 – No Action

Under the No Action Alternative, mature stands exhibiting large-diameter trees, snags, and LWD would be slow in developing. In the event of a fire start within the Project area, FFE modeling indicates several general patterns regarding fire behavior and fire induced tree mortality over time including (1) a constant or increasing crown fire potential under both moderate and severe weather conditions, (2) an increase in surface fire intensity under both moderate and severe weather conditions, and (3) either a constantly high or increasing level of basal area mortality (USDA Forest Service 2006d). These patterns may have some benefit to pileated woodpeckers, white-headed woodpeckers, hairy woodpeckers, and Vaux's swifts by creating nesting and roosting structure and by increasing foraging opportunities in the short term. However, uncharacteristic wildfire has the potential to remove existing habitat components such as large snags and LWD, to impact recruitment of these components over the long term, and to significantly reduce or create large gaps in the canopy. FFE modeling suggests that fire behavior over time would likely result in long term impacts that would exceed short term benefits for these species. The actual extent of these effects, whether beneficial or adverse, is dependent upon fire intensity and size.

Action Alternatives (2, 4, and 5)

The action alternatives would have similar effects to pileated woodpeckers, white-headed woodpeckers, hairy woodpeckers, and Vaux's swifts and will be discussed together. Of the 1,200 acres of potential habitat in the Project area, approximately 200 acres are located within treatment stands. Thinning, fuels reduction, and to a much lesser extent road and landing construction, are the treatments that have the greatest likelihood of impacting habitat.

Thinning and Fuels Reduction Treatments

Thinning designed to promote the development of late-successional habitat will not remove important structural components of pileated woodpecker, white-headed woodpecker, hairy woodpecker, and Vaux's swift habitat such as large-diameter trees, snags, and LWD. Thinning prescriptions are also designed to leave a minimum of 15 percent of each stand unthinned as well as a minimum canopy closure of 60 percent in existing northern spotted owl nesting, roosting, or foraging habitat. Thus, canopy cover, an important element of pileated woodpecker and Vaux's swift habitat, is not expected to be significantly impacted within potential habitat for these species. Thinning to create DFPZs may impact snag associated species habitat by removing large-diameter trees (>20 inches), snags, and LWD. The removal of large-diameter trees would only occur under limited circumstances and where stand conditions permit, LWD will be retained up to a level that remains consistent with DFPZ objectives. Therefore, impacts to the distribution and abundance of these habitat components are expected to be minimal. Fuel reduction treatments also have the potential to remove snags and LWD. However, prescriptions are designed to imitate low intensity fire and are designed to retain MLSRA recommendations for these components. Therefore, fuel reduction treatments are not expected to have a significant impact to important structural components of pileated woodpecker, white-headed woodpecker, hairy woodpecker, and Vaux's swift habitat.

Over time, thinning and fuel reduction treatments are expected to have significant benefits to these species by increasing the amount and distribution of important habitat components. Forest Vegetation Simulator (FFS) modeling indicates that 50 years post treatment trees >30 inches

DBH would increase from 1 to 3 per acre to 14 to 15 per acre (USDA Forest Service 2007b). FFE modeling also indicates that thinning and subsequent fuels treatment will generally reduce crown fire potential or maintain a surface fire type and significantly reduce predicted stand mortality in the event of a fire start (USDA Forest Service 2006d). These factors indicate that stands will be more resistant to large-scale fires but will still burn with sufficient intensity to create snags within forested habitat. Thus, these fire behavior patterns have the potential to create important structural components for pileated woodpeckers, white-headed woodpeckers, hairy woodpeckers, and Vaux's swifts without significantly reducing existing components.

Temporary Road and Landing Construction

Temporary road or landing construction will remove some large trees and snags suitable for nesting and roosting. However, roads have been aligned and landing sites identified to minimize impacts to these habitat components. Thus, at the scale of the project, these impacts are expected to be minimal.

Road-Related Activities

Road-related activities, including maintenance, closures, and decommissioning is not expected to remove any important structural components of snag associated species habitat.

Summary of Effects

Although some structural components of Vaux's swift, and pileated, white-headed, and hairy woodpecker habitat will be removed, these impacts are not anticipated to be significant and are not expected to result in a measurable reduction of habitat. Therefore, the Project is not expected to affect the population trends of these species at the Project or Forest scale.

Cumulative Effects

Within the Project area there are approximately 550 acres of private lands. Although the amount of habitat on private lands within the Project area is unknown, large trees, snags, and LWD do not appear to be abundant. Reasonably foreseeable future actions in the Project area include small scale timber harvest on private lands. These activities may remove individual large trees and snags, but due to the scale of these projects, impacts to these components are not expected to be significant. Other federal projects or activities expected to occur within Project area include ongoing pre-commercial thinning in existing plantations, grazing, and dispersed recreation. These activities are not expected to impact snag associated species habitat. Cumulatively, the reduction in potential nesting, roosting, and/or foraging structure is not expected to significantly impact the local population of pileated woodpeckers, white-headed woodpeckers, hairy woodpeckers, and Vaux's swifts.

Red-breasted sapsucker

Environmental Baseline

In addition to snags, LWD is also an important habitat component for this species (Raphael and White 1984). There are approximately 6,789 acres of mid- and late-successional habitat potentially suitable for red-breasted sapsuckers distributed through the Project area. Although red-breasted sapsuckers are not an uncommon species, little is known about local distribution and abundance.

Effects of the Proposed Project
Alternative 1 – No Action
Under the No Action Alternative, mature stands exhibiting snags, and LWD would be slow in developing. In the event of a fire start within the Project area, FFE modeling indicates several general patterns regarding fire behavior and fire induced tree mortality over time including (1) a constant or increasing crown fire potential under both moderate and severe weather conditions, (2) an increase in surface fire intensity under both moderate and severe weather conditions, and (3) either a constantly high or increasing level of basal area mortality (USDA Forest Service 2006d). These patterns may have some benefit to red-breasted sapsuckers by creating nesting structure and by increasing foraging opportunities in the short term. However, uncharacteristic wildfire has the potential to remove existing habitat components such as snags and LWD, to impact recruitment of these components over the long term, and to significantly reduce or create large gaps in the canopy. The actual extent of these effects, whether beneficial or adverse, is dependent upon fire intensity and size. FFE modeling suggests that fire behavior over time would likely result in long term impacts that would exceed short term benefits for the snag associated species.

Action Alternatives (2, 4, and 5)
The action alternatives would have similar effects to red breasted sapsuckers and will be discussed together. Of the 6,789 acres of potential habitat in the Project area, approximately 4,500 acres are located within treatment stands. Thinning, fuels reduction, and road and landing construction are the treatments that have the greatest likelihood of impacting habitat.

Thinning and Fuels Reduction

Thinning designed to promote the development of late-successional habitat will not remove important structural components of red-breasted sapsucker habitat such as large-diameter trees, snags, and LWD. While thinning may remove some trees suitable for foraging, foraging habitat for red-breasted sapsuckers will remain abundant and well distributed throughout the Project area. Although the creation of DFPZs may impact red-breasted sapsucker habitat by removing snags and LWD, these habitat components will be retained up to a level consistent with DFPZ objectives. Therefore, impacts to the distribution and abundance of snags and LWD are expected to be minimal. Fuel reduction treatments also have the potential to remove snags and LWD. However, prescriptions are designed to imitate low intensity fire and are designed to retain MLSRA recommendations for these components. Thus, fuel reduction treatments are not expected to have a significant impact to important structural components of red-breasted sapsucker habitat.

Over time, FFE modeling indicates that thinning and subsequent fuels treatment will generally reduce crown fire potential or maintain a surface fire type and significantly reduce predicted stand mortality in the event of a fire start. These factors indicate that stands will be more resistant to large-scale fires but will still burn with sufficient intensity to create snags within forested habitat. Thus, these fire behavior patterns have the potential to create important structural components for red-breasted sapsuckers without significantly reducing existing components.

Temporary Road and Landing Construction

Temporary road or landing construction will remove approximately 10 acres of potential red-breasted sapsucker habitat. However, this impact represents less than 0.2 percent of the existing suitable habitat in the Project area and is considered to be insignificant.

Road-Related Activities

Road-related activities, including maintenance, closures, and decommissioning is not expected to remove any important structural components of red-breasted sapsucker habitat.

Summary of Effects

Although thinning and fuels reduction activities are expected to degrade habitat for red-breasted sapsuckers, these activities are not expected to result in a measurable reduction of habitat. While temporary road and landing construction is expected to remove up to 10 acres of red-breasted sapsucker habitat, this level of habitat reduction is expected to be insignificant at the scale of the Project as it represents only 0.2 percent of the extant habitat in the Project area. Therefore, the Project is not expected to affect the population trends of red-breasted sapsuckers at the Project or Forest scale.

Cumulative Effects

Within the Project area there are approximately 550 acres of private lands. Although the amount of red-breasted sapsucker habitat on private lands within the Project area is largely unknown, snags do not appear to be abundant. Reasonably foreseeable future actions in the Project area include small scale timber harvest on private lands. These activities may remove individual trees and snags, but due to the scale of these projects, impacts to these components are not expected to be significant. Other federal projects or activities expected to occur within Project area include ongoing pre-commercial thinning in existing plantations, grazing, and dispersed recreation. These activities are not expected to impact red-breasted sapsucker habitat. Cumulatively, the reduction in habitat components is not expected to significantly impact the local population of red-breasted sapsuckers.

Black-backed woodpecker

Environmental Baseline

Black-backed woodpeckers are an irruptive species that often forages opportunistically on outbreaks of wood boring beetles following fires (Goggans 1988; Murphy and Lenhausen 1998). However, they may be found in unburned forests if adequate forage is present (Bull et al. 1986; Goggans et al. 1988). There are approximately 6,789 acres of mid- and late-successional habitat potentially suitable for black-backed woodpeckers distributed through the Project area. Although black-backed woodpeckers have not been documented in the Project area, stands exhibiting density related mortality, mistletoe, or root disease, which create a suitable environment for wood boring insects, occur in the Project area.

Effects of the Proposed Project

Alternative 1 – No Action

Under the No Action Alternative, foraging opportunities and the amount and distribution of snags suitable for nesting would likely increase in the short term. However, in the event of a

fire start within the Project area, FFE modeling indicates several general patterns regarding fire behavior and fire induced tree mortality over time including (1) a constant or increasing crown fire potential under both moderate and severe weather conditions, (2) an increase in surface fire intensity under both moderate and severe weather conditions, and (3) either a constantly high or increasing level of basal area mortality (USDA Forest Service 2006d). While these patterns would likely have short term benefits to black-backed woodpeckers by creating nesting structure and increasing foraging opportunities, FFE modeling suggests that expected fire behavior would impact recruitment of snags suitable for nesting over the long term.

Action Alternatives (2, 4, and 5)

The action alternatives would have similar effects to black-backed woodpeckers and will be discussed together. Of the 6,789 acres of potential habitat in the Project area, approximately 4,500 acres are located within treatment stands.

Thinning and Fuels Reduction Treatments

Thinning designed to promote the development of late-successional habitat will not remove important structural components of black-backed woodpecker habitat such as large-diameter snags and /or snag patches. While thinning may reduce foraging opportunities by removing trees infected with mistletoe, project design features ensure that trees infected with mistletoe will remain well distributed across the Project area. Thinning to create DFPZs may impact black-backed woodpeckers by removing snags and other trees of poor health and form. However, where stand conditions permit, these habitat components will be retained up to a level that remains consistent with DFPZ objectives. Therefore, impacts to foraging opportunities from the creation of DFPZs are not expected to be widely distributed. Fuel reduction treatments also have the potential to remove snags. However, prescriptions are designed to imitate low intensity fire and are designed to retain MLSRA recommendations for this habitat component. Thus, fuel reduction treatments are not expected to have a significant impact to important structural components of black-backed woodpecker habitat.

Over time, FFE modeling indicates that thinning and subsequent fuels treatment will generally reduce crown fire potential or maintain a surface fire type and significantly reduce predicted stand mortality in the event of a fire start. These factors indicate that stands will be more resistant to large-scale fires but will still burn with sufficient intensity to create snags within forested habitat. Thus, these fire behavior patterns have the potential to create important structural components for black-backed woodpeckers without significantly reducing existing components.

Temporary Road and Landing Construction

Temporary road or landing construction will remove some trees and snags suitable for nesting and roosting. However, roads have been aligned and landing sites identified to minimize impacts to these habitat components. Thus, at the scale of the project, these impacts are expected to be minimal.

Road-Related Activities

Road-related activities, including maintenance, closures, and decommissioning is not expected to remove any important structural components of snag associated species habitat.

Summary of Effects
While Project activities will likely remove some black-backed woodpecker habitat components, thinning and fuel reduction prescriptions and temporary road alignments have been designed to ensure that potential foraging habitat remains well distributed throughout the Project area and that snags are retained consistent with MLSRA recommendations. Therefore, no measurable reduction in black-backed woodpecker habitat is expected and population trends are not anticipated to be affected.

Cumulative Effects
Within the Project area there are approximately 550 acres of private lands. Although the amount of black-backed woodpecker habitat on private lands within the Project area is largely unknown, snags do not appear to be abundant. Reasonably foreseeable future actions in the Project area include small scale timber harvest on private lands. These activities may remove individual trees or snags, but due to the scale of these projects, impacts to these components are not expected to be significant. Other federal projects or activities expected to occur within Project area include ongoing pre-commercial thinning in existing plantations, grazing, and dispersed recreation. These activities are not expected to impact black-backed woodpecker habitat. Cumulatively, the reduction in potential nesting and foraging structure is not expected to significantly impact the local population of black-backed woodpeckers.

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