Cascadia Wildlands Project

Educating, Organizing, and Agitating for the Ecosystems of Cascadia

July 30, 2007

36 C.F.R. 215 APPEALS

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FIVE BUTTES PROJECT APPEAL

Pursuant to 36 C.F.R. 215, the Cascadia Wildlands Project appeals some of the decision to approve the Five Buttes Project in the Crescent Ranger District of the Deschutes National Forest.

TITLE OF DECISION DOCUMENT: Record of Decision (ROD) for the Five Buttes Project.

DATE DECISION SIGNED: June 8, 2007.

DATE DECISION PUBLISHED: June 14, 2007.

DESCRIPTION OF PROJECT: Commercial thinning and fuels treatments on 4,235 acres; fuels treatments on an additional 3,931 acres; temporary road construction and rehabilitation totaling 5.9 miles.

LOCATION: Townships 21, 22, 23, 24 South, and Ranges 5 ½, 6, 7, 8, 9, Willamette Meridian, Klamath and Deschutes Counties, Oregon.

DECIDING OFFICIAL: Leslie Weldon, Forest Supervisor, Deschutes National Forest.

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APPELLANT'S INTEREST

Appellant maintains specific interests in the Five Buttes Project. Appellant expressly indicated its interest at the earliest stages of planning by submitting three scoping letters and attending several field trips with Forest Service staff. Appellant timely commented on the January 2007 draft environmental impact statement (DEIS) and earned standing to appeal the Record of Decision (ROD) under 36 C.F.R. 215.13.

Appellant's interest will be adversely affected by the project. Appellant's members and staff live in Deschutes and Lane Counties, Oregon, and use and enjoy the forest and meadow environments of the project area for recreation, aesthetic pleasure, spiritual fulfillment, and education about the natural world. Appellant regularly visits the areas to be affected by the project to encounter forests with late-successional qualities, view wildlife, and study the historical ecology of the planning area. Appellant particularly values the existing late-successional forest and the suitable nesting, roosting and/or foraging habitat it provides within the Davis Late-Successional Reserve (LSR). Appellant will continue to visit the area and wishes to maintain the existing late-successional forest habitat in the project area for future generations of all species to enjoy.

Appellant's interests and activities will be irreparably damaged by ground disturbance including logging and road construction in late-successional forest. Appellant possesses the right to demand Forest Service compliance with applicable environmental laws and agency policies.

REQUEST FOR STAY

An automatic stay is in effect for this project pursuant to 36 C.F.R. 215.9(b). Appellant requests a stay of implementation of some actions associated with the project, as specified below. <u>Only the following component actions of the project are subject to this appeal and request for stay:</u>

- All tree cutting on 2,023 acres that currently provide suitable nesting, roosting and foraging (NRF) habitat for threatened northern spotted owl.
- All road construction and rehabilitation totaling 5.9 miles.

This request for stay on the above specified component actions covers sale preparation, layout, sale advertisement and auction, logging, road planning, road construction or other site preparation by the Forest Service or a contractor pending the final decision on this appeal. A stay of the component actions specified above is needed to prevent irreversible environmental damage and harm to Appellant's clearly articulated interests, as well as unnecessary expenditure of taxpayers' money in implementing a project that violates federal law and policy. Late-successional forests committed to a timber sale cannot be restored in any reasonable amount of time. Eroded soil cannot be replaced. To proceed before a final disposition on the merits of this appeal would unnecessarily expose the government to liability should a court find fault with the ROD.

NOTE: Appellant <u>does</u> <u>not</u> appeal or request a stay on the following component actions of the project:

- ✓ Commercial thinning and associated fuels reduction treatments on 2,212 acres approved for commercial timber harvest that do <u>not</u> currently provide suitable NRF habitat for northern spotted owl.
- ✓ Small-diameter (less than six inches diameter at breast height) tree thinning and fuels reduction treatments on 3,931 acres where commercial timber harvest is not approved at this time.

- ✓ Application of management-ignited prescribed fire for hazardous fuels reduction in any portion of the project area.

- ✓ Mitigation measures associated with the above specified actions that are not otherwise subject to this appeal and request for stay.

Appellants support implementation of the exempted actions because they meet the purpose and need for action while avoiding or minimizing environmental impacts in compliance with relevant law, regulation and policy.

There is no harm to the government from granting the stay. A stay will maintain the status quo. The Forest Service should grant the requested stay.

REQUEST FOR RELIEF

1. That the ROD be withdrawn insofar as it authorizes component actions subject to this appeal and request for stay.

2. That the Forest Service modify the project and revise its environmental analysis to respond to the issues described in the statement of reasons below.

3. That the Forest Service prepare a supplemental environmental impact statement subject to 40 C.F.R. § 1502 et seq. to properly disclose environment impacts of component actions in accordance with the National Environmental Policy Act.

STATEMENT OF REASONS

1. The ROD authorizes activities that contradict the purpose and need for action.

Canopy bulk density reduction increases fire hazard

Canopy thinning intended to reduce bulk density, and thus limit fire spread through the canopy, can trade-off with the objective of limiting surface fireline intensity. Canopy openings increase sunlight penetration below the canopy, which diminishes sub-canopy fuel moisture and relative humidity, and increases mid-flame wind speeds. In the absence of significant “green-up” of herbaceous vegetation following treatments (Agee et al. 2002), fuels under an opened canopy ignite more easily and potentially burn with greater intensity and biological effects (severity) than they would under a closed canopy.

> A mature, closed stand has a fireclimate strikingly different from that in the open. Here nearly all of the solar radiation is intercepted by the crowns … Because of the lower temperature and higher humidity, fuels within closed stands are more moist than those in the open under ordinary weather conditions … [F]irebrands that do not contain enough heat to start a fire in a closed stand may readily start one in the open. Fires starting in the open also burn more intensely and build up to conflagration proportions more quickly since less of the heat produced by the fire is used in evaporating water from the drier fuels (Countryman 1955).

Multiple assessments of wildland fire severity patterns undertaken at stand and landscape scales in dry portions of the Northwest Forest Plan area identify strong correlations of closed canopy forest with low-severity fire effects (*e.g.*, Odion et al. 2004, Raymond and Peterson 2005). The study by Raymond and Peterson (2005) is perhaps the best example of a well-designed empirical study demonstrating that stands thinned for canopy bulk density reduction burn more intensely with more severe effects than stands that remain untreated. The Forest Service is responsible to support its findings and contentions with the best available science (40 C.F.R. 1500 et seq.), but we attach the Raymond and Peterson (2005) study, which is not considered by the EIS, to this appeal for your convenience.

Keyes and O'Hara (2002) describe a repeatable process for quantifying canopy base heights that resist canopy ignition given a specified flame length. They identify two independent procedures that can be performed using *BehavePlus* to determine: a) minimum canopy base heights that resist canopy ignition, and b) maximum canopy bulk densities that inhibit canopy fire spread. The latter procedure depends on completion of the former. The EIS specifies surface flame lengths and local weather conditions that are reasonable for modeling purposes. These values are best combined in customized *BehavePlus* simulations with site-specific fuel data rather than with generic fuel models. Please see our analysis below of the need for site-specific fuels data to verify modeling assumptions and fire regime condition classification.

The Forest Service asserts in the EIS (p. 120) that canopy bulk density reduction is "necessary" to make fuel treatments effective "on a landscape scale." That statement is basically true, however, we demonstrate above that canopy bulk density reductions can adversely affect stand-scale fire resilience to fire, and the EIS does not show how authorized canopy bulk density reduction treatments in the Five Buttes Project fit within a landscape-scale fire management strategy, as we would expect given the state of the science on this topic (see Finney 2001 – attached). Figures in the EIS depicting potential fire spread patterns and burn probability (pp. 92-96) do not distinguish canopy thinning from other fuel reduction treatments, and the EIS does not disclose results of modeling for alternative treatments that it claims were considered (pp. 29-30). Please see our analysis of the efficacy of alternative fuel treatment configurations below. Additionally, we note that units 385, 410, 415 and 550, in which the ROD authorizes canopy bulk density reduction that will degrade suitable NRF habitat for northern spotted owl, do not factor into the Forest Service's modeling of potential fire spread and severity (p. 94).

Removal of large trees contradicts the purpose and need for action

A distinguishing feature of ecologically healthy and resilient conifer forests in the interior Columbia Basin, which includes the project area, is the prevalence of very large (>50 cm or >20 in. diameter) older trees that have survived numerous fires (Arno 2000). Such forests generally feature structural characteristics in the form of high closed canopies and large down trees that inhibit high-intensity fires (Agee et al. 2000, Graham et al. 2004). Shade provided by a closed canopy shields the ground surface from direct solar radiation, reduces ground temperature, and increases relative humidity as well as fuel moisture, inhibiting combustion (Countryman 1955). Large down trees slow sub-canopy horizontal wind movement and fire spread, and they store huge amounts of water that deprive fire of heat energy (Amaranthus 1989).

The ROD authorizes removal of large trees from the forest (p. 17). The EIS asserts that limitations on the age or size of trees to be removed would hinder attainment of the purpose and need, citing a need to thin "to densities that are deemed to be resistant to high levels of mortality from bark beetles in the overstory" (p. 401). However, it fails to show what basal area retention threshold would result in resistance to insect attack at a stand scale. It also concedes, "[S]everity of the large-scale loss of large trees is impossible to predict for insects in overstocked stands. Infestations are very stochastic in nature with a wide variety of climatic and other environmental conditions that can alter the intensity of the insect outbreaks" (p. 401). The Forest Service thus claims on one hand that it must remove trees to promote insect resistance in treated stands, but on the other hand it cannot assure that large tree removal will in fact promote resistance. The agency also fails to reconcile its position on large tree removal with scientific literature indicating that this activity may increase fire hazard and degrade ecosystem resilience to wildland fire (Allen et al. 2002, Brown et al. 2004, Carey and Schumann 2003, Franklin and Agee 2003, Graham et al. 2004). The Forest Service's failure to disclose or respond in good faith to the widely available studies referenced here violates the National Environmental Policy Act's requirement to address scientific uncertainty and controversy.

Should the Forest Service insist that too many large trees persist in the project area, it retains the option to kill those trees without removing them to maintain their unique wildlife habitat and fire resilience qualities on the landscape. In our view, any large tree felled for "forest health" reasons should be left on the ground to supply coarse woody debris and soil recruitment materials to the ecosystem. The EIS provides no rationale why it is necessary to both kill large trees and remove them from the forest.

Large trees in fire-adapted forests commonly exist in clumps. DellaSala and others (1998) observe clumping of co-dominant trees in mixed conifer forests in the southern Cascades near Keno, Oregon, just south of the Five Buttes planning area. They conclude that the clumping is due to trees surviving repeated fires in small groups. Thus, clumping of large trees in the Five Buttes Project area may be a response to repeated fires consistent with the resilient properties of fire-adapted forests. There is no need to selectively kill, fall or remove co-dominant trees in such clumps for "forest health."

The EIS fails to disclose elevated fire hazards created by logging slash

Mechanical thinning, especially that focused on canopy bulk density, generates large quantities of slash by relocating branches, twigs and needles from the canopy to the ground (Brown et al. 2004, Stephens 1998, van Wagtendonk 1996, Weatherspoon 1996). The Congressional Research Service (Gorte 2000) investigated the utility of timber harvesting in forest fire hazard reduction, and told Senator Wyden,

> Timber harvesting removes the relatively large diameter wood that can be converted into wood products, but leaves behind the small material, especially twigs and needles. The concentration of these "fine fuels" on the forest floor increases the rate of spread of wildfires. Thus, one might expect acres burned to be positively correlated with timber harvest volume.

Logging approved in the ROD will leave flammable slash on the ground even as non-flammable tree boles are removed from the forest. This activity will shift stand-scale fuel models upward – for example, in Anderson's (1982) system, from 10 to 12 – and increase potential fireline intensity of a wildfire until the slash and pre-existing surface fuels are treated with management-ignited prescribed fire (Graham et al. 2004).

The EIS portrays only two general fuel models (TU5 and TL9) as relevant to analysis of fire behavior in the planning area (pp. 85, 89). Even if those fuel models are common under current conditions, it is highly misleading to say that proposed actions would change only the relative proportion of those models. For example, mechanical thinning will cause forest stands currently exhibiting heavy forest litter as the primary potential carrier of fire (TU5) to resemble Anderson's (1982) Fuel Model 11 or 12 (light to moderate slash) for a significant period of time before they exhibit characteristics of the desired TL3 model (p. 84). Medford District BLM specialists working in the Applegate Watershed of southern Oregon routinely estimate that three-to-15 tons per acre of slash loading can result from mechanical thinning intended to reduce canopy bulk density in dry Douglas fir stands (e.g., USDI 2005, USDI 2002). The EIS avoids any mention of post-logging slash loads or their potential impact on fire behavior or effects.

A downward transition in fuel model may take several years to manifest, especially where management-ignited prescribed fire (MIPF) is not timely used. The EIS indicates that MIPF would not occur in all project units after mechanical thinning is completed (p. 110). Van Wagtendonk (1996) used FARSITE to simulate fire behavior modifications resulting from fuel breaks and alternative treatments of surface and crown fuels in mature, closed canopy Sierra Nevada mixed-conifer forests. MIPF emerged as the most effective fuels treatment. MIPF reduced average fireline intensity of a wildfire burning in severe weather conditions by 76 percent and its burned area by 37 percent, avoiding manifestations of extreme fire behavior. In contrast, low thinning to raise canopy base height combined with a pile-and-burn slash treatment on flat ground yielded nearly identical fire behavior to similar thinning without any slash treatment (*i.e.*, more intense than no treatment) because pre-existing surface fuels were not affected. In addition, lop-and-scatter slash treatments "significantly increased subsequent fire behavior."

Furthermore, Stephens (1998) compared the effects of 12 different fuel and silvicultural treatments using FARSITE and concluded that MIPF alone, or in combination with low thinning, was the most effective method to reduce fireline intensity of a simulated wildfire. Burning is so effective because fire consumes the finest fuels on the ground surface that present the greatest hazard (Deeming 1990). Applied management experience reported by others (*e.g.*, Fahnestock 1968) offers similar conclusions about the range of slash treatment options.

Therefore, effective fire hazard reduction (and downward transition in fuel model) is temporally dependent on the rate at which land managers treat thinning slash and surface fuels with MIPF. Failure to use MIPF would leave pre-existing surface fuels (*e.g.*, litter, duff and herbaceous fuels) untreated and perpetuate hazardous accumulations resulting from fire exclusion. The ROD for the Five Buttes project does not commit to specific locations or timelines for MIPF implementation.

Surface and ladder fuel treatments are effective without crown bulk density reduction

The EIS indicates that proposed actions intend both to limit canopy fire ignition (torching behavior) and canopy fire spread (active crown fire). The former is a function of surface fuel loading and canopy base heights, particularly when foliar moisture is relatively low (Van Wagner 1977, Agee et al. 2002). The latter is partly dependent on surface fireline intensity, and partly dependent on the density of canopy fuels (Agee and Skinner 2005, Scott and Reinhardt 2001). In order to spread independent of surface fireline intensity, a canopy fire requires rare combinations of topography and weather, and this phenomenon generally affects only small areas before ceasing on its own (Van Wagner 1977). There is no evidence in the EIS that the Davis fire replaced forest stands with active canopy fire independent of surface fireline intensity. Without such evidence, it is reasonable to assume effective fuel treatments in the Five Buttes project area will reduce potential surface fireline intensity by reducing ground fuels <3" diameter and increase canopy base heights to diminish convective heat transfer into canopy fuel strata.

Omi and Martinson (2002) sampled wildfire areas to describe the effectiveness of fuel treatments on subsequent fire severity. The strongest correlation they found was that between canopy base height and "stand damage," which they used to express severity. Importantly, canopy bulk density was not strongly correlated to fire severity. Instead,

> height to live crown, the variable that determines crown fire initiation rather than propagation, had the strongest correlation to fire severity in the areas we sampled... [W]e also found the more common stand descriptors of stand density and basal area to be important factors. But especially crucial are variables that determine tree resistance to fire damage, such as diameter and height. Thus, "fuel treatments" that reduce basal area or density from above (i.e., removal of the largest stems) will be ineffective within the context of wildfire management (p. 22).

Unfortunately, Omi and Martinson (2002) failed to collect information about extant fuel profiles before the fires they retrospectively studied, and the scale of events considered confounds replication. However, the authors claim that their results can be extrapolated widely to other sites. A key implication of the study is the importance of treating fuels "from below" in order to prevent widespread occurrence of stand replacing wildland fires. Keyes and O'Hara (2002) concur that raising a stand's canopy base height is critical, and argue, "pruning lower dead and live branches yields the most direct and effective impact" (p. 107). For this reason, Appellants do not challenge small tree thinning and associated fuel reduction treatments because we recognize the value and scientific defensibility of implementing such treatments in strategic areas identified by the Forest Service.

The EIS lacks site-specific data to support its fire spread and burn probability modeling

An accurate spatial description of wildland fuels is fundamental to assessing fire hazard and risk on a landscape (Chuvieco and Congalton 1989). The EIS uses remote sensing (satellite and aerial photo interpretation) of **canopy closure as a proxy** for fuel modeling. The proxy approach to fuels mapping biases analysis of fire hazard with an assumption that late-successional forest is most susceptible to severe fire effects when, in fact, the opposite may be true (Azuma et al. 2004, Odion et al. 2004, Raymond and Peterson 2005). Moreover, fuel models by themselves are useful only for fire behavior prediction since they do not quantify fuel characteristics such as large logs, duff, and crown fuels needed to predict fire effects (Keane et al. 2001).

Therefore, any characterization of fuel models should be supported by field sampling data. Planar intercept transects developed by Brown (1971, 1974) quantify surface wood fuel, litter and duff, and other methods enable description of sub-canopy fuel loading. The fuel model description tools created by Anderson (1982) and Scott and Burgan (2005) both cite planar intercept as a verification method. Weatherspoon and Skinner (1996) make clear that field data collection is a fundamental professional standard for project-scale fuels management planning:

> Mapping should utilize the best sampling strategies combining remote sensing imagery (perhaps at several scales) and ground truthing. The reliability of existing vegetation maps should be verified before they are incorporated into the database. Fire-relevant attributes of vegetation (including understory composition and structure, and vertical and horizontal continuity) need to be characterized adequately. Similarly, surface fuels should be described, utilizing field-verified vegetation/fuels correlations to the extent feasible (p. 1488).

It has not been demonstrated that fuel mapping accuracy can be improved through combining gradient modeling (*e.g.*, plant association groups) with maps derived from remotely sensed data. Keane et al. (2001) report accuracies between 30 and 40 percent for such an effort in the Gila National Forest, which is low even for generic vegetation mapping projects. Most fuel mapping projects do not report any error analysis, or the reported error analyses are deficient due to a lack of field verification (Keane et al. 2001). Finer-scale modeling combined with repeatable measurements of sub-canopy forest structure and composition is required, and this information must be included in the EIS to ensure scientific integrity of the analysis.

2. The ROD violates standards and guidelines for management of Late-Successional Reserves (LSR).

The Davis LSR does not provide adequate late-successional forest habitat now

The location of the Davis LSR in fire dependent forests reduces expectations that the entire LSR should provide late-successional forest habitat. Given this fact, the Davis LSR Assessment (USDA 2006) specifies a minimum threshold of only 25 percent of the whole LSR as suitable nesting, roosting and foraging (NRF) habitat for northern spotted owl (EIS p. 119). We note that the Davis LSR currently consists of only 17 percent NRF habitat (p. 113).

Allen and colleagues (2002), Arno (2000), Brown and others (2004) as well as Franklin and Agee (2003) emphasize that larger and older trees, especially those established prior to European settlement but including those recruited <u>after</u> settlement, are rare today and very difficult to replace once removed by timber sales. Therefore, silvicultural treatments in LSR should protect the largest and oldest trees with the best likelihood of contributing to late-successional forest structure, which the relevant science (cited above) consistently pinpoints at 20 inches in diameter at a minimum.

The NFP establishes clear standards for silviculture in the LSR

In LSRs east of the Cascades, the NFP directs, “Silvicultural activities aimed at reducing risk shall focus on younger stands in [LSRs]. The objective will be to accelerate development of late-successional conditions while making the future stand less susceptible to natural disturbances” (NFP ROD p. C-13). Where the risk of major disturbance is high, management activities must focus on <u>young stands</u>, but activities are permitted in late-successional habitat if they: (1) would clearly result in greater assurance of long-term maintenance of habitat, (2) would clearly reduce risks of major disturbance, and (3) would not prevent the LSR from meeting its intended purpose. Therefore, <u>any action in late-successional forest within LSR must be justified with demonstrated benefits to such habitat in order to comply with the NFP</u>. These benefits must be “clear” from analysis in the EIS. Professional opinion asserting possible benefits of active management, without supporting analysis, is not adequate to justify degradation of existing late-successional forest in LSR.

The ROD authorizes activities that violate LSR standards and guidelines

The ROD authorizes logging that would degrade seven (7) percent of existing late-successional forest in the LSR, and is "likely to adversely affect" northern spotted owl (EIS pp. 114, 120). Inexplicably, the Forest Service refused to study an alternative that would conduct fuels treatments without degrading NSO habitat. This presents a direct and significant impediment to the habitat values that the LSR is designed to provide under the NFP. Authorized degradation of NRF habitat in a LSR that is surrounded by fragmented forests, without explanation of how it would not prevent the LSR from meeting its purpose given its lack of adequate habitat in its current condition, directly contradicts the letter and intent of the NFP. LSR should be protected from "loss due to large-scale fire, insect and disease epidemics, and major human impacts" (NFP ROD p. B-1 – emphasis added). "[T]he scale of salvage and other treatments should not generally result in degeneration of currently suitable owl habitat or other late-successional conditions" (NFP ROD p. C-13).

The EIS contains promises that degraded habitat in the LSR would be more likely to persist through fire disturbance as a result of canopy thinning than without management, but those promises lack explanation. We note above the existence of scientific uncertainty and controversy about the efficacy of crown bulk density reductions and resultant slash accumulations in protecting habitat from stand replacing fire. Therefore, the ROD is unreasonable because it authorizes degradation of currently suitable owl habitat without assuring that authorized management activities will reduce the risk of a major stand-replacing natural disturbance.

Please note that authorized logging of currently suitable NRF habitat in the LSR will not occur in isolation. Rather, the degradation of 2,023 acres of NRF habitat in the Five Buttes Project is cumulative with and in addition to spotted owl habitat removal that occurred in the Davis Fire Recovery Project (see Bond et al. 2002 – attached). Please note our analysis of the Forest Service's obligation to disclose cumulative effects below.

3. The ROD violates legal requirements for management of NSO Critical Habitat

Degradation of 258 acres of Critical Habitat in unit OR-7 trades the potential for stand replacement by a hypothetical "problem fire" for the certainty of habitat loss by logging in the Five Buttes Project (EIS p. 113). If the USFS wished to do so, it could propose an action that both attempts to modify fire behavior and severity while retaining 60% canopy closure so as to avoid the "likely to adversely affect" determination for NSO Critical Habitat. Instead, the agency prefers to offer the false choice of degrading Critical Habitat, or "doing nothing." It is unfortunate that the Forest Service is unwilling to develop and implement fuels treatments that would maintain suitable NSO Critical Habitat.

"Destruction or adverse modification" includes changes to the critical habitat "that appreciably diminish[ ] the value of critical habitat for both the survival and recovery of a listed species." 50 C.F.R. 402.02. The Ninth Circuit emphasizes that agencies must manage for both the survival and recovery of a listed species. Gifford Pinchot Task Force v. U.S. Fish and Wildlife Service, 378 F.3d 1059 (9th Cir. 2004).

4. The EIS fails to disclose significant cumulative impacts to the environment.

The Forest Service is required to discuss and fully analyze the cumulative impacts of a project. 40 C.F.R. 1508.8. Ninth Circuit case law holds that "[g]eneral statements about possible effects and some risk do not constitute a hard look absent a justification regarding why more definitive information could not be provided." Klamath-Siskiyou Wildlands Center v. Bureau of Land Management, 387 F.3d 989, 993 (9th Cir. 2004). The Five Buttes EIS lists projects that are planned or ongoing in or around the project area (p. 37). It reveals no "quantified or detailed information" on any of the listed projects. Merely disclosing an activity is inadequate: the Forest Service must discuss the environmental consequences from the activities.

The EIS overlooks the Davis Fire Recovery Project, Seven Buttes Project and Seven Buttes Return Projects, all of which overlap the Five Buttes Project area. The Davis Fire Recovery Project salvaged 3,785 acres on the area of the Davis burn, which is entirely within the Five Buttes Project area. Contrary to Deschutes National Forest policy, the Davis fire did not "eliminate" spotted owl habitat (Bond et al. 2002). The Seven Buttes Project and Seven Buttes Return cumulatively affected approximately 19,000 acres of forest habitat, which is comparable to the acreage the EIS attributes to cumulative removal of spotted owl habitat on private land (p. 118).

5. ROD authorization of road construction undermines the Aquatic Conservation Strategy

The Five Buttes Project is entirely within a Tier 1 Key Watershed, which is a top priority under the Aquatic Conservation Strategy (ACS) of the NFP. The Five Buttes Project will build new roads and rehabilitate others totaling 5.9 miles. The ACS disallows any net increase of road density in Tier 1 Key Watersheds (NFP ROD p. C-7). The EIS does not demonstrate that road decommissioning or other restoration activities will offset authorized new road construction and thus help the project meet the ACS.

Roads contribute more sediment to streams than any other land management activity (Gibbons and Salo 1973, Meehan 1991). Substantial increases in sedimentation are unavoidable even when the most cautious road construction methods are used (Gucinski et al. 2001, McCashion and Rice 1983). The volume of sediment produced is directly proportional to the distance of road constructed (Megahan et al. 1992). Roaded and logged watersheds in the same basin feature significantly higher channel bed substrate embeddedness than do undeveloped watersheds (Burns 1984).

Road-stream crossings inevitably cause significant downstream sedimentation, largely resulting from channel fill around culverts and subsequent road crossing failures (Furniss et al. 1991, Trombulak and Frissell 2000). Road-stream crossings create unnatural channel width, slope and streambed form both upstream and downstream from the crossings, and these alterations of channel morphology can persist for long periods (Heede 1980). Channelized stream sections resulting from rip-rapping roads adjacent to stream channels are directly affected by sediment from side casting and road grading, and such activities can trigger fill slope erosion and failures (Gucinski et al. 2001). The Five Buttes EIS fails to account for these factors.

The EIS fails to locate road construction on the landscape, let alone its proximity to streams, but states that "riparian reserve buffers" between disturbed soils and surface waters will prevent sediment delivery from roads and log landings to streams (p. 254). This ignores considerable scientific controversy and uncertainty regarding the site-specific effectiveness of buffers in filtering sediment from roads.

Without clear understanding of surface and subsurface hydrology in riparian areas, it is impossible to accurately predict the effectiveness of riparian vegetation in trapping sediment pollutants (Gilliam 1994). Nobody has ever modeled the effects of sediment accumulation in buffers or observed their trapping efficiency over time (Dillaha and Inamdar 1996). The Forest Service produced no such information from the project area. It is necessary to account for sediment accumulations within buffer zones because they do not revert to an undisturbed condition at the beginning of each storm. Moreover, it is important to account for effects of concentrated water flow through buffers, particularly if construction activities intercept ground water.

The EIS claims that the activities of the project will mostly occur outside of riparian reserves, so there will be no effect to streams. However, sediment can affect streams regardless of whether the activities are inside or outside riparian reserves. Best Management Practices are not enough to prevent increased sediment loads. Furthermore, activities will occur on 684 acres of sensitive soils, including areas with greater than 30% slope. Tractors will be allowed to make one pass in and one pass out of these unstable slopes (EIS p. 23). These areas have a great risk of contributing sediment to streams when disturbed by commercial logging activities.

Finally, we note that the Forest Service lacks data to support its claim (p. 254) that there will be no increase in sediment or turbidity. The last stream surveys for sedimentation were conducted in 1998 (p. 247). The Forest Service has no data regarding turbidity in the Five Buttes Project area (p. 248).

For the reasons above, Appellants respectfully request that the Forest Service respond positively to the relief request specified above.

Sincerely,

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