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RE: Trinity County Roads and Plantations Pilot Project Scoping

Dear Mr. Myers,

I am writing on behalf of the Environmental Protection Information Center (EPIC), a nonprofit organization that works to protect and restore forests, watersheds and native species in northwestern California. Our organization has participated in planning efforts on the Shasta-Trinity National Forest for over a decade and has recently begun to participate in the Trinity County Collaborative. Please accept and consider these scoping comments on the Trinity County Roads and Plantations Pilot Project.

The project is within the South Fork Trinity River watershed on the Hayfork Ranger District of the South Fork Management Unit and is located adjacent to the Indian Valley (2N10) and Butter Meadows (3N08) roads located between the towns of Hayfork and Hyampom. The 4,000 acre project proposes; 1,690 acres of logging within natural forest stands, 1,360 acres of plantation thinning and 1,050 acres (40 miles) of road buffer treatments within Late Successional Reserves, Matrix, Adaptive Management Areas, Riparian Reserves and Administratively Withdrawn land allocations.

While our organization is generally supportive of treating fuels adjacent to major ingress/egress roads and within plantations, we are greatly concerned with the proposed adjacent logging within natural stands. We have further concerns with landing and dozerline construction as well as the use of machine piling and mastication and any proposed treatments within Late Successional Reserves, Riparian Reserves and Critical Habitat.

LATE SUCCESSIONAL RESERVES (LSR)

> Late-successional forest communities are the result of a unique interaction of disturbance, regeneration, succession and climate that probably can never be created with management… [c]onserving a network of natural old-growth stands is imperative for preserving biodiversity into the future. FEMAT IV-31-32.

Late seral forest stands provide delicate ecosystems and habitat for multiple species that are dependent upon closed canopy forests. Commercial logging and pruning as proposed may alter late seral characteristics. It is not clear from the scoping notice how much of the project area lies within the South Fork Mountain LSR or if there are other 100 acre LSRs present in the project area.

The Northwest Forest Plan NFP establishes clear standards for silviculture in the LSR.

> In Klamath Province LSRs, the Northwest Forest Plan 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 very high, management activities should *still* focus on young stands, 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, any action in late-successional habitat must be justified with *demonstrated benefits* to such habitat in order to comply with the NFP. These benefits must be "clear" from either the local analysis or from relevant scientific literature. The proposed commercial logging of native stands may target large fire resistant and co-dominant trees that may have late successional characteristics and would be contrary to protecting and enhancing late successional characteristics.

Northwest Forest Plan- Importance of Natural Forest Structure

> Structure and Composition:
> Four major structural attributes of old-growth Douglas-fir forests are: live old-growth trees, dead trees (snags), fallen trees or logs on the forest floor, and logs in streams. Additional important elements typically include multiple canopy layers, smaller understory trees, canopy gaps, and patchy understory. Structural characteristics of late-successional and old-growth forest vary with vegetation type, disturbance regime, and developmental stage. For example, in many Douglas-fir stands in western Oregon and Washington, the mature phase of stand development begins around 80 years and is characterized by relatively large live and dead trees, although multiple canopy layers may not yet be well developed. (B-2)
>
> Ecological Processes:

Tree growth and maturation, death and decay of large trees, and low-to-moderate intensity disturbances (e.g. fire, wind, insects, and diseases) that create openings or gaps in the various strata of vegetation are natural ecological processes that are essential for the development and maintenance of late-successional and old-growth forest ecosystems. In the maturation stage, large dead and fallen trees begin to accumulate. In Douglas-fir stands west of the Cascade Range, this stage typically begins between 80 and 140 years, depending on site conditions and stand history. (B-2, 3)

Late-Successional Reserves:
Desired late-successional and old-growth characteristics that will be created as younger stands change through successional development include: 1) multispecies and multilayered assemblages of trees, 2) moderate to high accumulations of large logs and snags, 3) moderate-to-high canopy closure, 4) moderate-to-high numbers of trees with physical imperfections such as cavities, broken tops, and large deformed limbs...Although they may not be duplicates of existing old-growth forests, these stands could provide adequate habitat for many species in the long term. (B-5)

The Role of Silviculture:
Objective of silvicultural systems proposed for LSR: development of old-growth forest characteristics including snags, logs on the forest floor, large trees, and canopy gaps that enable establishment of multiple tree layers and species composition. (B-5)

Stand Management:
Coarse woody debris is essential for many species of vascular plants, fungi, liverworts, mosses, lichens, arthropods, salamanders, reptiles and small mammals. Because of drier microclimates, logs in the matrix may be occupied by species different from those found on coarse woody debris in late-successional forests. However, these logs may provide transitional islands for the maintenance and eventual recovery of some late-successional organisms in the matrix. (B-7)

As proposed the project may eliminate multiple storied stands, exasperate habitat fragmentation in this LSR and degrade habitat contrary to the NFP ROD, Shasta-Trinity LRMP and the NSO Recovery Plan.

Retaining large diameter trees serves important ecosystem functions including snag recruitment, promoting multistoried canopies, moderating fire behavior and providing wildlife habitat. Large trees may also act as refuge or centers of dispersal for many organisms including plants and small vertebrates. The importance of late successional (LS) trees and stands cannot be overstated as they are necessary for a healthy functioning ecosystem. The Corral LSR consists of only 15% LS habitat and much of the 68% of the mid-successional habitat presently (according to the Shasta-Trinity Late Successional Reserve Assessment at 2-28) exhibits the same characteristics associated with LS habitat.

Diseased and damaged trees and logs are key structural components of late-successional and healthy forests. The loss of snags effect the development of future stands and habitat quality for a number of organisms. Snag removal may result in long-term influences on forest stands because large snags are not produced in natural stands until trees become large and begin to die from natural mortality. Cavity-nesting birds and mammals such as woodpeckers, nuthatches, chickadees, squirrels, red tree voles, and American marten use snags extensively. Removal of snags can reduce the carrying capacity for these species for many years. Insect damaged, mistletoe and moss laden trees provide appropriate structural components in late successional forest ecosystems.

Snags are an essential element of forest health, forest structure, and late-successional habitat. The Fish and Wildlife Service (1990) defined Spotted Owl (old-growth) habitat as including "numerous large snags." Similarly, the Shasta-Trinity National Forest LRMP directs the agency to "protect and enhance late-succssional characteristics" in LSRs. Large snags are a key late-successional characteristic. Hence snags should be retained as essential habitat elements in a Late Successional Reserve.

Large logs and branches are important sources of shelter for small mammals and large furbearers. These species need well-distributed downed woody materials across the landscape, especially in riparian areas. Large logs and branches should be left on-site for shelter, as they play an important ecological role as future soil conditioner and are not highly flammable. A variety of snags should be left in each unit, especially snags over 18 inches as they provide shelter for bats, birds and a food source for woodpeckers. Large snags also become large logs as they fall to the ground and break down into the soil. Large dead and dying trees, especially trees with large branches and hollowed-out cavities should be left for future snags.

Adequate numbers of large snags and green trees are especially critical for bats because these trees are used for maternity roosts, temporary night roosts, day roosts, and hibernacula. Large snags and green trees should be well distributed because bats compete with primary excavators and other species that use cavities. Day and night roosts are often located at different sites, and migrating bats may roost under bark in small groups. Thermal stability within a roost site is important for bats, and large snags and green trees provide that stability. Individual bat colonies may use several roosts during a season as temperature and weather conditions change. Large, down logs with loose bark may also be used by some bats for roosting. All large trees should be retained in late successional reserves and Riparian Reserves regardless of whether they are diseased or not because they play important roles while standing, decaying and lying on the forest floor.

The scoping notice states that thinning would retain the "best" healthiest trees. However, in LSRs this is not appropriate because trees affected by pathogens or diseases provide complex forest structure needed by wildlife. It is entirely expected that LSRs will contain a higher instance of diseased and dying trees. Please be descriptive in the forthcoming NEPA document as to exactly what and how much treatment is expected in LSR. Better yet avoid targeting any large trees that have old growth characteristics.

KEY WATERSHED AND RIPARIAN RESERVES

> Refugia are a cornerstone of most species conservation strategies. They are designated areas that either provide, or are expected to provide, high quality habitat. A system of Key Watersheds that serve as refugia is crucial for maintaining and recovering habitat for at-risk stocks of anadromous salmonids and resident fish species. Northwest Forest Plan B-18
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> Some of the most productive, sensitive, and diverse sites on the Shasta-Trinity NF are within Riparian Reserves. Shasta-Trinity Land Resource Management Plan (LRMP)3-17
>
> Riparian areas provide important habitat for fish and other aquatic life-forms, as well as a variety of wildlife species, including the willow flycatcher, fisher and bald-eagle. Riparian areas have high wildlife values because of the close proximity of water and structural diversity of the vegetation. LRMP 3-17
>
> Ecosystem management programs including wildlife and fisheries are emphasized while forest management activities that emphasis commercial product development and extraction, and other non-dependant resource practices are not emphasized. LRMP pg. 3-18
>
> The riparian assemblage represents species, which use the terrestrial vegetation of the riparian zone. Riparian areas have a high diversity of plant and wildlife species. Many wildlife species are dependant on this habitat type and adjacent vegetation. With **dense canopy providing cover, shade and cooler temperatures, riparian forests provide corridors, connective habitat and migration routes**. (Emphasis added)– LRMP3-25
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> Forest Service activities and programs are intended to assist in the recovery of T&E species and to avoid actions that may cause a species to become threatened or endangered. LRMP pg. 3-26
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> Current management direction is to provide a network of suitable habitat to include linkage in the form of dispersal habitat. This direction is being fulfilled with the implementation of the LSR and Riparian Reserve systems. LRMP pg. 3-27
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> The willow flycatcher is a Region 5 sensitive species and a State listed threatened species. Current management direction is to provide for population viability through the protection of habitat in the form of riparian habitat such as riparian management reserves and wet meadows. LRMP pg. 3-27

There should be no commercial logging or excessive pruning in RRs, the focus for these areas should not be in fuels treatment, but allowing the accumulation of LWD and a dense canopy in order to provide for undisturbed debris, natural processes, wildlife corridors, landscape connectivity and for lower stream temperatures to ensure the viability of aquatic life.

There should be no mechanized equipment operating in riparian reserves and sensitive areas, and there should be no mechanized or hand piling of slash or fuels in RRs that may disturb any streams.

Opening the canopy would remove the ability for recruitment of LWD until the canopy redevelops. Please specifically discuss the impacts to aquatic species that would result from thinning and pruning in RRs and removing LWD.

Mechanical removal has proven to have serious negative effects on the landscape. A recent study entitled "The Watershed Impacts of Forest Treatments to Reduce Fuels and Modify Fire Behavior," authored by independent hydrologist Jonathan J. Rhodes[1], raises serious questions about the ecological efficacy of forest thinning and other mechanical fuel treatments intended to control wildfires – primarily because of their unintended but inevitable damage to forested watersheds.

The impacts of mechanical fuel treatments on watersheds are especially of concern because aquatic systems are significantly and pervasively degraded. In some instances fuel treatments actually work against watershed restoration needs because of the practices involved and the diversion of resources away from beneficial restoration activities, such as road upgrading and removal.

The peer-reviewed report finds that the ecological costs of extensive thinning and other treatments are virtually inevitable: first, because many proposed projects necessarily involve repeated entries into the same area, which raises the scale of cumulative effects and effective level of disturbance; second, because the treatments cause direct impacts (e.g., they damage soils, cause erosion, disrupt streamflows, and damage riparian areas); and third, because the treatments fail to address the actual dominant causes of watershed degradation, such as road building. Combined, these factors can impede or set back ecologically sound efforts at aquatic ecosystem restoration.

Based on a detailed statistical analysis of a large body of fire data spanning many years, the report finds that mechanical fuel treatments are extremely unlikely to reduce the intensity of so-called catastrophic fires. In addition, the analysis finds that only in a small number of cases would treated areas likely be in the path of intense fire over their intended lifetimes (i.e., the period of time after treatment when fuels are reduced).

The report concludes with a precise set of recommendations to reduce the ecosystem damage from mechanical fuel treatments, including limiting treatments in the most sensitive portions of watersheds and prohibiting the most destructive fuel treatment activities.

The South Fork Trinity River is a Tier 1 Key Watershed it is also 303(d) listed under the clean water act as impaired. Key Watersheds are the highest priority for watershed

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[1] Rhodes, Jonathan. The Watershed Impacts of Forest Treatments to Reduce Fuels and Modify Fire Behavior. Pacific Rivers Council 2007

restoration. Removing large old trees and snags that are contributing critical elements of forest and riparian structure by logging, roadwork and use, landings and skid trails could degrade riparian values and watersheds at large. Please be descriptive in how the Project will meet Aquatic Conservation Strategy objectives and why any treatments in RRs are needed.

NATURAL STANDS, ECOLOGICAL NEED AND SOCIAL ACCEPTANCE

The title of this project is deceptive given that over 1/3 of the project area is within natural stands, this highly diminishes the social acceptance of this project. The forthcoming NEPA should be explicit when describing ecological need of the proposed treatments in these areas and should provide alternatives to address activities in these forest stands. In order for any fuel or fire break to be effective a project must retain adequate canopy over. Our recommendation would be generally 60% or greater canopy closure on south slopes and ridges and at least 80% on north facing slopes so ground fuels do not accumulate.

NORTHERN SPOTTED OWL (NSO) RECOVERY AND CRITICAL HABITAT

> Connectivity for the dispersal of forest-dependent organisms may decrease as fragmentation of the original forest matrix increases, resulting in the isolation of individuals and populations. The rate of successful dispersal of juvenile spotted owls (Strix caurina), for example, decreases in fragmented landscapes, thus influencing long-term population viability (Doak 1989; Miller et al. 1999). Swanson[2] pg. 10

> Balancing the goals of geographic distribution of reserves, and selecting reserves to maintain populations of individual species of concern (e.g., fishers, spotted owls) may require that the current Late-Successional Reserves network be augmented with new priority areas in high-value habitat areas in the most productive low- to mid-elevation forests of the west-central portion of our study. Zielinski 2006[3] pg.20

> Given the public trust duties for wildlife, the federal lands play a unique role in protecting biodiversity, including providing habitat for the area-limited focal species such as the spotted owl and the fisher. Zielinski 2006 pg.20

The Northern spotted owl (NSO) is on a precipice and populations continue to decline across the region. Recovery of the species is mandatory under the federal and state Endangered Species Act.

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[2] Swanson, Mark. Centuries of Change in Pacific Northwest Forests: Ecological Effects of Forest Simplification and Fragmentation. University of Washington College of Forest Resources Northwest Environmental Forum. Published November 2005

[3] Zielinski, William J. et al., *Using landscape suitability models to reconcile conservation planning for two key forest predators,* Biological Conservation (2006), doi:10.1016/j.biocon.2006.07.003.

In order to retain viable populations of Threatened, Endangered and Sensitive and other species the agency must stop removing and downgrading suitable habitat. The Klamath, Mendocino and Shasta-Trinity National Forests, continue to remove and degrade habitat at an alarming rate on a continuous large-scale basis within Late Successional Reserves (LSR), Critical Habitat, NSO Activity Centers and Nesting/Roosting habitat. The agency must look beyond the borders of this project to gain an adequate knowledge of how owl populations are surviving across the region to ascertain how the project would cumulatively affect the NSO and its Critical Habitat.

The forthcoming NEPA document must have a detailed cumulative effects analysis for NSO's. Please be descriptive when analyzing NSO Activity Centers, current suitable habitat, territory habitat deficiencies and Critical Habitat. Please be explicit with the evaluation of the short-term impacts to NSOs and their prey especially in spotted owl core-use areas.

Barred Owl

Please be explicit when analyzing the effects of logging and the increased threat of barred owl invasion. The barred owl is currently displacing NSOs from historical breeding territories to such an extent that the extinction probability of pairs of NSOs triples in areas where barred owls are present compared to areas where they are not. Even when habitat for NSOs is available, the probability that NSOs will colonize this habitat is greatly diminished when barred owls are present. Please be descriptive when disclosing NSO survey results and disclose what protocol is being used.

Recovery Plan and Barred Owls

The Final Recovery Plan for the Northern Spotted Owl (FRP) has partially addressed the barred owl issue by adopting Recovery Action 32 which urges the FS to "Maintain substantially all of the older and more structurally complex multi-‑layered conifer forests on Federal lands outside of MOCAs..." based on the idea that "protecting these forests will not further exacerbate competitive interactions between spotted owls and barred owls as would occur if the amount of shared resources were decreased." (FRP p 34). In considering this recommendation the agencies must prepare NEPA analysis, which considers the full potential of suitable habitat quantity and quality and its mediating influence on the interactions between spotted owls and barred owls. Maintaining a subset of suitable habitat as recommended by the recovery plan is one option, but the agencies must consider the full benefits of protecting all suitable habitat, not just a subset. It would be wise to do so at a range-‑wide level, but until that is done, the agencies should not adversely modify any suitable habitat.

Protection of additional suitable habitat in order to reduce competitive interactions between the two owls is now a recognized tool in the toolbox and represents significant new information about any proposal to modify suitable habitat. Project planning must survey to see if Barred owls are in the project area.

One can see that the barred owl, by invading, occupying suitable habitat and excluding spotted owls, has reduced the effective size of the reserves that were established in 1994, and thereby reduces the potential population of spotted owls. Extinction risk is increased by this loss of habitat and smaller population. If we provide more suitable habitat, the population potential increases, and the risk of extinction decreases. The most rational way to respond is to protect remaining suitable habitat, expand and restore the reserve system to provide more suitable habitat to increase the likelihood that the two owl species can co-exist.

This new approach and information is also discussed in the 2011 Recovery Plan under Recovery Action #10. Recovery Action #10 is intended to use habitat modeling to better identify those areas where land managers should better protect, enhance and develop habitat in the quality and distribution necessary to provide for the long-term recovery of spotted owls. Where modeling outputs and on the ground examinations indicate that vegetation management activities can improve long-term habitat conditions, they will be encouraged even if it may result in short-term impacts, *but only if a determination is made that these longer term goals outweigh short-term impacts*.

Please consider Recovery Action #10, which states, in the interim, while modeling is conducted, "[l]and managers should generally avoid activities that would *reduce* nesting, roosting and foraging habitat within provincial home ranges (e.g., 1.3 mile radius) of reproductive pairs."

Scientific peer reviewers and Forsman et al. (2011) recommended that we address this downward demographic trend by protecting known spotted owl sites in addition to the retention of structurally-‑complex forest habitat. NSO Recovery Plan III-‑42

<u>Thinning and Owls</u>

Seamans and Gutierrez 2007[4] found that mechanical treatments (e.g., thinning) of as little as 20 hectares (about 50 acres) within the 400-‑hectare home range core area of spotted owls reduced colonization of territories by spotted owls, and increased the probability of breeding dispersal away from territories—both substantially negative indicators for spotted owl conservation.

The planning document should analyze and disclose the impacts of their logging proposals on spotted owl Nesting Roosting and Foraging (NRF) habitat. The forthcoming NEPA document should disclose where, how much and/or what types of habitat is proposed for treatment including, Critical Habitat, Activity Centers and LSR's.

[4] Seamans, M.E., and R.J. Gutierrez. 2007. Habitat selection in a changing environment: the relationship between habitat alteration and spotted owl territory occupancy and breeding dispersal. The Condor 109: 566-‑576.

Protecting habitat is of utmost importance for the NSO given the continuous threats the species is up against. What had been viewed, as less-than-significant impacts on NSO may now need to be evaluated much more critically, with an eye to a regional conservation strategy rather than one that spans the entire NW Forest Plan area. Reconstructing roads and landings and entering natural stands would degrade suitable habitat.

Recent significant information regarding NSO population decline across its range, and the emergence of new threats not contemplated when the Northwest Forest Plan or the Shata-Trinity LRMP were signed. The agency is required to consider and disclose information that contradicts the assumptions of the Forest Plan and the LRMP during planning. We urge the agency to avoid actions (such as landing construction, commercial thinning, excessive pruning and other mechanical treatments) that will remove or downgrade suitable habitat for this federa and state listed species.

Owl habitat is characterized by large trees, high canopy closure, abundant dead wood, and well-developed understory, it is essential that such any prescription retains NSO Nesting Roosting and Foraging (NRF) habitat where it currently exists in the Corral LSR and Critical Habitat.

FISHER

The project occurs within the known habitat of the Pacific fisher. The Shasta-Trinity National Forest is one of the prime refuges for the Pacific fisher in California. It is not clear what information the Forest Service has on fisher use in this region. The Forest Service should survey for fisher *before* any alternatives are developed as survey information would likely influence the design of project alternatives. In designing a survey, the Forest Service should incorporate the best available science as it is very difficult to conclusively identify that fishers are *not* present. As explained in the 2014 Draft Species Report for the Pacific fisher:

> Determining an area is unoccupied by fishers is also difficult. Fishers within the analysis area tend to live in remote locations where they are seldom encountered, documented, or studied. They naturally occur at low population densities and are rarely and unpredictably encountered where they do occur. They are territorial and require expansive areas of forested habitat for each individual, meaning large areas may be occupied by just a few individuals, thus reducing the likelihood of detecting them. In addition, many mobile species are difficult to detect in the wild because of morphological features (such as camouflaged appearance) or elusive behavioral characteristics (such as nocturnal activity) (Peterson and Bayley 2004, pp. 173, 175). While positive fisher detections, using techniques such as sooted track plates and remotely triggered cameras, are conclusive, non-detections (inferred absence) are based on detection

> probability, which in turn, is strongly influenced by survey effort. (USFWS 2014).[5]

EPIC is concerned about the potential impact of logging activities natural stands and Riparian Reserves on the Pacific fisher. As articulated in the 2014 Draft Species Report, commercial thinning negatively impacts fisher habitat by removing structural complexity and increasing the risk of predation by predation by bobcats and mountain lions. Although no study has directly examined the impacts of thinning and other fuel management activities, there is reason to believe that commercial thinning—especially if not carefully performed with rigorous measures to ensure the retention of snags and other complex forest components—detrimentally affect fisher habitat. As the 2014 Draft Species Report highlighted in its discussion of threats to fisher habitat:

> The loss of and reduction in the availability and distribution of structural elements and the processes that create them (for example, mistletoe, heart rot fungi, age-related decadence, primary cavity excavators) can negatively affect fisher reproduction and energy budgets (Lofroth et al. 2010, pp. 123–130, Naney et al. 2012, p. 22). Also, in many of the ecosystems in the analysis area, these structural elements are important habitat components for fisher prey (Aubry et al. 1991, pp. 292–294; Carey and Johnson 1995, pp. 347–349; Bowman et al. 2000, p. 123). Timber harvest and silvicultural techniques such as regeneration harvest, selective harvest of insect damaged and diseased trees, and thinning to promote vigorous stands of trees, often removes the largest trees or focuses on the removal of older, diseased, or decadent trees resulting in the removal and limits future recruitment of rest and den trees. Fuels reduction and fire suppression techniques that focus on the removal or salvage of snags and fire damaged trees may diminish the distribution, abundance, and recruitment of den and rest sites across the landscape (Naney et al. 2012, pp. 29–37).[6]

Furthermore, thinning and understory clearing may increase the occurrence of fisher predators. Both bobcats and mountain utilize actively managed forest landscapes, such as commercially thinned forests.[7] Removal of brush and woody debris on the forest floor likewise removes habitat features that fishers may utilize to evade predators.

In moving forward, the Forest Service should ensure, to the greatest extent possible, the retention of large trees, snags, and other trees with complex structures (such as mistletoe brooms, downed trees, tree cavities, and broken tops). To the greatest extent possible, the proposed action should retain trees or snags with these structural features. Furthermore, project planning should address the potentially deleterious impacts of any proposed action intended to reduce fire risks on habitat. For example, the fisher may benefit from

[5] U.S.F.W.S. 2014. Draft Species Report Fisher (Pekania pennanti), West Coast Population.
[6] U.S.F.W.S. 2014. Draft Species Report Fisher (Pekania pennanti), West Coast Population at 54.
[7] U.S.F.W.S. 2014. Draft Species Report Fisher (Pekania pennanti), West Coast Population at 117.

the large amounts of down woody material, which is likely to develop if existing late-seral trees and stands are not logged.

SURVEY FOR SENSITIVE SPECIES

The Standards and Guidelines for the Shasta-Trinity National Forest (STNF) state that habitat must be surveyed and evaluated for any species that is threatened, endangered, or sensitive. This requirement includes protecting ecosystems and diversity of habitats, while maintaining viability for all species.

> Future management goals for T&E species will be directed towards (1) reaching viable populations in the case of T&E species; and (2) maintaining or if possible, increasing existing viable populations of sensitive species." LRMP pg. 3-27

> LRMP pg. 5-17 of Table 5-1 [Monitoring Action Plan] states under Wildlife – Threatened, Endangered and Sensitive species (TE&S) Goshawk: Activity: "Determine population and habitat trends". Under Techniques: "Identify and document habitat conditions in nest groves; survey habitat and determine occupancy and reproductive success." Page 5-18 under Furbearers: Activity: "Determine population and habitat trends within designated fisher and pine marten habitat."

Page III-122 of the LRMP FEIS states "Six of the Forest' threatened, endangered, and sensitive (TE&S) wildlife species have been selected as management indicators…." The Goshawk and Fisher have habitat in the project area yet they do not have actual project level population data or forest-wide trend data. Page III-27 continues, "*Forest personnel will continue to survey for additional populations and habitats of TE&S species… These surveys will intensify as management activities continue on the Forests. Additional inventory and/or surveys will be necessary to determine location, distribution, and habitat requisites of additional species and populations."*

This project proposes numerous treatments in habitat utilized by federal and state listed species as well as Sensitive species and may result in habitat loss, alteration, and fragmentation. The forthcoming NEPA document must analyze how the proposed activities may affect local populations of Threatened, Endangered, Candidate and Sensitive species.

MANAGEMENT INDICATOR SPECIES

> Use appropriate indicator species or habitat components to represent the assemblages. Survey for occupancy, reproductive success, population stability and growth, ecological health. LRMP 5-16

The forthcoming NEPA document needs to analyze and disclose survey results and the potential impacts of the project on Management Indicator Species (MIS) as defined by the LRMP.

The agency must provide information describing population numbers, locations, and trends for key wildlife species, and monitoring data to determine that the proposed action would maintain numbers and distribution of these species sufficient to ensure long-term viability. The forthcoming NEPA document should disclose information and analysis regarding MIS *population* on a majority of MIS species trends in these watersheds.

The findings of the NEPA document and Wildlife Biological Assessment/Biological Evaluation (BA/BE) must provide the decision maker and the public with enough information to conclusively know that the project will have no significant effect on threatened, sensitive, and management indicator wildlife species. 40 C.F.R. § 1508.27.

The BE is required to "ensure that Forest Service actions do not contribute to loss of variability of any native or desired non-native plant or contribute to animal species or trends toward Federal listing of any species," and to "provide a process and standard by which to ensure threatened, endangered, proposed, and sensitive species receive full consideration in the decision-making process." F.S.M. § 2672.41. To accomplish this task, BEs are required to assess cumulative effects of the proposed activity in relationship to all past, present, and reasonably foreseeable future actions regardless of what agency (Federal or Non-federal) or person undertakes such other actions. 40 C.F.R. § 1508.7; F.S.M. § 2672.42.

Please do not fail to substantively address the cumulative watershed effects of all actions in the affected watersheds and the impact on MIS by discounting cumulative impacts as individually minor impacts without examining their collective significance.

This duty to monitor management indicator species is non-discretionary. "Population trends of management indicator species will be monitored." 36 C.F.R. § 219.19(a)(6). The Forest Service must constantly monitor the Shasta-Trinity National Forest Land and Resource Management Plan's (LRMP) impact, including the impact of specific management actions, so that compliance with the Forest Plan is achieved and any needed revisions are ascertained. Inland Empire Public Lands Council v. United States Forest Service, 88 F.3d 754, 760 n.6 (9th Cir. 1996).

NEOTROPICAL MIGRATORY BIRDS

> Manage habitat for neotropical migratory birds to maintain viable population levels. LRMP pg. 4-29
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> Accepting that real declines are occurring raises the question of the cause of these population declines. Further research into the possible weather, climactic, and anthropogenic causes of observed population trends and the demographic mechanisms of these trends are necessary to address the causes of these declines. We suggest a raised concern for understanding the conservation biology of species we have found to be declining locally and regionally, and the strong

> negative strength of these declines indicates the problem may be urgent. Alexander 2005[8]

The regional decline of migratory birds is an issue in the Klamath Mountains. Numerous studies have reported local and regional trends in breeding and migratory bird populations throughout North America and suggest geographically widespread population declines that have provoked conservation concern for birds, particularly neotropical migrants. The Alexander 2005 report from the Klamath Bird Observatory indicates that several species on songbirds are suffering declining population trends at the regional level.

The planning document for this project must analyze and disclose the potential impacts of the proposed activities on neotropical bird population trends.

LRMP WILDLIFE STANDARDS AND GUIDELINES

The Monitoring Action Plan, Table 5-1 at LRMP 5-15 through 5-18 clearly cites the monitoring plans for wildlife and TES species, including level of monitoring, techniques, frequency and variability in standard requiring further evaluation and/or corrective action. The LRMP at 5-2 states "The Forest Supervisor, Staff Officers, and District Rangers will monitor the activities listed in Table 5-1." The LRMP at 5-3 states "These resource evaluation reports will be documented in an annual evaluation report prepared by the Land Management Planning Staff. The significance of the results of the monitoring program will be analyzed and evaluated by the Forest interdisciplinary team."

Page 5-18 states for Furbearers (marten and fisher) – Determine population and habitat trends within designated fisher and marten habitat. It also states Monitor furbearer network for occurrence and amount of appropriate habitat attributes and/or special components.

The LRMP forest-wide standards and guidelines at 4-30 states "Survey and evaluate habitat for TE&S species at the project level in coordination with the USFWS."

Under "Management Opportunities" on LRMP page 3-27 & 28 it states: "Future management goals for TE&S species will be directed towards (1) reaching viable populations in the case of T&E species; and (2) maintaining or, if possible, increasing existing viable populations of sensitive species."

"Forest personnel will continue to survey for additional populations and habitats of TE&S species. Comprehensive surveys have begun for bald eagles, peregrine falcons, and NSOs. These surveys will intensify as management activities continue on the Forests. Additional inventory and/or surveys will be necessary to determine location, distribution, and habitat requisites of additional species and populations."

[8] Alexander, J. Local and Regional Trends in Breeding and Migratory Bird Populations in the Klamath and Rogue River Valleys: Monitoring Results for 1993-2003 Klamath Bird Observatory 2005

There have only been a few monitoring reports in many years and most of the eight TES species are not included in these reports or only minimally. Furthermore the LRMP states monitoring evaluation reports will be conducted annually. This direction is being violated on the STNF. How will this project abide by LRMP monitoring standards?

ROADSIDE SAFETY

As stated in the scoping notice the roadside and plantation fuel reduction buffer (roadside safety corridor) would be 300 feet total width. The width is expected to shift with the minimum distance being 25 feet. The agency should account for this shift, as such, must survey and analyze at least 275 feet *on both sides of the road* to account for this malleable treatment area.

The scoping notice states that "where necessary" dozer line construction would be considered. Using bulldozers to clear swaths of forests down to bare mineral soil is highly controversial and questionably effective. Please do not consider this treatment or provide an alternative that does not include dozer line creation. Further, the forthcoming planning document should be site specific in detailing the amount and location of this treatment.

FIRE AND FUELS

North Facing Slopes

It is important when planning activities primarily aimed at influencing fire behavior to look at aspect, slope and weather and wind patterns. Trees and ground fuels slow wind speed, when all of the ladder fuels are removed as proposed, wind gains speed and will fan flames. Fire studies and common knowledge that fire severity is most often more severe on south facing slope at upper 1/3 of the slope. This is because north-facing slopes are most often more dense and provide more moisture and cooler micro-climates. The project proposes to open and clear out multi-layered forest stands throughout the the entire project area. This will increase solar radiation, wind speed and dry out and heat vegetation and soils while also increasing brush growth thereby making the landscape more susceptible to higher severity fire events.

Fire Modeling

While fire modeling on computers can be a helpful office exercise it does not often reflect actual conditions or fire behavior. Computer fire modeling has significant flaws. It is a snapshot in time with set conditions. The fire modeling used to show current crown fire potential in the scoping notice shows active crown fire within plantations and areas outside of the commercial logging units. EPIC supports the treatment of plantations and strategically located fuel breaks, however in this project the agency is proposing to also treat adjacent natural stands.

There is no temporal component in FlamMap, as such it uses spatial information on

topography and fuels to calculate potential fire behavior characteristics at a specific instant for the landscape under a specified set of conditions for every raster cell on the landscape with without contagion between data cells. FlamMap does not simulate temporal variations in fire behavior caused by weather and diurnal fluctuations, nor will it display spatial variations caused by backing or flanking fire behavior. Because of this, FlamMap is an ideal tool to compare relative fire behavior changes resulting from fuel modifications. Using just the fire behavior option, FlamMap is much like a point/stand fire model, however, the ability to analyze many stands in their georeferenced position does offer some degree of landscape perspective, albeit without topological influences.

Please avoid relying on fire modeling and disclose flaws associated with fire models used in planning.

Passive and Active Crown Fire

The planning document should be explicit as to where and what percentage active crown fire is modeled and where and what percentage passive crown fire is modeled. According to the USFS database Fire Effects Information System glossary (http://www.fs.fed.us/database/feis/glossary.html), active crown fire is one of several types of crown fire and is contrasted with passive crown fires which are less vigorous types of crown fire that do not emit continuous, solid flames from the canopy. Passive crown fire is a type of crown fire in which the crowns of individual trees or small groups of trees burn, but solid flaming in the canopy cannot be maintained except for short periods. Passive crown fire encompasses a wide range of crown fire behavior, from occasional torching of isolated trees to nearly active crown fire. Passive crown fire is also called torching or candling- A fire in the crowns of the trees in which trees or groups of trees torch, ignited by the passing front of the fire. The torching trees reinforce the spread rate, but these fires are not basically different from surface fires.

High Severity Fire

Miller et al. (2012)[9] analyzing all fires over 400 hectares 1987-2008 in the California Klamath region, found low proportions of high-severity fire (generally 5-13%) in long-unburned forests, and the proportion of high-severity fire effects in long-unburned forests was either the same as, or *lower than*, the high-severity fire proportion in more recently burned forests (see Table 3 of Miller et al. 2012.).

The fear of fire is often used to justify logging. Please acknowledge that fire exclusion does not automatically equate to high severity fire. Sivilcultural prescriptions are an art and a science, especially within Late Successional Reserves and critical habitat. Basing prescription on trees per acre prescription may not be effective at reaching the needs of late seral dependent flora and fauna. Historically large fire events in the Klamath Mountains typically have a less than ten percent high severity burn pattern. The

[9] Miller, J. D., Skinner, C. N., Safford, H. D., Knapp, E. E. and Ramirez, C. M. *Trends and causes of severity, size, and number of fires in northwestern California, USA*. 2012. Trends and causes of severity, size, and number of fires in northwestern California, USA. Ecological Applications, 22: 184-203.

ecological benefits and necessity of high severity must be acknowledged in the forthcoming NEPA document.

Effective Fuels Treatments Start Small

We recognize and encourage strategic and appropriate thinning of ground fuels and ladder fuels, however removing large-diameter trees from the forest canopy would not achieve the desire reduction in fuel hazard.

Fire behavior and severity depend on fuel properties and their spatial arrangement. Fuel bed structure plays a key role in fire ignition and spread, and is central to developing an effective fuel management strategy. The bulk density (weight within a given volume) of *surface fuels* consisting of grasses, shrubs, litter and dead woody material in contact with the ground are critical frontal surface fire behavior (heat output and spread rate - intensity) compared to simple fuel loading (weight per unit area). High surface fire intensity usually increases the likelihood of overstory canopy ignition and torching.

The shrub and small tree fuel stratum also is important to crown fire ignition because it supports surface fire intensity and serves as *ladder fuel* that facilitates vertical movement of fire from the ground surface into the canopy. The size of the gap between the ground and tree canopies is critical to ignition of crown fire from a surface fire. Van Wagner (1977)[10] reports that crown fires are ignited after a surface fire reaches critical fire line intensity relative to the height of the base of aerial fuels in the crown. This crown ignition can become a running crown fire if its spread rate surpasses a certain canopy density threshold. Agee (1996)[11] suggests a *canopy bulk density* threshold of 0.1 kg/ha as a general determinant for crown fire activity under extreme weather conditions. However, Keyes and O'Hara (2002)[12] note the incompatibility of such open forest conditions with key forest management objectives including wildlife conservation and prevention of understory initiation and ladder fuel development, especially in the absence of an institutional commitment to stand maintenance.

Omi and Martinson (2002)[13] sampled wildfire areas to describe the effectiveness of fuel treatments on subsequent fire severity. The strongest correlation they found was that between crown base height and "stand damage," which they used as a measure of 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. They also found the more common stand descriptors of stand density and basal area to be

[10] Van Wagner, C.E. 1977. Conditions for the start and spread of crown fire. *Canadian Journal of Forest Research* 7: 23-24.
[11] Agee, J.K. 1996. The influence of forest structure on fire behavior. Pp. 52-68 in: J.W. Sherlock (chair). *Proc. 17th Forest Vegetation Manage. Conf.* Jan. 16-18: Redding, CA.
[12] Keyes, C.R. and K.L. O'Hara. 2002. Quantifying stand targets for silvicultural prevention of crown fires. *Western Journal App. Forestry* 17: 101-109.
[13] Omi, P.N. and E.J. Martinson. 2002. *Effect of Fuels Treatment on Wildfire Severity*. Unpubl. report to Joint Fire Science Prog. Western Forest Fire Research Ctr., Colorado St. Univ. Fort Collins, CO. March 25. 36 pp.

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.

The Omi and Martinson (2002) study failed to collect information about fuel profiles before the fires, 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 increasing a stand's crown base height is critical and argue, "pruning lower dead and live branches yields the most direct and effective impact."

"To reduce fire damage from wildfires, future thinning operations must concentrate on small trees with operations called low thinning, removing the trees that have invaded these sites since fire exclusion began, and cleaning up the debris…By leaving the largest trees and treating fuels, fire tolerant forest conditions are created, so that fire severity can be significantly reduced." (Agee 1997)[14]

While our organizations generally support thinning small-diameter trees in the project area, particularly adjacent major ingress/egress roads, it is critical to recognize that logging and pruning may not influence fire and fuel hazard in the manner that the Forest Service predicts. Hence we urge the agency to proceed with caution and avoid excessive damage to forest resources from harmful practices like machine piling, tractor yarding, yarding, logging and pruning Riparian Reserves, dozerline construction and extreme pruning and mastication.

Peer-reviewed research on fire behavior in the Klamath Mountains (Odion et al 2004)[15] indicates that the effects of decades of fire suppression on fire behavior are greatly overstated.

Summary of the Odion Paper

Contemporary wildland fires in the western Klamath Mountains exhibit severity patterns consistent with those of historical fires. Low-severity fire effects predominate with variable amounts of moderate and highly severe effects creating landscape patches. Only

differences in mapping criteria applied to fires in 2001 and 2002 reflect severity patterns different from those of historical fires.

[14] Agee, J.K. 1997. *The Severe Fire Weather-Too Hot to Handle?* Northwest Science, Vol. 71, No.1: 153-156. Page 155) Note, this paper is also referenced in the FEIS prepared by the KNF for the Meteor timber sale at F-12.

[15] Odion, D.C., E.J. Frost, J.R. Strittholt, H. Jiang, D.A. DellaSala and M.A. Moritz. 2004. Patterns of fire severity and forest conditions in the western Klamath Mountains, California. Conservation Biology 18(4): 927-936.

Long absence of fire predicts low severity fire effects. Absence of fire enables closed canopy forest vegetation to replace shrub and open forest vegetation through succession. Shade reduces available fuel below the canopy as well as its potential surface heat output during fire events, making canopy fires less likely to occur. Therefore, severe fire effects are not correlated with the age of woody fuels. Instead, weather and climate dictate canopy fire behavior in closed canopy forests.

The proportion of highly severe fire effects in 1987 was greatest in open forest and non-forest vegetation. High-severity effects to vegetation communities dominated by shrubs, hardwoods and young trees tend to maintain that vegetation over time, just as fires of lower severity in closed canopy forests tend to maintain that vegetation type. This heterogeneity of fire effects may be an important contributor to landscape structure and biodiversity. Stand replacing fires, to some degree, are ecologically beneficial.

The spatial distribution of highly severe fire effects in 1987 was strongly associated with the previous occurrence of fires that exhibited high-severity effects in the same locations. Much of the observed high-severity "reburn" effects happened where post-fire salvage logging in 1977 had left behind flammable slash and tree plantations.

Tree plantations, which typically follow high-severity fires under traditional forestry practices, exhibited "twice the burn severity" of closed canopy forests (20 percent), even though they accounted for only four (4) percent of the study area. The relative combustibility of structurally homogenous tree plantations supports a self-reinforcing "feedback" dynamic of high-severity fires, and the authors anticipate continued high-severity fires in roaded and planted portions of the landscape.

Management Implications of the Odion Paper

The central conclusion of the paper is that long absence of fire predicts low-severity fire effects in Klamath mixed evergreen forests. This conclusion has four management implications:

1. The fuel build-up model formulated for southwestern ponderosa pine forests does not apply to mixed evergreen forests, and fuel treatments intended to prevent crown fires based on this model are misdirected.

2. Fuel treatments designed to impose a low-severity fire regime may be ecologically detrimental because highly severe fire effects, to some degree, support diverse vegetation community structures and habitats for which the Klamath region is globally unique. Some fuel treatments also may adversely affect soils, water quality, wildlife habitat, and spread noxious weeds.

3. Fuel treatments may be ecologically beneficial in tree plantations where past logging left behind unnatural fuel profiles.

4. Naturally ignited wildland fires may be beneficial to a variety of conservation objectives in Klamath forests. Home ignitability mitigation in the wildland-urban interface may increase options for backcountry wildland fire use.

Large-Diameter Trees And Down Logs Mitigate Potential Fire Risk And Hazard

While we recognize the thinning of ground fuels and ladder fuels, removing large-diameter trees from the forest canopy will not achieve reduction in fuel hazard, especially through canopy removal, skid roads, dozerline and landing construction and tractor logging.

Large-diameter standing trees and down logs exhibit several features that tend to mitigate their potential fire risk and hazard. Depending on weather conditions and time of year, their presence on the landscape can serve to lower the risk of rapid, intense fire spreading to adjacent areas. In general, fires burning through heavy fuels such as large-diameter downed logs tend to burn slowly, and depending on their spatial arrangement and fuel moisture levels, large downed logs can actually dampen a fire's intensity and rate of spread.

Large-diameter heavy fuels have low surface area-to-volume (S/V) ratios, which tend to inhibit the amount of oxygen feeding combustion. This is why large-diameter fuels, such as the main stems of standing and downed trees, are not included in agency fire spread models such as BEHAVE. The BEHAVE model only incorporates live fuels up to 1-inch in diameter and dead fuels up to three inches in diameter because these small-diameter fine fuels have high S/V ratios, and thus fuel high fire intensities and rapid rates of spread. Fuels larger than three inches in diameter do not factor in on fire spread calculations because they do not affect fire behavior until long after the fire front has passed.

Site-specific conditions like fuel moisture levels, which can differ according to stage of decay, season of the year, and prevailing weather conditions, can further enhance the relatively low flammability of large-diameter snags and logs. Downed logs can store large amounts of water, especially if the logs lay directly on the ground surface. Forest Service research on hot, dry forest sites in the Klamath-Siskiyou region revealed that even after prolonged drought and high intensity fire events, tremendous amounts of water can still be found in the interior of logs. The centers of large logs can actually be cool and moist even when the outer shell of a log is on fire. Large logs can provide vital refugia or "fire shelters" that enable a number of wildlife species, as well as mycorrhizal fungi and other micro-flora and fauna essential to natural recovery, to survive fires.

Over a typical fire season, this interior stored water is released slowly over time in the form of water vapor. This water release (coupled with the shade that snags and downed logs provide) can raise the relative humidity of micro-sites, which in turn tends to decrease the rate of evapotranspiration of adjacent live vegetation, and retains higher fuel moisture levels in adjacent dead fine fuels. These microclimatic effects make local sites adjacent to large-diameter downed logs moister and "greener" compared to sites devoid of large downed logs. With significant amounts of stored interior water, large-diameter

downed logs can function like “heat sinks” because so much heat energy is required for fire to evaporate the water, heat and ignite the woody biomass. In effect, large downed logs with sufficient stored water function like natural fire extinguishers that can retard fire intensity and rate of spread.

Large downed logs can also provide important shade structures that obstruct solar radiation and surface winds. These microclimate influences can result in lower ground surface temperatures and reduced surface wind speeds, which translate into higher live and dead fuel moisture levels compared to areas cleared of shade from standing or downed trees. Large downed logs can also reduce the speed and variability of surface winds, which inhibits extreme or erratic fire behavior. Thus, the ability of large downed logs to store water and provide shade from the sun and wind can function to lower the fire intensity and rate of spread on those specific sites.

> Retention of large and old trees can be a particularly contentious issue. In general, however, removal of large, old trees is not ecologically justified and does not reduce fire risks. Such trees contribute to resistance and resilience of the forest ecosystems of which they are a part. Large, old trees of fire-resistant species are the ones most likely to survive a wildfire and subsequently serves as biological legacies and seed sources for ecosystem recovery. They are also exceptionally important as wildlife habitat, before and after a fire event, as sources of large snags and logs that are critical components of terrestrial and aquatic habitats. For all practical purposes, they are impossible to replace. DellaSala 2014[16]

We refer the agency to "A Report to the President In Response to the Wildfires of 2000" September 8, 2000 by USDA Forest Service and DOI. The following is taken directly from PART III of the report, "Key Elements of the Administration's Wildland Fire Management Policy."

> "The removal of large, merchantable trees from forests does not reduce fire risk and may, in fact, increase such risk. Fire ecologists note that large trees are "insurance for the future - they are critical to ecosystem resilience."

The planning document should analyze the full range of adverse effects on wildlife, vegetation, and natural recovery processes (such as elimination of refuge during future fire events) that would result from logging large-diameter trees that may be targeted in the project.

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[16] Dellasala, Dominick, Williams, Jack E., Williams, Cindy Deacon, Franklin, Jerry F. Beyond Smoke and Mirrors: a Synthesis of Fire Policy and Science. Conservation Biology, Pages 976-986. Volume 18, No. 4, August 2004

CULTURAL RESOURCES

We are concerned about the project activities on cultural resources. Please be descriptive in the planning document as to any effects to these resources form project activities.

NATIVE BOTANICAL SPECIES

"Monitor the effects of management activities on sensitive and endemic plants. If monitoring results show a decline in species viability, alter management strategy." LRMP 4-16

We are concerned with rare and Sensitive native plant species including, Niles' madia, pale yellow stonecrop and peanut sandwort. Please analyze and disclose the effects of logging, landing and possible dozerline construction on these botanical species.

NON-NATIVE INVASIVE SPECIES

Invasive Non-Native Weeds are one of the four primary threats to our nation's forests and grasslands. In the USDA Forest Service Strategic Plan for fiscal years 2007-2012, one of the objectives under the primary goal is to, "restore, sustain and enhance the nation's forests and grasslands" and to "reduce adverse impacts from invasive species." One of the requirements contained in the FSM 2900 is for a determination of "the risk of introducing, establishing or spreading invasive species associated with any proposed action, as an integral component of project planning and analysis, and where necessary provide for alternatives or mitigation measures to **reduce or eliminate** that risk prior to project approval."

Please address how and ground based activities and road and landing construction and use will likely increase non- native plant species as research has documented.

> We found that fuel breaks have the potential to promote the establishment and spread of nonnative plants. However, fuel breaks with more canopy and ground cover may be less likely to be invaded. Varying construction methods to retain more litter cover, minimize the exposure of bare ground, and retain some canopy cover might reduce nonnative germination and establishment on fuel breaks. The 24 fuel breaks we sampled had unique histories, including various dates of construction, different construction and maintenance regimes, varying fire histories, and different land use histories. Despite this variation, we found that 19 of the 24 sites had significantly higher relative nonnative cover within fuel breaks than in adjacent wildland areas. Merriam 2007[17]

[17] Merriam, K.E., Keeley, J.E., and Beyers, J.L., 2007, *The role of fuel breaks in the invasion of nonnative plants:* U.S. Geological Survey Scientific Investigations Report 2006-5185, 69 p.

Non-Native Invasive Species (NNIS) of plants are a severe threat to the project area resulting in loss of biodiversity, increased exposure of native species to disease and degradation of the ecosystem. Early recognition and removal of NNIS is extremely important to maintain intact ecosystems.

MARIJUANA AGRICULTURE

The forthcoming NEPA document must disclose the potential cumulative impacts of the proposed action in combination with other impacts in the area, including the impacts of marijuana plantations.

As various officials of the Shasta-Trinity National Forest, and Forest Service Law Enforcement Officers from Region 5 have noted at length in various forums around the region over the last several years, the rising incidence of large commercial marijuana plantations on the Shasta-Trinity National Forest has raised serious concerns about potential environmental impacts. Such impacts would include at least water pollution (reports have included claims that fertilizers have been mixed directly in creeks); loss of stream flow from pumping to plantations (which could further reduce critical cold water habitat, as well as exacerbating pollution problems); dumping of trash, pipe, fertilizers and pesticides; and impacts to wildlife populations from habitat disruption, trapping, and shooting.

In order to understand the potential impacts of the proposed project in this context, the forthcoming NEPA document should analyze what the Forest Service knows about large marijuana plantations in the area of the proposed action, including approximate locations, area, age, the incidence of known or suspected pollution problems, and the extent and progress of the agency's program for remediation of these impacts.

SOILS

Total organic matter remaining after the fire and after salvage is the key indicator for the issue of site productivity. Please address soil chemistry, productivity, hydrology, and biological integrity on a site-specific basis. Please map soil types and composites using field reconnaissance data and include the maps in the NEPA document. Include a qualified, journey-level soil scientist on the ID Team. Design actions and mitigation *after* you have collected field reconnaissance data on soils at sites proposed for action. Please do not lump "moderate" and "severe" fire impacts to soils in your forthcoming analysis.

MACHINE PILING

Machine piling increases the disturbance to groundcover and soil. Soil displacement results from the ground-based machine use when the heavy equipment turns and pushes the slash throughout logging units. This displacement has many impacts. First, it removes the organic debris and exposes the soil. This in turn can cause surface sealing and crusting. Erosion and decreased infiltration can also result from this. Second, displacement results in the loss of important soil biota, like mycorrhizal fungi, which assists plant nutrient uptake. It is not an unreasonable request to ask for the Forest Service

to consider the other methods of slash treatment. Most project planners on public lands in the Klamath Siskiyous tend to avoid post-harvest machine piling because of the known impacts and availability of other slash reduction practices.

Please that the proposed machine slash piling will condense soil and decrease its porosity. This leads to a decrease in the productivity of that soil which affects the plant life. This can reduce root growth, timber volume, and tree height. These impacts can come as a result of as little as one pass by the logging equipment across a site. This loss in productivity can impact individual trees or whole sites. Even the microbial population in the soil can be adversely impacted.

We encourage the agency to review the findings of Geppert, R.R., Lorenz, C.W., and Larson, A.G., 1984. Cumulative Effects of Forest Practices on the Environment: A State of the Knowledge. Wash. For. Practices Board Proj. No. 0130, Dept. of Natural Resources, Olympia, Wash.

Since machine piling is so detrimental to soil and groundcover, manual piling or underburning are much more preferable. These two methods have none of the negative impacts to soils that result from tractor piling and can be easily implemented.

MASTICATION

We have concerns about the increasing use of the Slashbuster masticator. While this machine can be cost effective and may produce desired results in some instances, there is very little information available to the public or the decision maker regarding the impacts it has on the forest environment, particularly on the herbaceous understory. Broadly, we are concerned that there has been little monitoring of the affects of the Slashbuster. Several concerns have been raised by prominent scientists that study chaparral, soils, Neotropical birds, fire behavior, and other implications of the widespread use of the Slashbuster.

The planning document should make a distinction of the amount of acres that may be masticated as opposed to manually treated.

Soils and Hydrology

There have been no studies performed or proposed on the effects the Slashbuster has on soils. The Slashbuster had to be pulled out of a unit in the Ashland Watershed Protection Project due to soil displacement. Soil compaction could also happen as a result of Slashbuster use on certain soil types.

The use of the Slashbuster in certain areas could be altering hydrologic processes. Soil compaction, for example, is known to retard soil porosity and possibly increase runoff and peak flows.

The widespread use of the Slashbuster may in fact alter soil nutrient cycling. How important nutrient cycles such are influenced by the use of the Slashbuster at the site

level could be critical to the long-term site conditions. Soil biota is another important element of site level conditions that could be impaired by the Slashbuster. Lastly, the Slashbuster could harm mychorizal communities that are known to be important symbiots of many species.

Understory Flora (and Herbaceous Understory)

We have a number of concerns about the potential impacts that widespread use of the Slashbuster on forest and chaparral understory vegetation. Native plants could be harmed or extirpated, and it is unclear if buffering plant sites has been effective in previous Slashbuster treatments. How the understory responds has never been studied, and with the amount of masticated material left on the site years after a treatment it is likely that some native understory will be lost.

The rampant spread of noxious weeds is a growing problem for the forests of Northwestern California and Southwestern Oregon. The widespread use of the Slashbuster could facilitate the spread of noxious weeds. Seeds of invasive plant species could be spread on the machinery itself, or the treatment units could be prime sites for many "pioneer" invasive and noxious weeds.

Vegetation Dynamics

The dynamics of vegetation over time with the scale and rate of Slashbuster use on the landscape level is also a concern. The scale and rate of use will determine the cumulative level of impact to many species. Is there currently a way for the public or the decision maker to anticipate the amount of treatment that is likely to take place across the landscape? A landscape that is dominated by early-seral chaparral could benefit "generalist" species to the detriment of "specialists."

Prioritization of Sites

We are curious how the Forest Service chooses the sites on which to implement the Slashbuster treatment. Is there currently a prioritization of vegetation density, proximity to the community protection zone, vegetation type, or any other parameters or vectors? It appears that the sites are chosen based on non-commercial lands where the slope is gentle enough for the Slashbuster to operate. Some level of prioritization for fuels treatments based on Urban Interface and ecological need is appropriate. What criteria are currently being used to determine the location of proposed slashbuster treatments?

Fire Behavior

Our organization is very interested in learning about the impacts of slashbuster treatment on such "fire variables" as residence time, short-term fuel loading, long term vegetative response, and microclimatic conditions on the site. Please include and reference studies used in the planning document.

Neotropical Birds

Refugia for many species could be impaired by the widespread and ubiquitous use of the Slashbuster. Please disclose all literature or scientific studies relied upon in the analysis of impacts on Neotropical birds in the forthcoming NEPA documant.

Alternatives

Please consider the use of manual lopping and scattering as an effective alternative to mechanical slashbusting.

BORATE COMPOUNDS

We appreciate the Forest Service's concern over the spread annosus root rot disease. We are concerned, however, about whether the Forest Service has taken the requisite "hard look" at borax and borax alternatives.

Studies have prompted concern that borax is a human reproductive toxin (USFS 1995). A borax feeding study, which used mice, rats and beagle dogs showed boric acid and borax not to be carcinogenic; however, testicular effects and decreases in body weight resulted at high dose levels. The study resulted in blood and metabolism disorders, and effects to the endocrine system, brain weight, and size ratios among various organs and glands (US EPA 1993).

The US Forest Service (1995) reports that studies indicate chronic exposure to borax may cause reproductive damage and infertility. In the US EPA's Toxicological Review of Boron and Compounds (2004) the developing fetus of mammals is considered one of the most sensitive targets. The other most sensitive target is the testes of males, and adverse effects include testicular degeneration (US EPA 2004; USFS 2003, Evaluation of Human and Ecological Risk For Borax Stump Treatments). The US Forest Service (1995) admits that there is insufficient information available to determine the potential for adverse health effects for humans from contacting or consuming borax treated vegetation, water or animals. The most common borax product used in forests, Sporax, has a signal word of danger and the label describes the hazards to humans and domestic animals as follows: "DANGER. Corrosive. Causes irreversible eye damage. Harmful if swallowed. Do not get in eyes or on clothing" (Wilbur-Ellis, Sporax label). The Sporax material safety data sheet warns, "Do not ingest. Wash thoroughly before eating, drinking or smoking" (Wilbur-Ellis).

Borax is generally active in soils and it remains unchanged in the soil for one year or more. High rainfall conditions can cause borax to leach rapidly and soil microorganisms do not break it down (USFS 1995). Borax may be toxic to many essential soil microorganisms at high levels (USFS 1995) and thus may adversely affect nutrient cycling functions within the ecosystem.

Boron occurring in concentrations has shown to be toxic to plants (US EPA 1993) and high levels of borax will kill vegetation and thus it can be used as a nonselective herbicide (USFS 1995). The Forest Service reports that in high concentrations borax is "lethal to plants." It is also know to bio-accumulate in plants (Phelps et al. undated). The Sporax label reinforces

this concern as it states, “Borax carelessly spilled or applied to cropland or growing plants – including trees or shrubs – may kill or seriously retard plant growth” (Wilbur-Ellis). The Forest Service’s borax fact sheet (1995) warns “Borax may be a hazard to endangered plant species if it is applied to areas where they live” when applied as a forest fungicide on stumps which could effect seed germination, seedling emergence and vegetative vigor.

Since we have found no studies investigating the impacts of borax on amphibians, we are concerned that this salt, which remains active for a year in soils, may be having major impacts on amphibian populations. Amphibians are terrestrial and travel across the land. They are especially sensitive to chemicals and are believed to be useful indicator species within forest ecosystems.

While the Forest Service has been liberally applying borax throughout our public forestlands, there is some question as to whether or not it is as effective as believed (or even needed). In a study review of research on annosus root rot disease, US Forest Service Region 5 scientist R.S. Smith Jr. reported, “there is continuing concern that annosus can infect stumps via the roots rather than just through the stump surface, and that borax treatment may not be fully successful in preventing the disease” (Smith, 1989). An even more interesting study was done by Region 5 Forest Service scientists, which reviewed the efficacy of borax stump treatment in protecting trees from annosus root disease. The authors reported “borax may be ineffective because it washes off stumps and that high stump densities make it difficult to applyThe Forest Service has not taken a hard look at alternatives to borax. “Annosus root disease is a normal part of most forest ecosystems in the West contributing to structural and compositional diversity” (Schmitt et al. 2000).

We are sensitive to the need to protect trees that make up our public forestlands. However, we are concerned that in Region 5 (California) the US Forest Service is not using a true integrated pest management (IPM) strategy. The Forest Service is ignoring the cause of annosus spread and needs to focus on controlling the vectors that facilitate its movement. Region 5 is reliant on borax for annosus disease prevention and has failed to develop non-toxic, non-borax treatment methods for protecting our forests. This is of concern since other parts of the US and other countries (Canada, UK) effectively use non-borax prevention alternatives.

Logging has been shown by multiple studies to increase annosus root disease occurrence in western forests for a number of conifer species. The disease typically appears in stands several years after logging and is associated with stumps and logging wounds in remaining trees. Logged stands have a higher occurrence of the disease than un-entered stands, and stands with a history of multiple entries have the greatest rate of infection.

This pathogen can be eradicated or reduced by other means. One is using prescribed burns. One or more post-activity burn has been shown to destroy reproductive basidiocarps and eliminate litter and other favorable annosus habitat and basidiocarp development environments.

The use of Sporax in already infested stands may worsen the problem by preventing natural annosus competitors from entering stumps.

Phlebiopsis gigantea, an aggressive, highly competitive fungus recommended as a borax

alternative, as it colonizes stumps to the exclusion of annosus. Phlebiopsis gigantea is incapable of causing disease in standing trees and is not regarded as hazardous to human health. It has been utilized as a biological control agent for annosum root rot for approximately 40 years in Europe and has also been used with good results in Canada. In the southeast part of the US it has been shown that P. gigantea is completely effective in preventing stump colonization by H. annosum, with a cost only slightly more than that of borax.

Streptomyces griseologalbus, an actinomycete isolated from the rhizoplane of the nitrogen-fixing nodules of a common California native, has been identified as a strong antagonist of annosus, and a possible biological control in the Pacific NorthwestFurther analysis on the use of Sporax throughout national Forests in California should be conducted. The annosum fungus is naturally occurring and provides structural diversity to forest stands. The widespread use has not been fully analyzed on soil microbes, insects such as native pollinators or amphibians. Please refrain from using Sprorax or Cellu Treat in LSRs and Riparian Reserves or the entire project area.

ALTERNATIVES

Environmental analysis documents must "[r]igorously explore and objectively evaluate all reasonable alternatives" to the project. 40 C.F.R. § 1502.14(a). Consideration of alternatives is "the heart of the environmental impact statement." 40 CFR § 1502.14. NEPA mandates that an agency "shall to the fullest extent possible: Use the NEPA process to identify and assess the reasonable alternatives to proposed actions that will avoid or minimize adverse effects of these actions upon the quality of the human environment." 40 CFR § 1500.2(e). NEPA requires consideration of "all reasonable alternatives." 40 CFR § 1502.14(a**)**

Please consider a wide range of alternatives that would include:

Maintaining all large old fire resistant trees and those showing old growth characteristics
Retaining at least 60% canopy on south facing slopes and 80% on north facing slopes
No logging, mastication, machine piling or extreme pruning in RR's
Skips and Gaps for all treatments
Minimizing road and landing construction
Eliminate dozerline construction
Avoiding lop and scatter, unless underburning is planned
Considering prescribed fire or wildland fire use for future maintenance
Minimizing machine piling and mastication

CONCLUSION

Please do honestly consider a wide range of alternatives for the project in order to best protect the significant values of these forests and surrounding community. We do hope that the project will incorporate and address our concerns. We recognize the need to treat major ingress/egress routes and plantations and appreciate the thorough list of Project Design Features. We appreciate the time and willingness of your staff to work with the

communities and the collaborative on project planning.

Please send a hard copy of all forthcoming documents for the project to our Arcata office and please do let us know of any public meetings or visits planned to the area. Thank you for your consideration.

Sincerely,

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