HEADQUARTERS
120 Shelton McMurphey Blvd.
Suite 340
Eugene, OR 97401
(541) 485-2471
info@westernlaw.org

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July 2, 2020

Secretary David Bernhardt
United States Department of the Interior
1849 C Street, NW
Washington, DC 20240

Acting Director William Pendley
Bureau of Land Management
1849 C Street NW, Rm. 5665
Washington DC 20240

U.S. Department of the Interior
Bureau of Land Management
Attention: WO–210–SLVGCX
2850 Youngfield Street
Lakewood, CO. 80215

Submitted via public participation portal to: https://eplanning.blm.gov/eplanning-ui/project/1504279/595/8001448/comment

RE: Comments on *National Environmental Policy Act Implementing Procedures for the Bureau of Land Management (516 DM 11)* (85 Fed. Reg. 33,697, June 2, 2020)

Dear Secretary Bernhardt and Acting Director Pendley:

On behalf of the 76 undersigned organizations and individuals, we are pleased to provide the Bureau of Land Management (BLM) with the attached comments on the agency's proposed categorical exclusion for salvage logging. Our organizations collectively represent decades of experience with the BLM's implementation of NEPA, categorical exclusions (CXs), and timber harvest, particularly salvage logging (and especially post-fire salvage logging). Our organizations and members would be adversely affected by this proposal, which further threatens imperiled species and the ecological integrity of the places we advocate for and help to steward.

We have extensive expertise regarding the Council on Environmental Quality's (CEQ) NEPA regulations, the BLM's NEPA regulations and procedures, and the body of federal case law interpreting the agency's legal obligations under NEPA. Our experience in agency decision-making processes, collaborative efforts, and as plaintiffs in NEPA litigation lends us unique insight into the BLM's proposed CX.

In addition to our collective experience with BLM's land management practices and NEPA, we draw your attention to a letter in opposition from 192 scientific experts in forest ecology, biology, disturbance ecology, aquatics, and other disciplines regarding BLM's proposed CX.[1] Those experts explain that

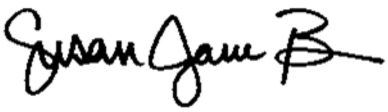
> It is widely acknowledged in the scientific community that the impacts of salvage logging and the associated timber yarding and road construction (temporary and permanent) are pervasive and cumulatively negative. Research regarding salvage logging in other types of recently disturbed forest, such as through insects, disease, windthrow, or drought, comes to similar conclusions.

Given the scientific consensus that post-disturbance logging has significant adversely environmental consequences, these experts concluded that "because the BLM's proposal does not comport with the best available science, we urge the BLM to abandon its rulemaking effort."[2] We join these experts in calling for the BLM to abandon this ill-advised and unsupported rulemaking.

The proposed CX appears to be in service of the present administration's deregulatory agenda that serves to elevate the interests of extractive industries above the interests of the public. This CX must be considered along with other proposed changes to the CEQ and Forest Service NEPA rules that will also negatively affect the ecosystem and imperiled species. This agenda is particularly inappropriate on the public lands managed by the BLM, which are owned in common by all Americans, not just a privileged few.

Because the BLM has failed to prepare a sufficient administrative record to support its proposed CX, we anticipate that the CX – should it be finalized – will be subject to judicial review. The agency should abandon this rulemaking effort and focus on immediate needs such as science-based restoration, monitoring, and partnership efforts.

With regards on behalf of the undersigned organizations and individuals,



Susan Jane M. Brown, Wildlands Program Director & Staff Attorney
Western Environmental Law Center
4107 NE Couch Street
Portland, OR. 97232
brown@westernlaw.org
503-914-1323

I. Introduction.

With this proposed rulemaking, BLM seeks to dramatically increase its management footprint on public lands managed by the agency. However, the best available science is clear that post-disturbance logging is one of the most ecologically damaging type of land management

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[1] Exhibit C, Letter from 192 Scientists Opposed to BLM's Proposed Salvage Logging Categorical Exclusion (Exhibit C), 1. This letter was also uploaded to BLM's E-Planning website and is part of the administrative record for this rulemaking.

[2] *Id.* at 2.

action a manager can take. BLM neither discloses nor discusses the weight of the scientific literature, undermining its proposed CX.[3]

Much of the scientific literature regarding post-disturbance management is based on research conducted on national forestlands after wildfire. Because of this emphasis in the literature, our comments here likewise focus on the ecological consequences of post-fire logging, often on national forests. Regardless of landownership, however, the effects of post-fire and post-disturbance logging are extreme. There is no ecological, social, or legal justification for BLM's proposed CX.

II. The Proposed Rulemaking Requires Preparation of an Environmental Impact Statement.

Major federal actions, including policy changes with significant impacts to the human environment, require preparation of an environmental impact statement (EIS). 42 U.S.C. § 4332(2)(C); 40 C.F.R. § 1508.18. The proposed CX is a major federal action, and it cannot proceed without environmental analysis and consideration of alternatives in an EIS.

At least two sections of the CEQ regulations require agencies to develop their own NEPA procedures. 40 C.F.R. §§ 1505.1, 1507.3. BLM's NEPA regulations state that "A bureau proposed action is subject to the procedural requirements of NEPA if it would cause effects on the human environment (40 C.F.R. 1508.14), and is subject to bureau control and responsibility (40 C.F.R. 1508.18)." 43 C.F.R. § 46.100. Because the preparation of a CX would cause effects on the human environment, and because the BLM has control and responsibility for the preparation of the CX, the creation of the CX is subject to NEPA analysis. Elsewhere, the CEQ regulations unambiguously explain that "actions" subject to NEPA include "new or revised agency rules, regulations, plans, policies, or *procedures*." 40 C.F.R. § 1508.18(a) (emphasis added). Like all agency actions, unless this one is categorically excluded from analysis, the BLM must comply with NEPA's analysis requirements before proceeding. Failing to undertake a NEPA analysis for BLM's proposed CX is arbitrary, capricious, and not in accordance with NEPA. 5 U.S.C. § 706(2)(A).

A. The proposed CX cannot be categorically excluded from analysis under NEPA.

The BLM cannot simply ignore NEPA's obligations. *Citizens for Better Forestry v. USDA*, 481 F. Supp. 2d 1059, 1085 (N.D. Cal. 2007) ("NEPA requires *some* type of procedural due diligence—even in cases involving broad, programmatic changes"). Consequently, if the BLM does not intend to prepare an EA or EIS for the proposed CX, it must at least attempt to justify the use of a CX for its proposed CX. This the BLM fails to do, not even offering a single legal authority for its failure to conduct a NEPA analysis on the creation of a CX that is likely to have significant adverse effects on the environment.

[3] These comments cite and quote at length many of these studies. Where possible, these comments include hyperlinks to the reference, and additional references are included as exhibits to this comment letter. Citations not referenced with a hyperlink or as an exhibit are available upon request. All sources are hereby incorporated into the administrative record by reference.

Although the BLM fails to cite it, the only existing CX that could arguably pertain to the creation of the proposed salvage CX is found at 43 C.F.R. § 46.210(i) ("Policies, directives, regulations, and guidelines: that are of an administrative, financial, legal, technical, or procedural nature; or whose environmental effects are too broad, speculative, or conjectural to lend themselves to meaningful analysis and will later be subject to the NEPA process, either collectively or case-by-case"). This category, however, cannot be used to authorize rules with substantive impact. *California v. USDA*, 575 F.3d 999 (9th Cir. 2009). Where, as here, a putatively procedural rule is intended to facilitate on-the-ground effects, those effects must be analyzed. *Citizens for Clean Energy v. DOI*, 2019 WL 1756296, at *8 (D. Mont. 2019) (Secretarial order replacing a moratorium on leasing with an order to expeditiously process leases could not be categorically excluded); *Shearwater v. Ashe*, 2015 WL 4747881 (N.D. Cal. 2015). The substantive effects of the BLM's so-called procedural changes are concrete and readily ascertainable as discussed in detail infra.

Even if a categorical exclusion could arguably be applied to this rulemaking, it would become inapplicable because of extraordinary circumstances. For example, the proposal will facilitate ground-based logging that research shows contributes to the introduction of invasive and noxious weed species, which the BLM's extraordinary circumstances definition precludes the use of a CX for the proposed activity. 43 C.F.R. § 46.215(l) ("Extraordinary circumstances...exist for individual actions within categorical exclusions that *may* meet *any* of the criteria listed in paragraphs (a) through (l) of this section...(l) Contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species known to occur in the area or actions that may promote the introduction, growth, or expansion of the range of such species (Federal Noxious Weed Control Act and EO 13112)") (emphasis added).

As discussed in detail below, the BLM's other extraordinary circumstances are routinely triggered by post-disturbance logging, particularly at the scale BLM proposes with this CX (i.e., up to 5,000 acres). Indeed, BLM's "Verification Report" that the agency claims supports the salvage CX does not discuss whether any of the salvage projects it reviewed involved extraordinary circumstances, but based on our experience with many of these projects, it is clear that the reason why these projects were not documented with a CX is precisely because of the extensive presence of extraordinary circumstances on the ground. As a result, this proposed CX cannot proceed without a traditional NEPA analysis.

B. An EIS is required because the proposed CX is expressly intended to increase the impact of BLM management.

The proposed CX is intended to dramatically increase the on-the-ground impact of BLM management. Verification Report, 26. Regardless of whether, "on balance the agency believes the effect[s] will be beneficial," 40 C.F.R. § 1508.8(b), they will certainly be significant, thus requiring the preparation of an EIS.

First, the proposal aims to increase the pace and scale of timber harvest. "This CX would allow the BLM more flexibility to quickly respond to disturbances across larger areas to provide for public and infrastructure safety, reduce hazardous fuel loads that impact firefighter and public safety, and contribute to one of the six principal or major uses of the public lands identified in the Federal Land Policy and Management Act of 1976, which recognizes 'the Nation's need for domestic sources of timber and fiber.'" 85 Fed. Reg. 33,698. In its justification for the CX, the BLM claims that the proposed CX is necessary to address forest health, wildfire, and post-disturbance recovery. *Id.* at 33,699. But increasing the use of logging will increase all of its impacts, both "positive" and negative. A claim that dramatically increasing timber harvest will not cause significant impacts is simply not credible, and the agency has cited no law or science to support its dubious claim, rendering the proposal's rationale arbitrary and capricious. 5 U.S.C. § 706(2)(A).

The BLM relies on logging after disturbance to reduce the future risk of wildfire, but this goal, even assuming that mechanical logging can achieve them, would remake entire landscapes.[4] Without the reintroduction of fire, either prescribed or managed natural ignitions, fire risks are likely to increase from commercial activity alone, at least for some time into the future. Furthermore, the role of thinning in effectively altering wildfire behavior is highly controversial and uncertain in many forest types, especially if fires are driven by hot dry winds. 40 C.F.R. § 1508.27 (explaining that controversial effects are more likely to be significant); *Bark v. United States Forest Serv.*, 958 F.3d 865, 870 (9th Cir. 2020) (holding that logging mature forest for fire risk reduction is "highly controversial and uncertain, thus mandating the creation of an EIS").

A proposal is highly controversial, mandating preparation of an EIS, when (1) "substantial questions are raised as to whether a project ... may cause significant degradation of some human environmental factor;" or (2) there is "a substantial dispute [about] the size, nature, or effect of the major Federal action." 40 C.F.R. § 1508.27(b)(4), *Nat'l Parks & Conservation Ass'n. v. Babbitt*, 241 F.3d 722, 736 (9th Cir. 2001). A substantial dispute exists "when evidence, raised prior to the preparation of an EIS or FONSI, casts serious doubt upon the reasonableness of an agency's conclusions." *Id.* The burden is placed on the agency to "come forward with a 'well-reasoned explanation' demonstrating why those responses disputing the EA's conclusions 'do not suffice to create a public controversy based on potential environmental consequences.'" *Id.* Further, where "the environmental effects of a proposed action are highly uncertain or involve unique or unknown risks, an agency must prepare an EIS." *Ocean Advocates v. U.S. Army Corps of Engineers*, 402 F.3d 846, 870 (9th Cir. 2005) (*citing* 40 C.F.R. § 1508.27(b)(5)).

Current scientific literature demonstrates that a substantial dispute exists over the nature and effect of post-fire commercial logging to recover ecosystem functionality. In fact, scientific consensus has almost universally shifted away from regarding post-fire logging as an activity with any ecological benefit.[5] As expressed by ornithologist Dr. Richard Hutto: "The ecological cost of salvage logging speaks for itself, and the message is powerful. I am hard pressed to find any other example in wildlife biology where the effect of a particular land-use activity is as close to 100% negative as the typical post fire salvage-logging operation tends

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[4] *See,* Kailes and Kent 2016; Zald & Dunn (2017), *Severe fire weather and intensive forest management increase fire severity in a multi-ownership landscape*, Ecological Applications; Kolden, C.A. *We're Not Doing Enough Prescribed Fire in the Western United States to Mitigate Wildfire Risk*, Fire 2019, 2, 30.

[5] *See,* e.g. Donato, D.C. et al. 2006. *Post-wildfire logging hinders regeneration and increases fire risk*. Science 31 1 No. 5759: 352; Beschta, R.L. et al. 2004. *Postfire management on forested public lands of the western USA*. Conservation Biology 18: 957-967; Lindenmayer, D.B. et al. 2004. *Salvage harvesting policies after natural disturbance*. Science 303:1303; Karr, J. et al. 2004. *The effects of postfire salvage logging on aquatic ecosystems in the American West*. Bioscience 54: 1029-1033; DellaSala, D.A., et al. 2006. *Post-fire logging debate ignores many issues*. Science 314-51-52.

to be."[6] Fire ecologists, wildlife biologists, and ornithologists have all learned that burned forests are not dead zones, but rather teem with life. The reflexive reaction to log after forest fires directly contradicts scientific research showing both the immense ecological importance of post-fire landscapes and the significant harm that can occur when such areas are logged.[7] Research has found that post-fire logging most often removes biological legacies (e.g., snags and native shrubs), replaces them with commercially valuable seedlings, and involves road building and road maintenance, non-native species for erosion abatement, herbicides that kill beneficial plants, and other management disturbances (e.g., livestock). Taken individually or in combination, such cumulative impacts disrupt post-fire successional processes and inhibit development and longevity of complex early seral forests.[8] Postfire logging impedes natural postfire processes by removing some of the rarest and most biodiverse wildlife habitat in many forest ecosystems, compacting soils, causing chronic erosion, delaying natural succession, and introducing or spreading invasive species. Rather than "jumpstarting" forest recovery, postfire logging damages or removes complex early seral forests and inhibits the return of forest ecosystem conditions over time by removing the very components crucial to their development.[9]

Forest fires result from, and are driven by, a multitude of factors; topography, fuel loads, the fire history of the environment in question and most importantly, weather.[10] Because weather is often the greatest driving factor of a forest fire, and because the strength and direction of the wildfire is often determined by topography, fuels reduction projects cannot guarantee fires of less severity.[11] Reducing fuels does not consistently prevent large fires, and does not always significantly reduce the outcome of these large fires.[12] The overwhelming factors driving large blazes are drought, low humidity, high temperatures, and most importantly, high winds.

Even if it was certain that the fuels reduction will reduce the severity of a possible future fire, there is also the question of how likely it is that a fire will burn in the treated area during the time that the treatment is effective. A recent study evaluating this question concluded that "treatments cannot reduce fire severity and consequent impacts, if fire does not affect treated areas while fuels are reduced."[13] The study found that there is a 2-8% chance that a fire will actually overlap with the window in which the fuels treatment may be effective at altering

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[6] Hutto, R. L. 2006. *Toward meaningful snag-management guidelines for post-fire salvage logging in North American conifer forests*. Conservation Biology 20: 984–993

[7] *Nourished by Wildfire: The Ecological Benefits of the Rim Fire and the Threat of Salvage Logging, a Report by the Center for Biological Diversity & John Muir Project,* 2014.

[8] *Early Seral Forest in the Pacific Northwest: A Literature Review and Synthesis of Current Science*, Mark E. Swanson, PhD, Washington State University, January 11th, 2012 (citations omitted).

[9] DellaSalla et al., *in The Aftermath of Fire, Nature's Phoenix*, Cpt. 11, p 338.

[10] Wilderness Society, 2003, *Fire & Fuels: Does Thinning Stop Wildfires?*

[11] Carey, H. and M. Schumann. 2003. *Modifying Wildfire Behavior–the Effectiveness of Fuel Treatments: the Status of our Knowledge*. National Community Forestry Center.

[12] Lydersen, J., North, M., Collins, B. 2014. *Severity of an uncharacteristically large wildfire, the Rim Fire, in forests with relatively restored frequent fire regimes*. Forest Ecology and Management 328 (2014) 326–334

[13] Rhodes, J. and Baker, W. 2008. *Fire Probability, Fuel Treatment Effectiveness and Ecological Tradeoffs in Western U.S. Public Forests*. The Open Forest Science Journal, 2008.

fire behavior.[14] Conversely, there is a 92-98% chance that the fuels treatment will not affect a fire's behavior.

Finally, the efficacy of using commercial logging to influence fire behavior and severity, particularly logging large, fire-resistant trees and mature moist forests, is highly uncertain, with peer-reviewed research showing logging may actually increase fire risk. For instance, a scientific synthesis recently found:

> The removal of larger, mature trees in thinning operations tends to increase, not decrease, fire intensity by: a) removing large, fire-resistant trees; b) creating many tons of logging "slash" debris – highly combustible branches and twigs from felled trees; c) reducing the cooling shade of the forest canopy, creating hotter, drier conditions on the forest floor; d) accelerating the growth of combustible brush by reducing the mature trees that create the forest canopy, thereby increasing sun exposure; and e) increasing mid-flame windspeeds (winds created by fire) by removing some of the mature trees and reducing the buffering effect they have on the winds associated with fires.
>
> The scientific evidence clearly indicates that, where it is important to reduce potential fire intensity (e.g., immediately adjacent to homes) this can be very effectively accomplished by thinning some brush and very small trees up to 8 to 10 inches in diameter. Removal of mature trees is completely unnecessary.[15]

Instead of increasing logging to affect fire behavior, a recent study emphasized the need to move beyond fuels reduction as the primary approach to fire management and adapt to greater fire frequency and severity through: 1) recognizing that fuels reduction cannot alter regional wildfire trends, 2) targeting fuels reduction specifically around residential communities, 3) actively managing more natural and prescribed fires for a range of severities, and 4) planning residential areas to withstand inevitable wildfires.[16]

Finally, the CX will also have the practical effect of reversing BLM transportation and travel management policy designed to right-size the agency's oversized and fiscally and ecologically unsustainable road system because it allows the increased construction of both temporary and permanent roads. Ignoring those policies and a robust body of science documenting myriad significant impacts associated with roads and motorized uses, the CX would facilitate nearly unlimited expansion of the system. Such activities are highly likely to result in individually and cumulatively significant impacts to water quality, wildlife habitat, recreation, agency budgets, and more, as discussed infra.

The BLM must analyze the impacts that it expects the proposed CX to have, both beneficial and adverse. With such an ambitious undertaking, both are reasonably foreseeable. Alternative approaches, such as requesting adequate budgets, emphasizing programmatic

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[14] *Id*.

[15] Hanson, C.T. 2010. *The myth of "catastrophic" wildfire: a new ecological paradigm of forest health.* John Muir Project Technical Report 1. John Muir Project of Earth Island Institute, Cedar Ridge, California.

[16] Schoennagel, L., et. al. *Adapt to more wildfire in Western America as climate changes.* Proceedings of the National Academy of Sciences, vol. 114, No. 18, 4582-4590.

analysis and tiering, and providing direction on the integration of collaboration into the NEPA process, will achieve more with fewer ancillary harms.

C. The proposed CX would strip analysis from some District's entire programs of work.

For some BLM Districts, a single CX decision could be used to cover several years' worth of timber sales. The BLM does not include any information in its rulemaking and Verification Report regarding the expected probable sale quantity or sustained yield calculations for any of its units, but based on our experience, some units have very low expected harvest volumes. Thus, virtually the entire timber program of some districts or resource areas could be categorically excluded from analysis under the proposed CX.

Rather than looking solely at a sample of individual projects from across the country, the BLM must also consider the cumulative impacts of these changes on individual Districts, many of which have complexities precluding the use of such a broad authority. Where the new authority would subsume entire programs of work for those particular Districts, the agency must explain why those programs of work have no potential for significant impacts. This is a hurdle that the proposed CX cannot clear, so it is no surprise that the agency attempts to ignore it.

D. The proposed CX must be analyzed in at least an EA to address unresolved conflicts by providing alternatives.

Even where a proposal may not have significant impacts, NEPA nonetheless requires consideration of alternatives when there are "unresolved conflicts concerning alternative uses of available resources." 42 U.S.C. § 4332(2)(E). Under the CEQ regulations, this requirement is met through preparation of an EA. 40 C.F.R. § 1508.9(b). Categorical exclusions do not involve the consideration of alternatives, 40 C.F.R. § 1508.4; consequently, where unresolved conflicts exist, a CX is the wrong tool.

An unresolved conflict exists when the agency's objective "can be achieved in one of two or more ways that will have differing impacts on the environment." *Trinity Episcopal School v. Romney*, 523 F.2d 88 (2nd Cir. 1975). The agency must consider alternatives at the site-specific and, as here, the programmatic level. *See Bob Marshall Alliance v. Hodel*, 852 F.2d 1223 (9th Cir. 1988) (requiring alternatives analysis, even though the decision was not itself an irretrievable commitment of resources, because it "may allow or lead to other activities" with environmental consequences).

The BLM must consider alternatives to its proposed CX, which is not the only, nor even the most effective, way to meet the BLM's stated goals. As explained further infra, the agency's proposal will not solve the problems it has identified (nor those it has failed to explicitly acknowledge in the proposal).

While we do not believe that such an approach is necessary given the BLM's existing authority to conduct salvage logging operations on 250 acres, one alternative would be to explore the use of regional or geographically-focused CXs to address high priority needs identified by the various BLM state offices. This approach would allow for the inclusion of regionally-standardized project design features that cannot be included (or analyzed for efficacy) in the BLM's one-size-fits-all proposed CX. *See*, Verification Report, 17 (acknowledging that the agency cannot standardize such project design features at the national level). Failing to consider this, or other reasonable alternatives to the proposed CX undermines the rulemaking process. *Cf. United Keetoowah Band of Cherokee Indians in Oklahoma v. FCC*, 933 F.3d 728 (D.C. Cir. 2019) (Order was arbitrary and capricious because FCC failed to consider alternative approaches to its policy change that could have accomplished streamlining benefits with fewer costs to environmental and historical values).

III. The Proposed CX Requires Consultation with the Fish and Wildlife Service and National Marine Fisheries Service.

The BLM must complete consultation with both the U.S. Fish and Wildlife Service (FWS) and the National Marine Fisheries Service (NMFS) (hereafter jointly "Services") to identify the potential harms caused by changes in the proposed CX. Under Section 7 of the Endangered Species Act and its implementing regulations, each federal agency, in consultation with the Services, must insure that any action authorized, funded, or carried out by the agency is not likely to (1) jeopardize the continued existence of any threatened or endangered species or (2) result in the destruction or adverse modification of the critical habitat of such species. 16 U.S.C. § 1536(a).

Agency "action" is broadly defined to include actions that may directly or indirectly cause modifications to the land, water, or air, and actions that are intended to conserve listed species or their habitat, specifically including, as here, "the promulgation of regulations." 50 C.F.R. § 402.02(b). Under the Services' joint regulations implementing the ESA, an action agency such as the BLM must initiate consultation under Section 7 whenever its discretionary action "may affect" a listed species or critical habitat. 50 C.F.R. § 402.14(a); *see also Lane Cty. Audubon Soc. v. Jamison*, 958 F.2d 290 (9th Cir. 1992).

The Fish and Wildlife Service Consultation Handbook defines the "may affect" standard as "[t]he appropriate conclusion when a proposed action may pose **any** effects on listed species or designated critical habitat."[17] Courts have made clear that the "may affect" threshold is low. *See, e.g.*, *Western Watersheds Project v. Kraayenbrink*, 632 F.3d 472, 496 (9th Cir. 2011) ("the minimum threshold for an agency action to trigger consultation with the Wildlife Service is low"); *Colorado Envt'l Coalition v. Office of Legacy Management*, 819 F. Supp. 2d 1193, 1221-22 (D. Colo. 2011) (holding that the action agency's conclusion that impact on a listed species was "highly unlikely" was enough to meet the "may affect" threshold, thus requiring consultation). A "may affect" determination is required by the Services' Joint Consultation Handbook when any "*possible* effect, whether beneficial, benign, adverse, or of an undetermined character" occurs. *Center for Biological Diversity v. BLM*, 698 F.3d 1101, 1122 (9th Cir. 2012) (emphasis added). Simply put, "may affect" includes any actual effect on an endangered species, and "no effect" means absolutely no effect on an endangered species whatsoever. As the Ninth Circuit explained in *Karuk Tribe of California v. U.S. Forest Service*, 681 F.3d 1006, 1027 (9th Cir. 2012), "actions that have any chance of affecting listed species or critical habitat — even if it is later determined that the actions are 'not likely' to do so — require at least some consultation under the ESA."

Here, the proposed CX easily crosses the "may affect" threshold for a number of reasons. As noted above, a key purpose and intended effect of the proposed CX is to increase the pace

[17] U.S. Fish & Wildlife Serv. and Nat'l Marine Fisheries Serv., Endangered Species Consultation Handbook at xvi (Mar. 1998).

and scale of salvage logging projects, meaning more logging will occur across a larger geographical area, and that it will occur rapidly due to the declining value of the timber. This obviously has the potential for impacts to the scores of candidate, threatened, and endangered species who rely on public lands for habitat.

Although effects to individuals of listed species or their habitat would occur in the future, at the project level, the case law is clear that consultation for the creation of a new CX must occur at the programmatic level as well. *See, e.g.*, *California ex rel. Lockyer v. U.S. Dept. of Agr*., 575 F. 3d 999 (9th Cir. 2009) (finding Forest Service violated the ESA by failing to consult on a rulemaking to replace the Roadless Area Conservation Rule with a state petition process); *Citizens for Better Forestry v. U.S. Dept. of Agric.*, 481 F.Supp.2d 1059, 1096 (N.D. Cal. 2007) (declining to dismiss plaintiffs' claim that the Forest Service failed to consult under the ESA on a decision to amend the agency's planning rules); *Lane County Audubon Society v. Jamison*, 958 F.2d 290 (9th Cir. 1992) (BLM programmatic spotted owl conservation strategy subject to ESA consultation).

For example, the proposed CX is likely to harm the threatened northern spotted owl. A number of recent studies (Bond et al, Ganey et al 2014) indicate owls will forage in moderate and even in high severity burn areas due to an abundance of prey, and that these fires create future nest trees and snags and large wood debris beneficial to owl prey (Baker et al 2012). Maintaining legacies is essential for future use by owls. North et al. (1999) notes "In our study area, stands with high use by owls typically included many "legacies" that survived a fire or windstorm that destroyed much of the previous stand." So, while fire risk reduction may be necessary to protect human lives and homes, scientific evidence is lacking that it is a critical conservation need of northern spotted owls.

Recovery Action 12 of the northern spotted owl Recovery Plan recognizes this importance and recommends that *all* biological features that take a long time to form such as large snags and large downed trees be retained.[18] But post-fire logging projects in areas of suitable owl habitat remove these legacies RA 12 says should be retained, and this effect would be exacerbated by the proposed CX. The U.S. Fish and Wildlife Service determined that in addition to myriad detrimental ecological effects, post-fire logging is harmful to the northern spotted owl that uses burned habitats, but less frequently will use burned habitat that have then been logged.[19] FWS also concluded that post-fire logging and the subsequent creation of tree plantations can increase fire risks.

BLM does not require scoping for the use of CXs, which the public and federal and state agencies rely on to identify project locations that may affect listed species. The lack of site-specific public involvement for projects in ecologically complex areas will result in serious but uncounted harms to rare species. The BLM's efforts to scale up timber harvest with the

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[18] U.S. Fish and Wildlife Service. 2011. *Revised Recovery Plan for the Northern Spotted Owl (Strix occidentalis caurina)*. U.S. Fish and Wildlife Service, Portland, Oregon. xvi + 258 pp. ("Recovery Action 12: In lands where management is focused on development of spotted owl habitat, post-fire silvicultural activities should concentrate on conserving and restoring habitat elements that take a long time to develop (e.g., large trees, medium and large snags, downed wood). Examples of areas where we believe this recovery action would greatly benefit future spotted owl habitat development include such fire-affected areas as the Biscuit fire, the Davis fire and the B&B complex").
[19] *Id*. at III-49.

salvage CX means less (or no) time spent by biologists and botanists on each acre. Conducting more timber harvest on more acres with the salvage CX will ensure that the public is less involved at the site-specific level and will therefore be unable to catch mistakes. This is a disastrous combination for rare species, and violates the ESA.

IV. The Proposed Rule is Fatally Vague.

The proposed CX is fatally vague because it does not specify the extent of its application. In particular, the Oregon and California lands (O&C lands) located in southwest Oregon are managed by the BLM pursuant to the O&C Lands Act of 1937. Some O&C lands, however, are managed by the United States Forest Service consistent with the National Forest Management Act: under the Controverted Lands Act, the Department of Agriculture administers the "controverted lands" as part of the National Forest System, subject to the laws, rules, and regulations of the national forests.[20] There are 462,000 acres of controverted lands in southwest Oregon intermingled with other O&C and public domain lands.

The salvage CX does not appear to be limited to public domain, O&C, and other lands managed by the BLM pursuant to FLPMA and the O&C Act. Presumably the proposed CX will not be applied to the controverted lands, but the BLM must clarify the specific lands to which this CX applies should it finalize the proposed rule.

V. The Proposed CX is Arbitrary and Capricious and Contrary to Law.

Court challenges to the BLM's proposed CX will be reviewed under the Administrative Procedure Act (APA), 5 U.S.C. § 706, under which agency actions are unlawful "if the agency has relied on factors which Congress has not intended it to consider, entirely failed to consider an important aspect of the problem, offered an explanation for its decision that runs counter to the evidence before the agency, or is so implausible that it could not be ascribed to a difference in view or the product of agency expertise." *Motor Vehicle Mfrs. Ass'n v. State Farm Mut. Auto Ins. Co.*, 463 U.S. 29, 43 (1983) (summarizing judicial review under the Administrative Procedure Act).

The agency's rationale for its new policy must be clearly stated in the administrative record. *SEC v. Chenery*, 318 U.S. 80 (1943). That rationale must also be genuine: the agency cannot rely on a pretextual or contrived explanation in order to avoid legal or political accountability for its actions. *Dep't of Commerce v. New York*, 139 S. Ct. 2551, 2575–76 (2019) ("The reasoned explanation requirement of administrative law, after all, is meant to ensure that agencies offer genuine justifications for important decisions, reasons that can be scrutinized by courts and the interested public").

Notably, agencies are entitled to deference only when they are interpreting a statute that they are uniquely responsible for administering. *Ardestani v. INS*, 502 U.S. 129, 148 (1991) ("[C]ourts do not owe deference to an agency's interpretation of statutes outside its particular expertise and special charge to administer"). Because NEPA applies broadly to federal agencies, the BLM will receive no deference in the interpretation of its requirements. *United Keetoowah Band of Cherokee Indians in Oklahoma v. FCC*, No. 18-1129 (D.C. Cir. Aug. 9, 2019); *Grand Canyon Trust v. Federal Aviation Admin*., 290 F.3d 339, 341-42 (D.C. Cir. 2002) ("because NEPA is addressed to all federal agencies and Congress did not entrust

[20] Act of June 24, 1954, ch. 357, § 1(a), 68 Stat. 270, 270-71.

administration of NEPA to [any one agency]," "the court owes no deference to [an agency's] interpretation of NEPA or the CEQ regulations"); *Park County Resource Council, Inc. v. United States Dep't of Agric.*, 817 F.2d 609, 620 (10th Cir. 1987) ("deference to agency expertise is inapplicable in the NEPA context").

Under the APA, an agency action that constitutes a policy change is arbitrary and capricious where the agency fails to provide a reasoned explanation for the change. The requisite explanation requires acknowledgment of the change, a showing that there are good reasons for the new policy, and an examination of the facts and circumstances that underlay or were engendered by the prior policy. *E.g.*, *Encino Motorcars, LLC v. Navarro*, 136 S. Ct. 2117, 2125–26 (2016) (*citing FCC v. Fox Television Stations, Inc.*, 556 U.S. 502, 515 (2009)) ("When an agency changes its existing position, it 'need not always provide a more detailed justification than what would suffice for a new policy created on a blank slate.' But the agency must at least 'display awareness that it is changing position' and 'show that there are good reasons for the new policy.' In explaining its changed position, an agency must also be cognizant that longstanding policies may have 'engendered serious reliance interests that must be taken into account.' 'In such cases it is not that further justification is demanded by the mere fact of policy change; but that a reasoned explanation is needed for disregarding facts and circumstances that underlay or were engendered by the prior policy'").

Expanding the extent of harmful actions that the agency has previously understood could not be categorically excluded (such as salvage harvest on more than 250 acres) is arbitrary and capricious. The agency has failed to justify why the harms that it previously understood made a larger CX inappropriate would be any different now. *See United Keetoowah Band of Cherokee Indians in Oklahoma v. FCC*, No. 18-1129, slip op. at 22 (D.C. Cir. Aug. 9, 2019) (holding FCC order was arbitrary and capricious where it swept away review that the Commission had previously concluded was necessary); *Organized Vill. of Kake v. U.S. Dep't of Agric*., 795 F.3d 956, 966–70 (9th Cir. 2015) *Nat'l Cable & Telecomms. Ass'n v. Brand X Internet Servs*., 545 U.S. 967, 981 (2005); *FCC v. Fox Television Stations, Inc*., 556 U.S. 502 (2009).

Development of the salvage CX must comply with the requirements identified by the Ninth Circuit Court of Appeals in *Sierra Club v. Bosworth*, 510 F.3d 1016 (9th Cir. 2007). First, the BLM must conduct scoping to determine the range of potential issues and impacts related to the activities covered by the contemplated CX. *Id.* at 1027 ("The determination that a categorical exclusion was the proper path to take should have taken place after scoping, reviewing the data call, and determining that the proposed actions did not have individually or cumulatively significant impacts.").

The BLM also must analyze whether the impacts of the actions encompassed by the CX will individually or cumulatively have a significant environmental impact. *See id*. at 1027-1028, 1026 (stating that the proper question is "whether the evidence supports the Forest Service's determination that the identified category of actions in the [challenged] CX do not individually or cumulatively have a significant impact on the environment," *and citing* Mandelker, NEPA Law & Litigation § 7:10 for the proposition that"[t]he effect of this method of defining categorical exclusions is to apply the same criteria for determining whether an impact statement is necessary to the categorical exclusion decision").

The determination of significance must be made in light of the same context and intensity factors that are implicated in evaluating individual actions. *Bosworth*, 510 F.3d at 1030-1031.

The agency cannot evade such analysis by asserting that the analysis of cumulative impacts is impractical or infeasible, because the use of a CX is improper where such impacts cannot practically or feasibly be assessed. *Id*. at 1028. Nor can the agency satisfy that obligation with conclusory assertions. *Id*. at 1030; *see also Heartwood, Inc. v. U.S. Forest Serv.*, 73 F. Supp. 2d 962, 975 (S.D. Ill. 1999) (CE was arbitrary and capricious where "FS did not provide any rationale for why [the] magnitude of timber sales [under the CE] would not have a significant effect of the environment" and record lacked "any evidence … to support the [new increased] limit, except to refer to the FS' expertise and prior experience with timber sales having 'these characteristics'").

Further, the proposed CX must be written with sufficient specificity to distinguish between actions likely to have significant impacts and those properly covered within a CX. *Bosworth*, 510 F.3d at 1032-33 ("The Service must take specific account of the significant impacts identified in prior hazardous fuels reduction projects and their cumulative impacts in the design and scope of any future Fuels CX so that any such impacts can be prevented.").

The proposed CX does not adequately demonstrate that salvage actions do not individually or cumulatively have a significant effect on the human environment *and which have been found to have no such effect*. 40 C.F.R. § 1508.4. Therefore the proposed CX is arbitrary and capricious for the following reasons.

A. The BLM does not have the administrative record to use mitigated FONSIs to justify the CX.

The BLM argues that salvage projects currently analyzed using EAs can instead be approved with CXs because the agency routinely arrives at FONSIs for those projects. There are numerous methodological problems with this rationale.

1. Mitigation for past actions must be included as explicit limits on new CXs.

The BLM fails to appreciate the difference between an EA and a CX. It is true that most EAs result in the preparation of a decision record and finding of no significant impact (DR/FONSI). However, these EAs and DR/FONSIs are appropriately categorized as "mitigated EAs and FONSIs:" that is, the BLM is able to justify its finding of no significant impact (and therefore proceeds without preparing an EIS) only because it has employed mitigation measures (often dozens or more) to reduce the impact of the proposed action below the threshold of significance.

BLM confusingly states that it does not utilize mitigated FONSIs, and did not consult them in the development of its proposed CX. The Verification Report states that

> There were no instances where any of the evaluated projects included mitigation measures as features of the proposed action or alternatives in order to preclude the need to prepare an EIS. That is, in order to ensure that only actions which, of themselves do not result in significant impacts, individually or cumulatively, this review did not include, and this report does not rely on, situations where BLM relied on mitigated Findings of No Significant Impacts (FONSIs).

Verification Report, 1. Instead, BLM states that its EAs utilize "project design features" and rely on requirements of RMPs to avoid a finding of non-significance, arguing that "these are not "mitigated" FONSIs; rather, they are FONSIs reached for proposed actions limited by the requirement that they conform to the applicable land use plan." *Id.* at 4-5. This rationale is nonsensical.

First, the use of "project design features" are by definition constraints on agency action employed for the protection of the environment. Whether these measures are called "project design features" or "mitigation measures" or any other formulation of words, the fact remains that they are required in order to reach a finding of no significant impact: without them, an EIS would be required. Thus, BLM's EA decisions are "mitigated" to the point where a FONSI is appropriate.

CXs are defined as "a category of actions which do not individually or cumulatively have a significant effect on the human environment." 40 C.F.R. § 1508.4. Mitigated EAs and DR/FONSIs are decidedly not such a category of action. In fact, these types of salvage projects may have an individual or cumulative effect on the environment, but those effects have been minimized to the point of non-significance by the utilization of mitigation measures. Had it not been for preparation of an EA, the measures may never have been developed in the first place. Site-specific mitigation measures are often added by BLM specialists during interdisciplinary project review, but they are also frequently developed through engagement with the public during preparation of the EA and/or consultation with the expert federal agencies, a process unlikely to occur with use of a CX. Indeed, BLM provides no evidence demonstrating that such mitigation measure development will occur with the use of the proposed CX.

Because mitigation measures are used to reduce a project's impacts below the significance threshold, there is no factual basis to conclude that the scope of work proposed in a mitigated EA is appropriate for a CX. As CEQ has explained, "[c]are must be taken to ensure that any mitigation measures during the EA process are an integral component of the actions considered for inclusion in a proposed categorical exclusion."[21] Proposing to eliminate the EA process based on the lack of impact from prior projects that were avoided because of the EA process, itself is inherently circular. *See United Keetoowah Band of Cherokee Indians in Oklahoma v. FCC*, 933 F.3d 728, 744 (D.C. Cir. 2019) (holding that FCC's elimination of review for certain small cellular sites was arbitrary and capricious because, although the Commission "found that adverse effects are rare," it did not consider "how that rarity depends on the very review it eliminates, which forestalled adverse effects that otherwise would have occurred"). Indeed, "[t]he lack of significant impact should be a testament to the value of the review process in these instances, not negate its necessity." *Id.*

Significant issues addressed through project refinement, alternatives analysis, expert agency consultation, and mitigation include old growth, access, inventoried roadless areas, potential wilderness areas and other undeveloped areas, botanical areas, areas of critical environmental concern, soil erosion, sedimentation of waters, state-designated natural areas, threatened and endangered species and critical habitats, cultural and social impacts, and ecological restoration.

[21] Memorandum from Nancy Sutley, CEQ Chair, to Heads of Federal Departments and Agencies, *Establishing, Applying, and Revising Categorical Exclusions under the National Environmental Policy Act* (Nov. 23 2010) (hereinafter "CEQ CX Memorandum").

Access, in particular, is a significant issue that is inextricably related to timber and salvage harvest. Using a CX to implement salvage logging would hide the cumulative impact of projects with respect to this significant issue, making it impossible to systematically address the urgent need to move toward a more ecologically and fiscally sustainable road system. The haphazard approach to road-building in previous eras is the cause of the road system's unplanned proliferation and unsustainable costs.

Second, regardless of whether BLM's EAs are more accurately described as mitigated EAs and FONSIs, reliance on compliance with the RMP as evidence that 5,000 acres of salvage logging should be categorically excluded from detailed NEPA analysis is a tautology that has no basis in fact or law. BLM units must comply with the applicable RMP in every land management decision it makes. 43 U.S.C. § 1732; 43 C.F.R. § 1610.5-3(a). But some RMPs do not contain guidance regarding all aspects of salvage logging, and some RMP direction is insufficiently protective of resources. Thus, relying on a programmatic document that by definition does not consider site-specific impacts is an inappropriate attempt to tier site-specific project effects (or alleged lack thereof) to a more general programmatic analysis that does not and cannot address site-specific environmental consequences. *'Ilio'ulaokalani Coal. v. Rumsfeld*, 464 F.3d 1083, 1095-96 (9th Cir. 2006); *Pit River Tribe v. U.S. Forest Serv*., 469 F.3d 768, 784 (9th Cir. 2006); *Resources Ltd. v. Robertson*, 35 F.3d 1300, 1306 (9th Cir. 1993); *Blue Mountains Biodiversity Project v. Blackwood*, 161 F.3d 1208, 1214 (9th Cir. 1998) ("nothing in the tiering regulations suggests that the existence of a programmatic EIS for a forest plan obviates the need for any future project-specific [environmental analysis]").

Third, BLM claims that it will require the use of project design features when using the salvage CX in the field, Verification Report, 4, but then fails to identify what those features will be because "development of lists of standard project design features as required components of this proposed CX is not suitable given the variability in specifications by region and land use planning area," *id*, 17. We agree: the fact that the BLM cannot identify and require a standard set of project design features for the salvage CX demonstrates that the proposed CX is too broad. A smaller, targeted CX – or the agency's current CX authority limiting salvage to 250 acres – is the best tool to take into account local, site-specific ecological considerations. Instead, the proposed CX is too large to effectively capture and address unique place-based situations, rendering the salvage CX arbitrary, capricious, and not accordance with law. 5 U.S.C. § 706(2)(A).

2. The BLM lacks adequate monitoring data to show the absence of significant impacts.

a. Lack of monitoring data renders predictions about future on-the-ground impacts arbitrary and capricious.

To identify a new category of CX, the BLM must demonstrate that the activity will not individually or cumulatively have a significant environmental impact. 40 C.F.R. § 1508.4; *Sierra Club*, 510 F.3d at 1027-1028. The BLM has not proffered adequate data demonstrating that the categories of action described in its new CX would have no significant individual or cumulative effects. To justify a determination that work usually undertaken with an EA is appropriate for a CX, the BLM must analyze whether projects analyzed with EAs did in fact have no significant direct, indirect, or cumulative impacts on the environment. Although the agency claims to have conducted this analysis for the Verification Report, the baseline and monitoring data have not been made available to the public for inspection. We have requested this information through the Freedom of Information Act (FOIA), but given the short timeline for public comments on this proposed rule (30 days) and the BLM's demonstrated inability or deliberate refusal to comply with FOIA's timelines under the present administration, it is unlikely that we will receive the information necessary to provide informed comments on the proposed CX.

A FONSI is a prediction. The BLM may get away with a weakly supported prediction in an individual project, but its burden when it undertakes rulemaking is more rigorous. The agency must show that those predictions have been reliable and that the projects have in fact had no significant impacts on the ground. In our experience, however, the mitigation measures required by mitigated EAs and DR/FONSIs are often ineffective at reducing the environmental impacts of vegetation management projects. Thus, a proposed CX that required measures utilized in past mitigated EAs and DR/FONSIs would need to be supported by an analysis demonstrating that the required mitigation measures are likely to be employed *and* effective in reducing individual and cumulative impacts below the significance threshold. Because many mitigation measures are either not implemented in the field or are only partially effective (or not effective at all), we anticipate that it will be difficult for the agency to make such a showing. BLM cannot simply allege that its project design features are effective. 5 U.S.C. § 706(2)(A).

For example, gates, tank traps, and other methods to block "closed" roads used for logging activities can be ineffective in prohibiting resource damage to soils, vegetation, and wildlife. Other mitigation measures such as treating hazardous fuels in logged areas with prescribed fire to reduce logging-created fuels, are only partially implemented, or not implemented in a timely fashion, which increases the fire risk in those areas. BLM monitoring reports (when they are prepared) do not consistently address the outcomes associated with implementation of mitigation measures and often indicate that measures designed to protect terrestrial and aquatic resources are ineffective. Because mitigation measures are not consistently effective, it is inappropriate for the agency to presume that activities undertaken with mitigated EAs and DR/FONSIs are appropriate for a CX. *Cf. Klamath-Siskiyou Wildlands Ctr. v. Forest Service*, 373 F. Supp. 2d 1069 (E.D. Cal. 2004) (impacts were significant because the data did not show use of a seasonal restriction that had been committed to in the EA).

In addition, some forests are more complex than others, and monitoring project impacts and mitigation implementation and efficacy is even more important. The broad-brush and untailored nature of the proposed CX ignores the variability of the public lands. Given the vast dearth of monitoring that occurs post-project, we would be surprised to learn that the agency has carefully analyzed this issue.

In developing the salvage CX, the BLM states that it relied on the monitoring of 18 nonrandom projects to justify the proposed CX. Verification Report, 10 (Table 3). There is no indication that this sampling method is scientifically valid, particularly because it relies on unknown "monitoring" methods. NEPA is a forecasting law designed to predict environmental impacts. But only post- implementation monitoring can determine whether the predicted effects were the actual effects of an action, or whether other, unforeseen effects in fact occurred. And because the BLM lacks a budget to sufficiently monitor and adaptively manage the public lands, it is unlikely that the agency can rationally conclude that its salvage logging actions can appropriately be documented with the use of a CX.

b. Without consistent monitoring of the spread of non-native invasive species, the proposal violates Executive Order 13112.

One issue of particular importance related to monitoring (and triggering of BLM's extraordinary circumstances) is the spread of non-native invasive species (NNIS). Under Executive Order 13112 (1999), agencies have a duty to "monitor invasive species populations accurately and reliably." The BLM must also identify projects that "may" spread NNIS, and it is prohibited from "authoriz[ing]...actions it believes are likely to cause or promote the introduction or spread of invasive species."[22]

Many of the BLM's projects do in fact contribute to the spread of invasive species. As shown by research cited elsewhere in these comments, forest roads are commonly vectors for such a spread. The removal of pinyon and juniper is associated with the spread of cheatgrass. In the Southeast, logging roads are vectors for microstegium and many others. The BLM often addresses concerns about the spread of NNIS dismissively, concluding in NEPA decisions that its control practices will be effective. Yet its NEPA analyses seldom grapple with the reality that management practices both transport seeds and other invasive plant materials and create favorable conditions in treated stands for the establishment of new invasive plant populations. The BLM does not have the monitoring data to show that its control practices effectively mitigate this risk. To the contrary, the spread of NNIS over time is directly correlated to the location of management practices that involve roads and equipment, soil disturbance, and changing light conditions.

Because the agency has not met its duty to monitor populations of NNIS accurately and reliably or to identify which management practices contribute to (and which mitigation measures actually prevent) the spread of NNIS, it may not blithely exclude these risky activities from analysis in a CX. The cumulative effect of spreading NNIS over time is significant, requiring site-specific analysis, public involvement, and consideration of alternatives, including the no action alternative, which may often be the only alternative capable of preventing a violation of Executive Order 13112.

While the Executive Order forbids the thoughtless spread of NNIS by acting without monitoring and risk assessment, it is not intended as a straightjacket on agency action. If management benefits are important enough to move ahead despite knowledge that they will, cumulatively, result in the spread of NNIS, the Executive Order makes allowances for a programmatic approach, which involves the public, to determine which actions should go forward despite the risk, and what measures will be required to mitigate that risk. Exec. Order 13112 § 2(a)(3). Without an umbrella analysis and adequate prescriptive sideboards in place, the BLM has left its duties to the site-specific level, which means that cumulative impacts analysis and public involvement continue to be required. However, the proposed salvage CX would obviate this analysis.

[22] Executive Order 13112 of February 3, 1999.

c. The proposed CX cannot lawfully be used as a programmatic, policy-level effort to significantly increase the agency's management footprint.

Under the current presidential administration, the BLM has expressed its desire to increase its management footprint on the public lands by arguing that projects need to be bigger in order to have the desired effect on the landscape. Usually this justification stems from the desire to reduce the risk of wildfire and its impacts on public lands. The agency's intent with this management approach admittedly is to have a "more significant" impact on the composition, structure, and function of these forests. On this basis alone, a NEPA analysis should have been undertaken for BLM's proposed salvage CX.

The problem with using a CX to implement this work is one of scale. CXs are intended to be used for "small," "insignificant," and "routine" projects, *Sierra Club v. Bosworth*, 510 F.3d 1016, 1027 (9th Cir. 2007), not 5,000-acre projects that alter fire regimes, vegetation classes, or watershed condition class. The latter effects are substantial, and likely have direct, indirect, and/or cumulative effects – as they should, because that is the stated purpose and need of the project. If the BLM wants to increase the pace and scale of land, then using a "small" tool like a CX, independent of a larger programmatic plan and analysis, is by definition the wrong tool. Instead, the agency should make more use of programmatic NEPA analysis and tiering, as described elsewhere in these comments.

Indeed, proliferating use of CXs to do the bulk of the agency's work will undermine the programmatic planning approach required by Congress in FLPMA. Creation of an overbroad CX encourages ad hoc project development—pursuit of projects that can move quickly to meet goals and targets set outside of land management planning—rather than deliberate progress toward a unit's desired conditions through interdisciplinary project development and public comment.

d. A CX is inappropriate for actions that involve unresolved conflicts of the use of available resources.

Different areas of the public lands are different, and the same actions in different areas will have different effects. *New Mexico v. BLM*, 565 F.3d 683, 706 (10th Cir. 2009) (the "location of development greatly influences the likelihood and extent of habitat preservation. Disturbances on the same total surface area may produce wildly different impacts on plants and wildlife depending on the amount of contiguous habitat between them"). For example, fuels treatments aren't effective at reducing wildfire risk unless they're located in the right places.[23] Salvage logging old-growth forests is not equivalent to salvage logging a third-growth plantation forest.

[23] *See generally* Vaillant and Reinhardt, *An Evaluation of the Forest Service Hazardous Fuels Treatment Program—Are We Treating Enough to Promote Resiliency or Reduce Hazard?* 115 J. For. 300 (July 2017) (noting that because "[i]t is neither realistic nor necessary to do fuel treatments on every acre …, it is important to prioritize when, where and how to treat wildland fuels"). Although this report examines the Forest Service's hazardous fuels reduction efforts, the scientific principles apply equally to the BLM's land management actions.

Examples of site-specific factors affecting the potential significance of a project's impacts include:

- **Type/intensity of harvest** (*Curry v. Forest Service*, 988 F. Supp. 541 (W.D. Pa. 1997); *House v. Forest Service*, 974 F. Supp. 1022 (E.D. Ky. 1997));

- **Economic cost of harvest** (*Kettle Range Cons. Group v. Forest Service*, 148 F. Supp. 2d 1107 (E.D. Wash. 2001));

- **Old-growth characteristics** (*Curry v. Forest Service*, 988 F. Supp. 541 (W.D. Pa. 1997); *Lands Council v. Cottrell*, 731 F. Supp. 2d 1028 (D. Idaho) (R&R adopted 731 F. Supp. 2d 1074); *Neighbors of Cuddy Mountain v. Forest Service*, 137 F.3d 1372 (9th Cir. 1998); *Idaho Sporting Cong. v. Alexander*, 222 F.3d 562 (9th Cir. 2000) (overruled on other grounds); *Wildwest Inst. v. Austin*, 2006 WL 8435846, at *1 (D. Mont. 2006));

- **Presence within an area potentially suitable for future protection as wilderness** (*Lands Council v. Martin*, 529 F.3d 1219 (9th Cir. 2008); *Mountaineers v. Forest Service*, 445 F. Supp. 2d 1235 (W.D. Wash. 2006));

- **Proximity to a unique area such as designated wilderness** (*Sierra Club v. Bosworth*, 352 F. Supp. 2d 909 (D. Minn. 2005));

- **Risk factors for soil impacts and erosion** (*Cowpasture River Pres. Ass'n*, 911 F.3d 150, 177 (4th Cir. 2018); *Sierra Club v. Forest Service*, 843 F.2d 1190 (9th Cir. 1988); *Kettle Range Cons. Group v. Forest Service*, 148 F. Supp. 2d 1107 (E.D. Wash. 2001); *Blue Mountain Biodiversity Project v. Blackwood*, 161 F.3d 1208 (9th Cir. 1998); *Wildwest Inst. v. Austin*, 2006 WL 8435846, at *1 (D. Mont. 2006));

- **Sensitivity of receiving waters and fisheries** (*Sierra Club v. Forest Service*, 843 F.2d 1190 (9th Cir. 1988); *League of Wilderness Defenders v. Forest Service*, 2005 WL 3307087, at *1 (D. Or. 2005));

- **Impacts to wetlands** (*Helena Hunters & Anglers v. Tidwell*, 841 F. Supp. 2d 1129 (D. Mont. 2009));

- **Efficacy of site-specific BMPs** (*Colorado Envt'l Coalition v. Dombeck*, 185 F.3d 1162, 1173 (10th Cir. 1999); *Ohio Valley Envtl. Coalition v. Hurst*, 604 F. Supp. 2d 860, 889 (S.D.W.Va. 2009); *Hells Canyon Pres. Council v. Connaughton*, 2012 WL 13047991 (D. Or. 2012) (R&R adopted 2013 WL 665134 (2013)));

- **Recreational values and uses** (*Sierra Club v. Forest Service*, 843 F.2d 1190 (9th Cir. 1988); *Sierra Club v. Bosworth*, 352 F. Supp. 2d 909 (D. Minn. 2005));

- **Scenic and esthetic qualities of the site** (*Sierra Club v. Forest Service*, 843 F.2d 1190 (9th Cir. 1988); *Curry v. Forest Service*, 988 F. Supp. 541 (W.D. Pa. 1997));

- **Geology of the particular area** (*House v. Forest Service*, 974 F. Supp. 1022 (E.D. Ky. 1997));

- **The presence of rare species** (e.g., sensitive, field office concern, regional field office concern, species of conservation concern)(*Lands Council v. Cottrell*, 731 F. Supp. 2d 1028 (D. Idaho) (R&R adopted 731 F. Supp. 2d 1074) (species viability));

- **Impacts to quality of wildlife habitat** (*Found. for N. Am. Wild Sheep v. Dep't of Ag.*, 681 F.2d 1172 (9th Cir. 1982));

- **Impacts to connectivity of wildlife habitat** (*Helena Hunters & Anglers v. Tidwell*, 841 F. Supp. 2d 1129 (D. Mont. 2009));

- **Condition and location of access roads** (*Or. Nat. Desert Ass'n v. Rose*, 921 F.3d 1185, 1189 (9th Cir. 2019);

- **The likelihood that the action will cause an increase of use on a particular road associated with the project** *(Found. for N. Am. Wild Sheep v. Dep't of Ag.*, 681 F.2d 1172 (9th Cir. 1982));

- **The history of similar activities at the particular site** (*Sierra Club v. Forest Service*, 843 F.2d 1190 (9th Cir. 1988); *Curry v. Forest Service*, 988 F. Supp. 541 (W.D. Pa. 1997); *Conservation Congress v. Forest Service*, 2013 WL 4829320, at *1 (E.D. Cal. 2013));

- **Foreseeable future activities at the particular site** (*Sierra Club v. Forest Service*, 843 F.2d 1190 (9th Cir. 1988));

- **The degree of scientific certainty that activities or mitigation measures will have the predicted effect given a site's unique characteristics** (*Blue Mountain Biodiversity Project v. Blackwood*, 161 F.3d 1208 (9th Cir. 1998); *Cascadia Wildlands v. Forest Service*, 937 F. Supp. 2d 1271 (D. Or. 2013));

- **Absence of data about the ecological importance of the site** (*Helena Hunters & Anglers v. Tidwell*, 841 F. Supp. 2d 1129 (D. Mont. 2009)); and

- **Recency of data that are subject to change over time** (e.g., wildlife population data) (*Klamath-Siskiyou Wildlands Ctr. v. Forest Service*, 373 F. Supp. 2d 1069 (E.D. Cal. 2004)).

The BLM cannot lawfully use a CX for projects that could, depending on the agency's exercise of discretion with respect to harvest location, have different impacts on these site-specific factors. Where alternative locations or methods for harvest would have different environmental impacts, NEPA requires the agency to weigh those alternatives, even if the environmental differences would not be "significant" enough to require an EIS. *See EPIC v. Forest Service*, 234 F. App'x 440 (9th Cir. 2007).

Nothing about the proposed salvage CX prevents responsible officials from choosing the wrong treatments or the wrong places. Indeed, without public input it is likely they will do so, at least occasionally. As a matter of law, an agency simply cannot rely on unguided discretion or good intentions in order to ensure that actions under a proposed CX will not have significant impacts.

The BLM enjoys considerable discretion in the location of management activities. RMPs do not commit to actions in specific locations; that discretion is deferred to the project level. Plans simply do not, generally, commit to site-specific impacts. Those decisions, significant or not, are left to the project level. As a result, the exercise of discretion to locate forest management activities at the site-specific level inherently involves an unresolved conflict of available resources. 42 U.S.C. § 4332(2)(E); 40 C.F.R. § 1507.2(d).

Some forest management activities will not involve "unresolved conflicts," because the agency will lack the legal discretion or the practical ability to choose. For example, issuance of a temporary road closure order to meet water quality requirements would not require consideration of alternatives. Similarly, if a unit's RMP requires it to conduct a sanitation harvest to prevent the spread of bark beetles, there would not be any unresolved conflicts in conducting such a harvest. In either case, the decision space has already been narrowed by external legal requirements.

The same is not true, however, for most salvage logging projects. On most forests, timber harvest occurs for a variety of purposes—both ecological and economic. The BLM enjoys broad discretion to balance the benefits of timber harvest against its site-specific impacts. Within any given analysis area, the BLM can choose any number of stands for salvage harvest. The same is true of road locations, and indeed the BLM often relocates road alignments during project development based on public feedback.

Because of that broad discretion, and because of the wide variety of environmental differences between potential locations for salvage timber harvest, the BLM is obligated to consider alternatives. Categorical exclusions do not require consideration of alternatives, *Mahler v. Forest Service*, 927 F. Supp. 1559, 1573 (S.D. Ind. 1996), and they are therefore the wrong tool for salvage timber harvest. And even if the agency were prepared to consider alternatives internally for a CX, it would not be enough because the public must be involved in the process of suggesting alternatives and providing feedback on their respective impacts. *Ayers v. Espy*, 873 F. Supp. 455 (D. Colo. 1994).

e. Plan consistency is not enough to avoid significant impacts.

The proposed CX relies heavily on the legal requirement of project consistency with land use plans. These external limitations, while important, do not prevent significant impacts.

RMPs simply do not prevent significant impacts. If they did, there would be no need for the BLM to provide procedures for project-level EAs and EISs. Many BLM proposals have potentially significant impacts, which explains why so many BLM decisions are made as mitigated FONSIs (see supra). RMPs also do not prevent significant impacts from permitted activities, such as salvage logging.

Furthermore, RMPs change. They are revised periodically, and their changes can carry significant consequences for particular areas through the impacts of future projects. For example, an RMP revision could shift the management direction for an unroaded area from backcountry to a more intensive management classification. Such a change would not commit that area to be developed but it would allow development through future projects with impacts that would be significant. *See, e.g.*, *Lands Council v. Martin*, 529 F.3d 1219, 1230 (9th Cir. 2008).

We are not aware of a single BLM RMP that adequately addresses the cumulative effects of salvage logging on early seral habitat, snag habitat, big game habitat, aquatic resources, carbon emissions, increased fire hazard from dense young stands resulting from post-salvage replanting, and the myriad adverse effects of road construction associated with salvage logging. BLM cannot say that RMP compliance offers any kind of guarantee that salvage logging effects will be insignificant when all of these critical issues remain unaddressed either cumulatively or site-specifically.

Making matters worse, RMP consistency cannot reliably be determined without public involvement. The BLM often proposes projects that are inconsistent with the RMP, as a review of the case law for challenges to BLM decisions quickly reveals. The agency may argue that it routinely makes determinations of plan consistency in decision memos, but the public does catch mistakes in those determinations, even without the opportunity to review the agency's analysis in an EA.

RMP consistency can be violated on paper or on the ground. A project may proceed with the *prediction* that it will not violate RMP requirements, but during implementation the prediction may prove false. Evaluating RMP consistency for large projects is not a legal checklist that can be done effectively in a Decision Memo. It can be complicated and uncertain, and it will always require the consideration of site-specific risks and benefits with input from the public. The proposed CX would obviate those requirements.

In sum, the BLM should not presume that a category of action documented with an EA is appropriate for a CX simply because the action is one that is regularly undertaken. To rationally support the proposed salvage CX, the BLM must document – with data – that the category does not have significant individual or cumulative effects. Because the agency so far has failed to do so, its proposed rule is arbitrary and capricious. 5 U.S.C. § 706(2)(A).

f. The BLM cannot create a new, larger salvage CX without evidence that its current, limited salvage CX does not have significant impacts.

To our knowledge (and from our review of the Verification Report offered in support of the rulemaking), the BLM has not conducted any systematic review of its existing salvage CX authority to determine whether it has had significant impacts. CEQ has explained that agencies should review their existing categorical exclusions at least every 7 years.[24] While failure to do so does not invalidate the category, it is certainly relevant to whether the BLM is acting arbitrarily and capriciously by attempting to promulgate a new, larger CX while turning a blind eye to the impacts of its existing salvage CX authority.

The BLM states that there were "56 filings of CXs with salvage in the title in ePlanning." Verification Report, 11. But the BLM has made no attempt to understand the cumulative effects of these decisions over time. For example, were those CXs used repeatedly in the same geographical areas? Have they had impacts not expected when the DM was signed? Neither the public nor the BLM appear to know.

Another important question that the BLM has failed to ask is whether changed conditions and new research has shown that prior assumptions about a category's impacts were reliable. For

[24] CEQ CE Memorandum.

example, how have the realities of climate change (both our better understanding of carbon stocks and information about drought, flooding, and saltwater intrusion for example) affected what forest professionals should be doing on the ground? These are programmatic questions, but they will never be answered if the relevant impacts are hidden from the public and decisionmakers.

g. The Verification Report is flawed.

The Verification Report contains significant errors and omissions and reaches unfounded conclusions in a number of ways. In particular, we draw the BLM's attention to the Verification Report critique by Dr. Dominick DellaSala, appended to these comments as Appendix B.[25] As Dr. DellaSala points out, the Verification Report does not support the proposed CX.

We point out additional flaws in the Verification Report. For example, the BLM salvage logging timber sales stemming from the 2002 Biscuit and Timbered Rock fires involve issues that are substantively identical to the resources concerns identified in these comments on the proposed CX (i.e., effects to wildlife, water quality, soils, and fire hazard/risk) and included actions that mirror the scope and intensity of the logging activities that the BLM now seeks to exempt from detailed NEPA analysis and public review.

The Verification Report the BLM contends that the Timbered Rock EIS planning process should be distinguished from the proposed salvage logging CX in part because it "incorporated a research element to compare various treatment types including salvage within Riparian Reserves (RRs) and salvage of large trees in Late Successional Reserves (LSRs)." Verification Report, 23. We agree that the proposed salvage logging CX may be distinguished from the Timbered Rock EIS because the former contains no research or monitoring whatsoever while the latter did.

However, this distinction highlights the arbitrary and capricious nature of the proposed CX and underscores the lack of data, monitoring, mitigation, and science in the Verification Report. Indeed, we agree with the Verification Report that "reliance on a CX to support action does not yield analysis of predicted environmental consequences against which observed results can be validated…" Verification Report, 19. Therefore, we are in fundamental agreement with the BLM that while the Timbered Rock EIS contained an attempt to include and acknowledged research and monitoring, the proposed salvage CX is notably free from the constraints of research and monitoring and instead focuses entirely on facilitating salvage logging that will not be informed by research, monitoring, site-specific analysis, or public involvement. Why the BLM believes that this strengthens, rather than undercuts, its attempt to exempt salvage logging from detailed NEPA analysis is unclear to us.

The Verification Report further attempts to distinguish the Timbered Rock EIS from the proposed CX by noting that of the LSR and RR logging supported by the EIS,

> [t]he appropriateness of salvage within reserves is dependent upon each administrative unit's land use plan and suite of best-management practices included in

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[25] Exhibit B, Verification Report Critique. We request that BLM review and respond to each and every allegation in the DellaSala critique as the critique responds to a number of BLM's assertions put forth in this rulemaking.

> the land use plan analysis and any proposed salvage action implementing the land use plan would need to be consistent with these, as well as document that consistency in order for the BLM to rely on the proposed CX.

Verification Report, 23. This quoted direction from the BLM NEPA Handbook to distinguish the Timbered Rock EIS is without relevance or substance. In fact, the 2016 RMP governing BLM actions in southwest Oregon (including within the Medford BLM District in which the Timbered Rock fire and project is located) explicitly calls for post-disturbance salvage logging in reserve land use allocations if the BLM's subjective intent for such logging is not primarily economic gain and timber production. While we do not deign to pretend to know the subjective intent of BLM timber planners, the fact remains that the RMP may allow for salvage logging in reserve land use allocations such that the proposed CX could result in logging prescriptions that directly mirror those proposed for reserves in the Timbered Rock EIS. Indeed, the Ninth Circuit Court of Appeals held that this reserve logging violated the RMP then applicable to the Medford District. *Or. Nat. Res. Council Fund v. Brong*, 492 F.3d 1120 (9th Cir. 2007).

The BLM's reference to and reliance upon Best Management Practices in this context is misguided given the acknowledgement that the agency is unable to provide standardized Project Design Features to support this CX and is unable to disclose or analyze what PDFs or BMPs may (or may) not be implemented during the proposed accelerated salvage logging facilitated by the proposed CX. Verification Report, 17.

The BLM's contention that the scale proposed 6,780-acres of salvage and green tree logging at Timbered Rock was "substantial" yet 5,000-acres of salvage logging without benefit of any environmental analysis or public involvement is not "substantial" is curious. Verification Report, 23. Would a CX for, say, 6,000 acres of salvage logging reach the BLM's (undefined) threshold as "substantial?" Conversely, if the Timbered Rock decision document had selected an action alternative that only logged 5,000 acres would the project scale no longer qualify as "substantial?" Evidently the magic number is somewhere between 5,000-acre and 6,780-acres but what exactly the trigger point is cannot be determined from the Verification Report. This is the definition of arbitrary and capricious.

Similarly, the BLM's contention that 100 miles of proposed road maintenance and 11 stream crossing upgrades contained in the Timbered Rock EIS render its scope more "substantial" than the salvage logging and road construction authorized in the proposed CX is irrational. Verification Report, 23. Road maintenance is an activity that is designed to decrease (rather than increase) the impacts of the BLM transportation system on terrestrial and aquatic resources. Similarly, stream crossing upgrades are designed to improve, rather than degrade aquatic resources during timber haul. In contrast, as established elsewhere in these comments, the BLM's proposal to construct up to one mile of permanent logging roads and a literally unlimited number of "temporary" roads (with potentially long-term impacts) with no site specific commenting or analysis whatsoever most certainly qualifies as a "substantial" impact to post-disturbance landscapes.

The Verification Report makes mention of the Biscuit salvage logging EIS but makes no real attempt to summarize its findings or distinguish its significant effects from those that would be authorized by the proposed salvage logging CX. The Biscuit project only involved 195 acres of salvage logging on BLM lands. Verification Report, 23. ***This level of logging could have occurred under the BLM's existing CX authority***, and under the proposed CX, a project involving an area 25 times larger than that approved for the Biscuit project would be permitted. This indicates rather persuasively that there is no pressing “need” for the proposed dramatic expansion of the agency’s desire to forego environmental analysis and public input to facilitate its post-disturbance logging agenda.

The BLM’s primary contention in regards to the Timbered Rock and Biscuit salvage EIS documents seems to be that these projects involved extensive fuel management zones and are not the kinds of actions suitable for CX with exception for roadside hazard trees in LSRs. The BLM’s belief that relatively benign and non-controversial actions such as the utilization of prescribed fire and the establishment of fuels breaks on acreages significantly less than the 5,000-acres proposed for CX salvage logging are not suitable for categorical exclusion while the larger acreage proposed salvage logging are suitable for exclusion is unsupportable. The contention that 5,000-acres of salvage logging, up to a mile of new road construction, and unlimited temporary road construction represent a “limited extent of treatments” is simply false and not based on science or fact.

Since the Verification Report contains no actual references to the any findings contained in the Biscuit and Timbered Rock NEPA documents, we bring the following items to your attention for inclusion in the administrative record for this rulemaking:

- The Timbered Rock FEIS acknowledges concern regarding cumulative terrestrial and watershed effects stemming from adjacent private lands post-disturbance logging. Because much of the BLM managed forests in southern Oregon consist of a “checkerboard” land ownership pattern, such cumulative impacts are likely if not certain to occur through implementation of the BLM’s 5,000-acre salvage logging CX.

- The Timbered Rock EIS indicates that leaving non-merchantable small-diameter material on site while focusing on the removal of larger marketable material after a disturbance “does pose an increased [fire] hazard.” No such acknowledgment is present in the Verification Report for the proposed CX.

- The Timbered Rock EIS found that “[r]oad building in steep mountainous terrain has been long recognized as the single greatest cause of soil mass movement.” The proposed CX disregards this best available science and would allow and facilitate such road construction without the benefit of detailed environmental analysis or public input.

- The Timbered Rock EIS indicated that post-fire logging “would negatively impact recovery of soil productivity on moderate and high burn severity sites.” The proposed CX would allow and facilitate the reduction of soil productivity without the benefit of detailed environmental analysis or public input.

- The Timbered Rock EIS acknowledges that roadside salvage logging with ground-based yarding systems “would create a mechanism for sediment delivery by directly connecting disturbed areas to roadside ditches, many of which are hydrologically connected.” The proposed CX would allow and facilitate the creation of mechanisms for sediment delivery from roadside salvage logging without the benefit of detailed environmental analysis or public input.

- The Timbered Rock EIS acknowledges that after large disturbance events, the local wood products market is often flooded and that BLM timber volume is in competition with private fiber producers to the detriment of both. Like the Timbered Rock EIS, the Biscuit EIS also acknowledged that large-scale salvage logging (as proposed in the BLM CX) often floods local timber markets, driving down prices and harming private timber owners. The proposed salvage CX will facilitate and accelerate the reduction of timber value in post-disturbance situations.

- The Biscuit EIS indicates that the impacts of post-fire "temporary" road construction on terrestrial and aquatic resources are often "long term." The proposed CX will accelerate the construction of roads to facilitate salvage logging without the benefit of site-specific detailed environmental analysis or public input.

The Verification Report also neglects to address another environmental assessment prepared by the BLM to authorize extensive post-fire logging in Oregon, which undermines BLM's assessment that a CX is appropriate for large-scale post-disturbance logging. In the Douglas Complex Environmental Assessment, the BLM analyzed post-fire logging on approximately 1,276 acres as a result of the 2013 Douglas Complex Fires, predominately on the Medford District BLM. In addition to resulting in the incidental take of 24 Threatened northern spotted owls, the BLM concluded that:

- "Temporary routes, new and expanded landings and new skid trails would all compact soils and impact subsurface hydrology in the short-term."[26]

- "High density road networks that route surface and subsurface flows also increase mass wasting potential especially in areas where water yield is above normal due to a high percentage of open canopy."[27]

- "[R]oad construction, landing construction, lop and scatter and/or piling and burning of activity fuels, roadside hazard tree removal, salvage logging and associated hauling could result in spread of noxious weeds."[28]

- "Radio telemetry studies of Northern spotted owl in post-fire landscapes indicate that Northern spotted owls use forest stands that have been burned, but generally do not use stands that have been burned and logged."[29]

These findings further undermine BLM's assertions that actions that it "routinely" undertakes (i.e., post-fire logging) do not have individual or cumulative effects such that a CX is the appropriate NEPA tool to conduct a sufficient environmental review. Instead, as the Douglas Complex EA clearly disclosed, there in fact are adverse direct and/or cumulative effects from post-fire logging. Thus, a CX is the wrong tool for NEPA compliance.

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[26] Douglas Fire Complex Recovery Project Environmental Assessment (DOI-BLM-OR-M070-2014-006-EA) (May 2014), 163.
[27] *Id.* at 161.
[28] *Id.* at 213.
[29] *Id.* at 93.

Given that the Verification Report is deeply flawed, incomplete, and inconsistent, it in no way can be said to support the proposed rulemaking. 5 U.S.C. § 706(2)(A).

B. The proposed CX will have significant adverse effects as a result of post-disturbance logging.

1. Salvage logging is scientifically controversial.

As noted above, the impacts of the CX are likely to be significant as there is a substantial scientific controversy surrounding the size, nature and effects of salvage logging. 40 C.F.R. § 1508.27(b)(4). BLM completely overlooks the overwhelming scientific consensus that post-disturbance logging generally – and post-fire logging specifically – is highly controversial, and fails to cite or consider that scientific consensus in its rulemaking. Because BLM did not include this scientific information in its Verification Report or proposed rule, we bring the agency's attention to the following sample of scientific literature, much of which was developed by federal agency experts, which directly undermines the BLM's justification for its proposed CX:

- Treatment of areas following occurrence of major disturbances is a complex and controversial topic. Complexities include the trade-offs among various resource management goals, such as between management of fuels and provision of wildlife habitat in the case of wildfires. Conflicts often exist between economic and ecological objectives as timber salvage is generally about recovering economic values rather than enhancing ecological recovery. A further complication is that science of post-disturbance management activities has only recently begun to receive serious attention.[30]

- Treatment of areas following occurrence of major fires is a complex and controversial topic. Complexities include the trade-offs among various resource management objectives, such as fire fuel management objectives and provision of wildlife habitat. Conflicts often exist between economic and ecological objectives.[31]

- What are appropriate restoration treatment policies after a fire? The topic is contentious.[32]

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[30] Johnson & Franklin 2009. Report: *Restoration of Federal Forests in the Pacific Northwest*, available at http://www.forestry.oregonstate.edu/cof/fs/PDFs/RestorationOfFederalForests-InThePacific-Northwest.pdf.

[31] K. Norm Johnson, Jerry Franklin, Debora Johnson. *The Klamath Tribes' Forest Management Plan*. Dec 2003, available at http://web.archive.org/web/20090122131645/-http://www.klamathtribes.org/forestplan.htm.

[32] Franklin and Agee. 2003 "*Forging a Science-Based National Forest Fire Policy*," Issues in Science and Technology Online. Fall 2003; available at http://web.archive.org/web/-20071215154828/http://www.issues.org/issues/20.1/franklin.html.

- There is widespread debate over the merits of salvage logging, and salvage is controversial in the technical literature. … [T]here is considerable controversy over post-fire logging (such as salvage logging) and its role in ecosystem recovery.[33]

- The costs and benefits of activities such as salvage logging and its appropriate role have emerged as national issues.[34]

- Post-Fire Salvage Logging: one of the more controversial activities in the post-fire environment is salvage logging of fire-killed trees...Salvage logging is controversial because few short-term positive ecological effects and many potential negative effects have been associated with post-fire logging (Peterson et al. 2009). Knowledge of the ecological effects of post-fire logging, most of which is short-term, has been summarized by McIver and Starr (2000), Lindenmayer et al. (2004), Lindenmayer and Noss (2006), Peterson et al. (2009), and Lindenmayer et al. (2011). These reviews note that general ecological concerns associated with salvage logging include impacts to soils; impacts to understory vegetation and recruitment; potential increases in surface fuel loads; reductions in such as snags and burned logs and their associated habitat values; and other influences on forest development. Impacts to tree recruitment have been observed when salvage logging has been delayed until after seedlings have become established (Donato et al. 2006, Newton et al. 2006). Salvage logging by helicopter is likely to avoid more of the ground disturbance. However, the economic feasibility of salvage logging in general, and especially more costly methods such as helicopter logging, may depend on removing larger, more merchantable dead trees. Such larger trees are likely to be disproportionately valuable for post-fire dependent wildlife (Hutto 2006)...Despite controversy over the ecological effects of salvage logging, several studies have found a high level of public support for salvage logging in communities that have experienced a nearby wildfire, or are located in an area where the risk of wildfire is high...However, their support was contingent on salvage logging being environmentally benign.[35]

2. The effects of salvage logging are uncertain.

The effects of salvage logging are likely to be significant because it produces uncertain effects. In his 2015 comments on a large post-fire salvage proposal in California, Jerry Franklin said "there is much to learn about the role of dead wood in the development of forests." Other researchers have similarly concluded that while we know much about wildfire and forest succession and response, the effects of post-fire logging remain uncertain in many

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[33] FWS 2008. Final Recovery Plan for the Spotted Owl. Appendix E: Fire and Spotted Owl Habitat, pp 119-120, available at http://www.fws.gov/pacific/ecoservices/endangered-/recovery/pdf/NSO%20Final%20Rec%20Plan%20051408.pdf.

[34] U.S. Department of Agriculture, Forest Service. 1996. *Status of the interior Columbia basin: summary of scientific findings*. Gen. Tech. Rep. PNW-GTR-385. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station; U.S. Department of the Interior, Bureau of Land Management. 144 p. p 22.

[35] USDA Forest Service Pacific Southwest Research Station. 2013. *Science synthesis to promote resilience of social-ecological systems in the Sierra Nevada and southern Cascades*. Albany, CA: U.S. Department of Agriculture, Forest Service, Pacific Southwest Research Station. 504 p. available at http://www.fs.fed.us/psw/publications/reports/psw_science-synthesis2013/index.shtml.

respects.[36] But BLM never discloses or addresses these findings in the Verification Report or the rulemaking record, rendering the proposed CX arbitrary, capricious, and not in accordance with law. 5 U.S.C. § 706(2)(A).

3. Programmatic analysis is required to assess the cumulative effects of salvage logging.

BLM does not have a programmatic NEPA document that takes a hard look at the cumulative effects of its salvage logging program. BLM therefore has no NEPA analysis it can tier to. Such an analysis is needed to address potentially significant effects on complex early seral habitat, wildlife associated with snags and dead wood, acceleration of carbon emissions and climate effects, soil and water quality impacts, increased fire hazard caused by moving fine fuels to the ground and creating dense young conifer plantations that represent hazardous fuel conditions and remove early seral wildlife habitat.

4. The effects of post-fire logging specifically are significant.

Snags are not just useful for wildlife but for a wide variety of ecosystem services such as slope stability, erosion control, snowpack stabilization, favorable sites for germination and establishment of diverse plants, capture/store/release of water/nutrients/thermal energy/carbon/etc. Salvage logging is likely to cause significant effects by sacrificing these ecological functions when wood is removed from the forest.

Current RMP direction for protecting and providing snags and down wood tends to be focused on a small subset of the full spectrum of values provided by dead wood and does not ensure the continued operation of these ecosystem functions or meet the complete lifecycle needs of the many species associated with this unique and valuable habitat component. Careful NEPA analysis is needed to allow decision-makers to weight and consider all the many values of snags and down wood.

The BLM's proposed CX for post disturbance salvage logging does not comport with best available science as post fire logging would remove the majority of these important biological legacies.[37] Because the BLM failed to provide this information in the Verification Report, we quote here at length from Rose et al.[38] to more fully complete the administrative

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[36] *See generally*, Jonathan R. Thompson, Thomas A. Spies, and Lisa M. Ganio. 2007. *Reburn severity in managed and unmanaged vegetation in a large wildfire*. Proceedings of the National Academy of Sciences. PNAS published online Jun 11, 2007, available at http://www.fs.fed.us/pnw/pubs/journals/pnw_2007_thompson001.pdf; Olsen, Christine S.; Shindler, Bruce A. 2007. *Citizen-agency interactions in planning and decision making after large wildfires*. Gen. Tech. Rep. PNWGTR-715. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 37 p., available at http://www.fs.fed.us/pnw/pubs/pnw_gtr715.pdf.

[37] Rose at al. 2001. *Decaying Wood in Pacific Northwest Forests: Concepts and Tools for Habitat Management*, Chapter 24 in *Wildlife-Habitat Relationships in Oregon and Washington* (Johnson, D. H. and T. A. O'Neil. OSU Press. 2001), available at http://web.archive.org/web/20060708035905/http://www.nwhi.org/inc/data/GISdata/docs/chapter24.pdf.

[38] *Id.* (internal citations omitted).

record, and specifically request that the agency respond to this scientific literature in its final rule:

> Decaying wood has become a major conservation issue in managed forest ecosystems. Of particular interest to wildlife scientists, foresters, and managers are the roles of wood decay in the diversity and distribution of native fauna, and ecosystem processes. Numerous wildlife functions are attributed to decaying wood as a source of food, nutrients, and cover for organisms at numerous trophic levels.
>
> Principles of long- term productivity and sustainable forestry include decaying wood as a key feature of productive and resilient ecosystems. In addition to a growing appreciation of the aesthetic, spiritual, and recreational values of forests, society increasingly recognizes ecosystem services of forests as resource capital with tangible economic value to humans, such as air and water quality, flood control, and climate modification.
>
> The ecological importance of decaying wood is especially evident in coniferous forests of the Pacific Northwest. In this region, the abundance of large decaying wood is a defining feature of forest ecosystems, and a key factor in ecosystem diversity and productivity.… Large accumulations of decaying wood provide wildlife habitat and influence basic ecosystem processes such as soil development and productivity, nutrient immobilization and mineralization, and nitrogen fixation.…
>
> Since the publication of Thomas et al. and Brown, new research has indicated that more snags and large down wood are needed to provide for the needs of fish, wildlife, and other ecosystem functions than was previously recommended by forest management guidelines in Washington and Oregon. For example, the density of cavity trees selected and used by cavity-nesters is higher than provided for in current management guidelines....
>
> Recent significant advancements have defined wildlife species-specific relationships with particular characteristics and components of decaying trees, both standing and fallen, and implications for management.…Hollow trees larger than 20 inches (51 cm) in diameter at breast height (dbh) are the most valuable for denning, shelter, roosting, and hunting by a wide range of animals....In the Interior Columbia Basin, grand fir and western larch form the best hollow trees for wildlife uses.…
>
> Recent studies have provided valuable insight on wildlife uses of snags (dead trees). Snags provide essential habitat features for many wildlife species (Figure 6). The abundance of cavity-using species is directly related to the presence or absence of suitable cavity trees. Habitat suitability for cavity-users is influenced by the size (diameter and height), abundance, density, distribution, species, and decay characteristics of snags. In addition, the structural condition of surrounding vegetation determines foraging opportunities.
>
> The Habitat Elements matrix on the CD-ROM with this book lists a total of 96 wildlife species associated with snags in forest (93 species) or grassland /shrubland (47 species) environments. Most of these species use snags in both environments. In forests, this includes 4 amphibian, 63 bird, and 26 mammal species. Additionally, 51 wildlife species are associated with tree cavities, 45 with dead parts of live trees, 33 with remnant or legacy trees (which may have dead parts), 28 with hollow living

trees, 21 with bark crevices, and 18 with trees having mistletoe or witch's brooms. Habitat uses include nesting, roosting, preening, foraging, perching, courtship, drumming, and hibernating (Figure 7).

Of the 93 wildlife species associated with snags in forest environments, 21 are associated with hard snags (Stages 1 and 2), 20 with moderately decayed snags (Stage 3), and 6 with soft snags (Stages 4-5) in the five-stage classification system. According to the matrixes,188 most snag-using wildlife species are associated with snags >14.2 inches (36 cm) diameter at breast height (dbh), and about a third of these species use snags >29.1 inches (74 cm) dbh.

This query of the Habitat Elements matrix illustrates the breadth of updated information about wildlife and snag habitat relations. Research results have expanded the number and variety of decaying wood categories over what was previously presented in Thomas and Brown....Down Woody Material (logs). Down wood affords a diversity of habitat functions for wildlife, including foraging sites, hiding and thermal cover, denning, nesting, travel corridors, and vantage points for predator avoidance. Larger down wood (diameter and length) generally has more potential uses as wildlife habitat. Large diameter logs, especially hollow ones are used by vertebrates for hiding and denning structures....

Long term Productivity… Processes that sustain the long- term productivity of ecosystems have become the centerpiece of new directives in ecosystem management and sustainable forestry. Given the key role of decaying wood in long-term productivity of forest ecosystems in the Pacific Northwest, the topic should remain of keen interest to scientists and managers during the coming decade.…functions of decaying wood directly linked to long-term productivity, include[e] influences on the frequency and severity of disturbances such as fire, disease, and insect outbreaks....

Nutrient Cycling and Soil Fertility. Decaying wood has been likened to a savings account for nutrients and organic matter, and has also been described as a short-term sink, but a long-term source of nutrients in forest ecosystems.…Substantial amounts of nitrogen are returned to the soil from coarse wood inputs, yet even where annual rates of wood input are high, 4 to 15 times more nitrogen is returned to the forest floor from foliage than from large wood.…The low nutrient content in wood, small mass of tree boles relative to foliar litterfall, and slow rates of wood decay suggest that large wood plays a minor role in forest nutrition. After large scale disturbance such as fire and blowdown, however, the large nutrient pool stored in woody structures of trees (bole, branches, twigs, roots) becomes available to the regrowing forest. Large down wood may thus be an ample source of nutrients throughout secondary succession....

Recent studies indicate that wood may release nutrients more rapidly than previously thought through a variety of decay mechanisms mediated by means other than microbial decomposers, i.e. fungal sporocarps, mycorrhizae and roots, leaching, fragmentation, and insects.…Soil is the foundation of the forest ecosystem.… On the H. J. Andrews Experimental Forest of western Oregon, 20-30% of the soil volume consists of decaying wood dispersed throughout a matrix of litter and duff. Because wood is a relatively inert substance, it may help to stabilize pools of organic matter in forests by slowing soil processes and buffering against rapid changes in soil chemistry….Numerous studies have demonstrated that losses in soil productivity often are closely linked to losses in soil organic matter....

Mass Wasting and Surface Erosion. ...Large wood helps to anchor snowpacks, limit the extent of snow avalanches, and may even stabilize debris flows, depending on the depth of the unstable area.…By covering soil surfaces and dissipating energy in flowing and splashing water, logs and other forms of coarse wood significantly reduce erosion. Large trees lying along contours reduce erosion by forming a barrier to creeping and raveling soils, especially on steep terrain. Material deposited on the upslope side of fallen logs absorbs moisture and creates favorable substrates for plants that stabilize soil and reduce runoff.

Stand Regeneration and Ecosystem Succession. Decomposing wood serves as a superior seed bed for some plants because of accumulated nutrients and water, accelerated soil development, reduced erosion, and lower competition from mosses and herbs. In the Pacific Northwest, decaying wood influences forest succession by serving as nursery sites for shade-tolerant species such as western hemlock, the climax species in moist Douglas- fir habitat. Wood that covers the forest floor also modifies plant establishment by inhibiting plant growth, and by altering physical, microclimatic, and biological properties of the underlying soil. For example, elevated levels of nitrogen fixation in *Ceanothus velutinus* and red alder have been reported under old logs....

Streams and Riparian Forests. Long-term productivity in streams and riparian areas is closely linked to nutrient inputs, to attributes of channel morphology, and to flow dynamics created by decaying wood...Large wood is the principal factor determining the productivity of aquatic habitats in low- and mid-order forested streams. Large wood stabilizes small streams by dissipating energy, protecting streambanks, regulating the distribution and temporal stability of fast-water erosional areas and slow-water depositional sites, shaping channel morphology by routing sediment and water, and by providing substrate for biological activity. The influence of large wood on energy dissipation in streams influences virtually all aspects of ecological processes in aquatic environments, and is responsible for much of the habitat diversity in stream and riparian ecosystems.

Key Ecological Functions of Wildlife Species Associated With Decaying Wood…Various symbiotic relations can be described for the 96 snag-associated species. Sixteen species are primary cavity excavators and 35 are secondary cavity users; 8 are primary burrow excavators and 11 are secondary burrow users; 5 are primary terrestrial runway excavators and 6 are secondary runway users. Nine snag-associated species create nesting or denning structures and 8 use created structures. Sixteen species might influence vertebrate population dynamics and 22 might influence invertebrate population dynamics. Snag-associated species also contribute to dispersal of other organisms including seeds and fruits (21 snag-associated wildlife species perform this function), invertebrates (8 species), plants (8 species), fungi (2 species), and lichens (1 species). Six snag-associated species can improve soil structure and aeration through digging, 2 species fragment standing wood, and 2 species fragment down wood. One snag-associated species creates snags, and at least 1 can alter vegetation structure and succession through herbivory...both snag- and down wood-associated wildlife more or less equally participate in dispersal of seeds and fruits (although the particular species they disperse may differ); however, snag-associated wildlife play a greater role in dispersal of invertebrates and plants, and down wood-associated wildlife play a greater role in dispersal of fungi and lichens.

Down wood-associated species might contribute more to improving soil structure and aeration through digging, and to fragmenting wood. This is one example of the far greater differentiating power afforded by a well-constructed set of matrixes than was previously available in Thomas and Brown.…

Fire Suppression. In the eastern Cascades and through much of the intermountain area, extensive forest insect and disease problems have resulted from decades of fire suppression in combination with selective harvesting of pines. An analysis of landscape dynamics in the Interior Columbia River Basin revealed that fire suppression resulted in a decreased abundance of large- diameter trees, and caused fuel accumulations that predisposed forests to stand-replacement fires**.** As mentioned previously, more intense fires not only consume more wood, but can inhibit wood decay by reducing nitrogen availability (and other elements) through volatilization and leaching, especially for wood in close association with the soil. Wood decay in post- fire regenerating forests also may be exacerbated by a decline in symbiotic nitrogen-fixing plant species in stands subject to prolonged fire suppression.…

Management Considerations Management Ramifications of Snag and Down Wood Abundance…The apparent dearth of large snags in Ponderosa pine may mean lower suitability for the 54 wildlife species associated with large snags (20+ in or 51+ cm dbh) in that wildlife habitat. Intensive forest management activities that have decreased the density of large snags in early forest successional stages (sapling/pole and small tree stages) may have had adverse impacts on the 61 associated wildlife species (Figure 12). Similarly, the lesser amount of large down wood in early forest successional stages may not provide as well for the 24 associated wildlife species. Such results suggest the continuing need for specific management guidelines to provide large standing and down dead wood in all successional stages.…

Depletion of Large Wood. The loss of large wood structures has numerous potential impacts on ecological functions of forests, although available information is inadequate for a definitive assessment. The lack of large logs on steep slopes can decrease water percolation into soil, impair slope stability, accelerate soil erosion and sediment input to streams, and increase nutrient losses in litter. Some data support a linkage between intensive management (especially depletion of decaying wood) and reduced forest biomass productivity, particularly on less productive sites. Lower productivity is attributed to nutrient losses from managed forests, reduced nutrient availability in older stands, and decreased nutrient storage, particularly in the soil. Depletion of soil organic matter has been cited as a primary factor contributing to declining forest productivity and biodiversity in the Pacific Northwest and elsewhere.…

Riparian Forests.…Far-reaching effects of the absence of large wood structures in streams include: 1) simplification of channel morphology, 2) increased bank erosion, 3) increased sediment export and decreased nutrient retention, 4) loss of habitats associated with diversity in cover, hydrologic patterns, and sediment retention. In coastal environments and estuaries, the loss of large wood may disrupt trophic webs and alter coastal sediment dynamics.…

Lessons Learned During the Last Fifteen Years…Several major lessons have been learned in the period 1979-1999 that have tested critical assumptions of these earlier management advisory models:

- Calculations of numbers of snags required by woodpeckers based on assessing their biological potential. (that is, summing numbers of snags used per pair, accounting for unused snags, and extrapolating snag numbers based on population density) is a flawed technique. Empirical studies are suggesting that snag numbers in areas used and selected by some wildlife species are far higher than those calculated by this technique.
- Setting a goal of 40% of habitat capability for primary excavators, mainly woodpeckers, is likely to be insufficient for maintaining viable populations.

- Numbers and sizes (dbh) of snags used and selected by secondary cavity-nesters often exceed those of primary cavity excavators.

- Clumping of snags and down wood may be a natural pattern, and clumps may be selected by some species, so that providing only even distributions may be insufficient to meet all species needs.

- Other forms of decaying wood, including hollow trees, natural tree cavities, peeling bark, and dead parts of live trees, as well as fungi and mistletoe associated with wood decay, all provide resources for wildlife, and should be considered along with snags and down wood in management guidelines.

- The ecological roles played by wildlife associated with decaying wood extend well beyond those structures per se, and can be significant factors influencing community diversity and ecosystem processes.

We have also learned that managing forests with decay processes should be done as part of a broader management approach to stand development, with attention paid to retaining legacies of large trees and decaying wood from original or prior stands. Further lessons have been learned in the area of technical and operational developments; some of these are discussed below.…Studies suggest that wood habitat structures function best for wildlife when they are broadly distributed as well as occurring in locally- dense clumps, such as with scattered snag or down wood patches…

Management Tools and Opportunities…In young stands, recommends that management should:

1. Aggressively create stands of mixed composition to maintain habitat for a broad array of species (and to achieve diversity in quality and timing of nutrient inputs to streams).

2. Delay the process of early canopy closure (wide spacings, pre-commercial thinning etc.).

3. Provide for adequate amounts and a continuous supply of large wood, including snags and down logs, for maintaining structural diversity in forests and streams and maintaining all other ecosystem processes associated with wood.

The basic theme of these revisions of intensive forestry practices is to retain the higher levels of complexity found in natural forests, and in so doing, to protect processes and structures that retain future options for ecosystem management.… Retention of snags provides numerous habitat benefits. However, safety and liability issues associated with snag retention have posed an operational barrier to management objectives for structural retention. Two approaches useful in reducing hazards associated with snags are: 1) to cluster snags in patches rather than wide dispersal, and 2) to create snags from green trees after cutting...Managers must also consider the temporal dimension to decaying wood, to ensure that sufficient snag and down wood densities are provided through time....

Live (Green) Tree Retention. Retention of living trees on cutover areas is one form of structural retention that can provide for future recruitment of snags and down wood…Green trees function as a refugium of biodiversity in forests. For example, many species of invertebrate fauna in soil, stem, and canopy habitats of old-growth forests do not disperse well, and thus, do not readily recolonize clear-cut areas. The same concept holds for many mycorrhizae-forming fungal species. Added benefits of green tree retention include moderated microclimates of the cutover area, which may increase seedling survival, reduce additional losses of biodiversity on stressed sites, and facilitate movement of organisms through cutover patches of the landscape. Green trees retained across harvest cycles can also be used to grow very large trees for either ecologic or economic goals.…

Green tree retention offers many benefits to wildlife. For example, the higher structural diversity in young stands that contain legacy trees from previous stands provides much improved habitat values to late successional species such as the northern spotted owl, as well as other vertebrates that use late-successional stands for some elements of their life history. Such stands may provide wildlife habitat as early as age 70-80 years rather than 200-300 years, the approximate time interval required for old-growth conditions to develop after secondary succession.…

Summary of Management Recommendations. The information presented in this chapter emphasizes several properties of decaying wood in forest ecosystems: (1) each structure formed by decaying wood helps support a different functional web in the ecosystem; (2) no one decaying wood structure supports all functions equally; and (3) all decaying wood habitats together support the widest array of ecological functions and associated wildlife species...Lessons for managers [include]…

- **Emphasize retention of wood legacies, and secondarily promote restoration where legacies are deficient to meet stated objectives.** The decline of species associated with late-successional forest structures, as well as the prolonged time needed to produce wood legacies, suggests that it is both ecologically and economically advantageous to retain legacy structures across harvest cycles wherever possible, rather than attempt to restore structures that have been depleted. This is especially obvious for slow-growing tree species and very large wood structures...

- **Operational Considerations**… OSHA revised the federal Logging Standard (29 CFR 1910.266) in 1995, to clarify its intent that danger trees may be avoided, rather than being removed or felled. A danger tree is any standing tree (live or dead) that poses a hazard to workers, from unstable conditions such as deterioration, damage, or lean. The revised rule allows some discretion

> in determining the hazard area around a danger tree, by....allowing work to commence within two tree lengths of a marked danger tree, provided that the employer demonstrates that a shorter distance will not create a hazard for an employee..(OSHA Logging Preamble, Section V). Determining a safe working distance requires a case-by-case....evaluation of various factors such as, but not limited to, the size of the danger tree, how secure it is, its condition, the slope of the work area, and the presence of other employees in the area...Concerns frequently arise where high public use creates a risk of third party liability. Considerations include the proximity of reserve trees to roads, trails, campgrounds, ski areas, and other recreation areas and public access points. Methods for addressing these concerns include signage and clear delineation of potential hazard areas, fencing and other barriers to discourage public access, snag height reduction and use of setbacks to minimize exposure.

The forgoing information comes from a single publication addressing only a single topic (the ecological value of dead wood) relevant to BLM's rulemaking; and yet the BLM neither disclosed to the public nor discussed any of this information that is directly relevant to the ecological impact of its proposed salvage CX. The proposed CX is therefore arbitrary and capricious. 5 U.S.C. § 706(2)(A).

5. Effects to wildlife.

a. Salvage logging will result in loss of complex early seral habitat.

The agency must prepare a programmatic EIS to consider the effect of salvage logging on young complex forests and the development of complex older forest. The BLM should not conduct any more salvage logging until the agency has fully disclosed and considered current scientific understandings about the role of fire and other disturbances in forest development.

Salvage logging and replanting will convert a structurally complex landscape into a simplified and biologically depraved landscape. Unsalvaged, naturally regenerated, young stands are one of the rarest forest types in the Pacific northwest, and their biodiversity rivals that of old-growth forests.[39] In October 2013, 250 scientists signed a letter urging greater attention to the conservation of complex early seral forests and natural recovery after fire. These scientists conclude that the

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[39] Lindenmayer, David B. and Jerry F. Franklin. 2002. *Conserving Forest Biodiversity: A Comprehensive Multiscale Approach*. Island Press. Washington, DC: 69 ("Indeed, naturally developed early-successional forest habitats, with their rich array of snags and logs and nonarborescent vegetation, are probably the scarcest habitat in the current regional [Pacific Northwest] landscape"); see also, DellaSala, D.A., J.E. Williams, C. Deacon-Williams, and J.F. Franklin. *Beyond smoke and mirrors: a synthesis of fire policy and science*. Conservation Biology, Pages 976–986. Volume 18, No. 4, August 2004; available at http://ir.library.-oregonstate.edu/xmlui/bitstream/handle/1957/17521/Beyond%20smoke%20and%20mirrors.pdf; Janet Ohmann; Science Findings, Issue 56; *Seeing the trees for the forest: mapping vegetation biodiversity in coastal Oregon forests*; (September 2003) ("There has been a loss of diverse young forests on all ownerships...Conservation of diverse young forests has received little attention in forest policy"), available at http://www.fs.fed.us/pnw/sciencef-/scifi56.pdf.

> Current state of scientific knowledge, … indicates that [salvage logging] would seriously undermine the ecological integrity of forest ecosystems on federal lands. … This post-fire habitat, known as 'complex early seral forest,' is quite simply some of the best wildlife habitat in forests and is an essential stage of natural forest processes. Moreover, it is the least protected of all forest habitat types and is often as rare, or rarer, than old-growth forest, due to damaging forest practices encouraged by post-fire logging policies. While there remains much to be discovered about fire in our forests, the scientific evidence indicates that complex early seral forest is a natural part of historical fire regimes in nearly every conifer forest type in the western U.S. (including ponderosa pine and mixed-conifer forests) … Numerous studies also document the cumulative impacts of post-fire logging on natural ecosystems, including the elimination of bird species that are most dependent on such conditions, compaction of soils, elimination of biological legacies (snags and downed logs) that are essential in supporting new forest growth, spread of invasive species, accumulation of logging slash that can add to future fire risks, increased mortality of conifer seedlings and other important re-establishing vegetation (from logs dragged uphill in logging operations), and increased chronic sedimentation in streams due to the extensive road network and runoff from logging operations.[40]

The agency must prepare a programmatic EIS to comprehensively disclose and consider at least the following issues:

- The natural range of variability and existing rarity of complex young forests (e.g., young forests that are unsalvaged after disturbances). Since large snags are outside the natural range of variability across the landscape, the agency must retain all large snags to start moving the landscape toward the natural range of variability, or the agency must carefully justify in the NEPA analysis every large snag it proposes to remove.[41]

- The ecological values (such as wildlife habitat) associated with snags, dead wood, and complex young forests.[42]

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[40] Della Sala, D. et al (2013) Open Letter to Members of Congress from 250 Scientists Concerned about Post-fire Logging. October 30, 2013, available at http://geosinstitute.org/-images/stories/pdfs/Publications/Fire/Scientist_Letter_Postfire_2013.pdf.

[41] *See*, Jerome J. Korol, Miles A. Hemstrom, Wendel J. Hann, and Rebecca A. Gravenmier. *Snags and Down Wood in the Interior Columbia Basin Ecosystem Management Project*. PNW-GTR-181, available at http://www.fs.fed.us/psw/publications/documents/gtr-181/049_Korol.pdf. This paper estimates that even if we apply enlightened forest management on federal lands for the next 100 years, we will still reach only 75% of the historic large snag abundance measured across the interior Columbia Basin, and most of the increase in large snags will occur in roadless and wilderness areas. *See also*, Dominick A. DellaSala 2006. *Post-Fire Logging Summary of Key Studies and Findings*, World Wildlife Fund, February 2006, available at ftp://frap.cdf.ca.gov/pub/incoming/IMMP/Post%20Fire%-20Salvage%20Logging%20Papers/Post%20Fire%20Logging%20Review%202006.pdf.

[42] *See*, Rose et al., 2001; *see also* USDA PNW Research Station. Science Findings #56 - *Seeing The Trees For The Forest: Mapping Vegetation Biodiversity In Coastal Oregon Forests*. Sept 2003, available at http://www.fs.fed.us/pnw/sciencef/scifi56.pdf ("[T]here's a looming shortage of diverse young forests - where seedlings intermingle with fallen logs, standing dead snags, and shrubs - that provide specialized habitat for certain animals and

- Given the regional deficit of young complex forests and the fact that many species, such as woodpeckers and secondary cavity users, appear to be adapted to exploit the structure and resources available within disturbed forests, the agencies should comprehensively consider and disclose the direct and indirect effects of salvage logging on species associated with young complex forests.[43]

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plants. … there's a looming gap in diverse, young, early-successional conifer forest, the type of forest that once came in naturally after forest fires. These young forests, up to 10 years old, have a diversity of forest structures - fallen logs and dead snags - and a diversity of plant life. They are important habitat for the western bluebird and other birds that prefer open areas, as well as some shrub species. Today, because of intense timber management on private lands, young forests don't get the chance to develop much diversity); Ohmann, Spies, Gregory, Johnson. 2002. *Vegetation Biodiversity in the Oregon Coast Range*, available at http://www.fsl.orst.edu/clams/download/presentations/j02s_ohmann_10june02.pdf (slide 24) ("Diverse young forests: also rare but receiving less attention. Legacy tree habitat: uncertain future.."); Swanson et al. 2010. *The forgotten stage of forest succession: early-successional ecosystems on forest sites*. Front Ecol Environ 2010; doi:10.1890/090157; Carol Chambers and Erin Saunders. *Bats in the Burns - Studying the impact of wildfires and climate change*. Bat Conservation International. Winter 2013, Volume 3, No. 4, available at http://www.batcon.org/index.php/media-and-info/batsarchives.html?task=viewArticle&-magArticleID=1154; *Blown-Down Forests, a Story of Survival To preserve forest health, the best management decision may be to do nothing*, available at http://www.nsf.gov/news/news_summ.jsp?cntn_id=125744; Audrey Barker Plotkin, David Foster, Joel Carlson, and Alison Magill 2013. *Survivors, not invaders, control forest development following simulated hurricane*. Ecology, 94(2), 2013, pp. 414–423, available at http://harvardforest.fas.harvard.edu/sites/harvardforest.fas.harvard.edu/files/publications/pdfs/BarkerPlotkin_Ecology_2013.pdf; Betts et al. 2010. *Thresholds in forest bird occurrence as a function of the amount of early-seral broadleaf forest at landscape scales*. Ecological Applications, 20(8), 2010, pp. 2116–2130, available at http://www.fsl.orst.edu/flel/pdfs-/Betts%20et%20al%202010%20Ecol%20Apps.pdf.

[43] Hutto, R.L., 2006. *Toward Meaningful Snag-Management Guidelines for Postfire Salvage Logging in North American Conifer Forests*. Conservation Biology Volume 20, No. 4, 984–993, available at http://web.archive.org/web/20090310114517/http://avianscience.-dbs.umt.edu/documents/hutto_conbio_2006.pdf ("Species such as the Black-backed Woodpecker (Picoides arcticus) are nearly restricted in their habitat distribution to severely burned forests. Moreover, existing postfire salvage-logging studies reveal that most postfire specialist species are completely absent from burned forests that have been (even partially) salvage logged. I call for the long-overdue development and use of more meaningful snag-retention guidelines for postfire specialists, and I note that the biology of the most fire-dependent bird species suggests that even a cursory attempt to meet their snag needs would preclude postfire salvage logging in those severely burned conifer forests wherein the maintenance of biological diversity is deemed important"); CFER 2007. *Response of Birds to Fire Mosaics*. CFER News. Winter 2007, available at http://www.fsl.orst.edu/cfer/pdfs/-Vol7_1.pdf; DellaSala, Hanson et al (2015) Open Letter to U.S. Senators and President Obama from Scientists Concerned about Post-fire Logging and Clearcutting on National Forests, available at http://www.geosinstitute.org/images/stories/pdfs/Publications/Fire/-SciLetterOpposingPostfireLoggingBillsSept2015.pdf (explaining that "numerous scientific studies tell us that even in the patches where forest fires burn most intensely, the resulting wildlife habitats are among the most ecologically diverse on western forestlands and are

- The effects of salvage logging on the development of complex forest habitat; "The early post-disturbance period of forest ecosystem development - pre-tree-canopy closure - is profoundly important!" because it is heterogeneous, light-energy rich, structure rich, biodiversity rich, and process rich. Removal of legacies is most profound long-term impact because of the importance of coarse wood as habitat for species, organic seedbeds (nurse logs), modification of microclimate, protection of plants from ungulates, sediment traps, sources of energy and nutrients, sites of N-fixation, special source of soil organic matter, and structural elements of aquatic ecosystems.[44]

- Scientific literature related to salvage logging and dead wood.[45]

Without a programmatic environmental analysis of these issues, the BLM cannot demonstrate that its proposed salvage CX will not have any significant direct, indirect, or cumulative effects.

b. Pollinators and nitrogen fixation.

Salvage logging adversely affects important ecosystem services such as soil fertility and pollination services.[46] The BLM did not address or consider these issues in developing the proposed CX.

c. Dead wood and snag-associated wildlife.

As discussed supra, salvage logging by definition removes dead wood from the landscape. But this action is likely to have significant adverse effects on snag-associated wildlife

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essential to support the full richness of forest biodiversity...Post-fire conditions also serve as a refuge for rare and imperiled wildlife species that depend upon the unique habitat features created by intense fire. These include an abundance of standing dead trees, or "snags," which provide nesting and foraging habitat for woodpeckers and many other plant and wildlife species responsible for the rejuvenation of a forest after fire...This post-fire renewal, known as "complex early seral forest," or "snag forest," is quite simply some of the best wildlife habitat in forests, and is an essential stage of natural processes that eventually become old-growth forests over time. This unique habitat is not mimicked by clearcutting, as the legislation incorrectly suggests. Moreover, it is the least protected of all forest habitat types, and is often as rare, or rarer, than old-growth forest").

[44] Jerry Franklin, *What is a 'Good' Forest Opening?* available at http://courses.washington.-edu/esrm315/Lectures/FranklinEarlySuccession.pdf.

[45] *See* Beschta R.L., J.J. Rhodes, J.B. Kauffman, R.E. Gresswell, G.W. Minshall, J.R. Karr, D.A. Perry, F.R. Hauer, and C.A.Frissell, 2004. *Postfire management on forested public lands of the western USA*. Cons. Bio., available at http://pacificrivers.org/files/post-fire-management-and-sound-science/Beschta-etal2004.pdf; *see also,* Rose et al..

[46] DellaSala, Hanson et al (2015) Open Letter to U.S. Senators and President Obama from Scientists Concerned about Post-fire Logging and Clearcutting on National Forests, available at http://www.geosinstitute.org/images/stories/pdfs/Publications/Fire/SciLetterOpposing-PostfireLoggingBillsSept2015.pdf ("The post-fire environment is rich in patches of native flowering shrubs that replenish soil nitrogen and attract a diverse bounty of beneficial insects that aid in pollination after fire").

species.[47] In a dynamic ecosystem life may be fleeting but the snags and logs that survive disturbance provide very critical temporal links from one stand to the next. Under natural conditions, a forest hands down a large legacy of living and dead material from one stand to another even after an intense disturbance. Even non-stand-replacing disturbance creates pulses of dead material that are critical for forest ecosystems.[48]

Salvage logging can be expected to reduce avian and terrestrial species diversity which affects plant and invertebrate diversity. Since different wildlife help disperse different sets of seeds and invertebrates, reduced wildlife diversity can significantly affect pace of recovery and the diversity of the regenerating forest. Snag-associated wildlife play a greater role in dispersal of invertebrates and plants, while down-wood-associated wildlife play a greater role

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[47] Oregon Forest Resources Institute 2011. *Oregon' Forest Protection Laws – An Illustrated Manual*, Revised Second Edition, available at http://www.forestresourceinstitute.com-/images/or_for_protect_laws_2011.pdf ("Snags provide homes to owls, woodpeckers, bats, squirrels, bluebirds, wood ducks, swallows, mergansers, weasels, raccoons and many other animals. More than 50 species of birds and mammals use snags for nesting, feeding and shelter. A lack of snag cavities for nesting can limit populations of some bird species. Snags larger than 20 inches DBH are in short supply on private lands. Snags can be created from live trees, and wildlife respond quickly to their availability. You can reduce the cost of leaving snags by selecting rotting or deformed trees. In eastern Oregon, down logs are used by 150 species of wildlife, including amphibians, reptiles, birds and mammals. Logs are also important to certain insects, fungi and plants. … [A] forest without down logs may have fewer species of plants and animals"); USDA Forest Service, *Animal Inn*, available at http://web.archive.org/web/20021122150003/http://www.fs.fed.us/r6/nr/wildlife/animalinn/basicneed.htm; Franklin, J.F., Lindenmayer, D., MacMahon, J.A., McKee, A., Magnuson, J., Perry, D.A., Waide, R., and Foster, D. 2000. *Threads of Continuity*. Conservation Biology in Practice. [Malden, MA] Blackwell Science, Inc. 1(1) pp 9-16; William F. Laudenslayer, Jr., Patrick J. Shea, Bradley E. Valentine, C. Phillip Weatherspoon, and Thomas E. Lisle Technical Coordinators. *Proceedings of the Symposium on the Ecology and Management of Dead Wood in Western Forests.* PSW-GTR-181, available at http://www.fs.fed.us/psw/-publications/documents/gtr-181/; Lofroth, Eric. 1998. *The dead wood cycle*. In: *Conservation biology principles for forested landscapes*. Edited by J. Voller and S. Harrison. UBC Press, Vancouver, B.C. pp. 185-214. 243 p., available at http://www.for.gov.bc.ca/hre/deadwood/-DTrol.htm; Rose et al. (2001). *Decaying Wood in Pacific Northwest Forests: Concepts and Tools for Habitat Management*, Chapter 24 *in Wildlife-Habitat Relationships in Oregon and Washington* (Johnson, D. H. and T. A. O'Neil. OSU Press. 2001), available at http://www.fs.fed.us/wildecology/decaid/decaid_background/chapter24cwb.pdf; Stevens, Victoria. 1997. *The ecological role of coarse woody debris: an overview of the ecological importance of CWD in B.C. forests*. Res. Br., B.C. Min. For., Victoria, B.C. Work. Pap. 30/1997, available at http://www.for.gov.bc.ca/hfd/pubs/docs/Wp/Wp30.pdf; Hagar, Joan, 2007, *Assessment and management of dead-wood habitat: USGS Administrative Report 20071054*, pp. 1-32, available at http://pubs.usgs.gov/of/2007/1054/pdf/ofr20071054.pdf; Bruce G. Marcot 2017. *Ecosystem Processes Related to Wood Decay*. PNW Research Note 576, available at https://www.fs.fed.us/pnw/pubs/pnw_rn576.pdf; Jennie Sandström et al. 2019. *Impacts of dead wood manipulation on the biodiversity of temperate and boreal forests. A systematic review*, Journal of Applied Ecology (2019). DOI: 10.1111/1365-2664.13395, available at https://besjournals.onlinelibrary.wiley.com/doi/pdf/10.1111/1365-2664.13395.

[48] *Id.*

in dispersal of fungi and lichens. Down wood-associated species might contribute more to improving soil structure and aeration through digging, and to fragmenting wood which increases surface area encouraging biological action that releases nutrients. Salvage logging will adversely affect all these ecological functions.

In September 2015, over 260 scientists sent a joint letter to Congress and the President highlighting the ecological value of post-fire landscapes, the significant adverse effects of salvage logging, and opposing bills that would encourage post-fire logging. They concluded that:

> … numerous scientific studies tell us that even in the patches where forest fires burn most intensely, the resulting wildlife habitats are among the most ecologically diverse on western forestlands and are essential to support the full richness of forest biodiversity.
>
> Post-fire conditions also serve as a refuge for rare and imperiled wildlife species that depend upon the unique habitat features created by intense fire. These include an abundance of standing dead trees, or "snags," which provide nesting and foraging habitat for woodpeckers and many other plant and wildlife species responsible for the rejuvenation of a forest after fire.
>
> The post-fire environment is rich in patches of native flowering shrubs that replenish soil nitrogen and attract a diverse bounty of beneficial insects that aid in pollination after fire.…
>
> This post-fire renewal, known as "complex early seral forest," or "snag forest," is quite simply some of the best wildlife habitat in forests, and is an essential stage of natural processes that eventually become old-growth forests over time. This unique habitat is not mimicked by clearcutting, as the legislation incorrectly suggests. Moreover, it is the least protected of all forest habitat types, and is often as rare, or rarer, than old-growth forest.…
>
> After a fire, the new forest is particularly vulnerable to logging disturbances that can set back the forest renewal process for decades. Post-fire logging has been shown to eliminate habitat for many bird species that depend on snags, compact soils, remove biological legacies (snags and downed logs) that are essential in supporting new forest growth, and spread invasive species that outcompete native vegetation and, in some cases, increase the flammability of the new forest.[49]

A review of 116 research articles, dating from 1960 to 2002, which examined bird-forestry relationships in managed forests across North America found that:

> …The response of birds to forestry practices has been mixed and highly species-specific, but in general, net change in community richness following timber harvest was negligible. Among silvicultural practices, uneven-aged management (e.g., selection harvest) appears to be the most favorable for birds. In contrast, snag removal

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[49] DellaSala, Hanson et al (2015) Open Letter to U.S. Senators and President Obama from Scientists Concerned about Post-fire Logging and Clearcutting on National Forests, available at http://www.geosinstitute.org/images/stories/pdfs/Publications/Fire/SciLetterOpposingPost-fireLoggingBillsSept2015.pdf.

> was highly deleterious, with >80 percent of studies reporting net species loss; net gain was never reported....
>
> …What seems to be particularly detrimental to forest avifauna is removal of snags. When prescriptions involved manipulation of snag densities, either by removing (Kilgore 1971, Scott 1979, Dingledine and Haufler 1983, Scott and Oldemeyer 1983, Schreiber and deCalesta 1992), retaining (Dickson et al. 1983, Zarnowitz and Manuwal 1985, Stribling et al. 1990, Schreiber and deCalesta 1992, Welsh et al. 1992), or creating (McPeek et al. 1987) snags, bird numbers were typically found to be positively correlated with snag density. Unlike even-aged and unevenaged management practices, removal of snags never resulted in more species increasing in abundance than decreasing. The importance of snags to birds is well known (Davis et al. 1983 and references therein, Bull et al. 1997, references above), not only to cavity nesters, but also songbirds (Sallabanks et al. 2002) that may use snags for nesting, perching, foraging, singing, and scanning for predators.
>
> … Since large remnant snags and "defective" residual green trees provide much of the snag habitat for cavity-nesters in early- to mid-successional stands, particularly on private lands (Ohmann et al. 1994), retention of these structures will be important for maintaining populations of cavity- and snag-using avian species in managed forests. Snag retention and/or creation were the most commonly listed management recommendations from studies included in our review. We concur that leaving snags wherever possible is another important way that foresters can improve or maintain avian habitat quality within managed forest landscapes.[50]

Commercial salvage almost always focuses on removing large trees which will disproportionately harm wildlife because: (1) larger snags tend to persist longer on the landscape and therefore provide their valuable ecosystem services longer than smaller snags, and then serve longer as down wood too, and (2) most snag-using wildlife species have a preference for large and very large snags.[51] This is corroborated by a study conducted in the Black Hills National Forest found that 1) Wildlife disproportionately forage on large diameter snags; 2) Cavity nesters disproportionately utilized large diameter snags for nesting; 3) Cavity nesters were less abundant (usually absent in this case) in managed forest because of the scarcity of large diameter snags; and 4) Logging and thinning has led to serious shortages of large diameter snags.[52]

The Oregon Wildlife Conservation Plan recommends maintaining and creating snags and down logs for a variety of at-risk "strategy" species, including: American marten, California myotis, Fringed myotis, long-legged myotis, Pallid bat, ringtail, silver-haired bat,

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[50] Rex Sallabanks and Edward B. Arnett. *Accommodating Birds in Managed Forests of North America: A Review of Bird-Forestry Relationships*. PSW-GTR-191, available at http://www.fs.fed.us/psw/publications/documents/psw_gtr191/Asilomar/pdfs/345-372.pdf.
[51] See *DecAID, the Decayed Wood Advisor for Managing Snags, Partially Dead Trees, and Down Wood for Biodiversity in Forests of Washington and Oregon*, available at http://web.archive.org/web/20030416095852/http://wwwnotes.fs.fed.us:81/pnw/DecAID/DecAID.nsf.
[52] D.J. Spiering, R.L. Knight. 2005. *Snag density and use by cavity-nesting birds in managed stands of the Black Hills National Forest*. Forest Ecology and Management 214 (2005) 40–52, available at http://www.sciencebuff.org/content/files/sciencestaff/spiering_knight_-2005.pdf (Note: "large" snags in this study were >48 cm, or 19" dbh).

Townsend's big-eared bat, three-toed woodpecker, black-backed woodpecker, flammulated owls, Lewis' woodpecker, spotted owl, Pileated woodpecker, western bluebird, western purple martin, white-headed woodpecker, clouded salamander, Oregon slender salamander, Chace sideband, evening fieldslug, Oregon shoulderband, and traveling sideband.[53] Similarly, scientific study of the effects of the Davis fire salvage showed that black-backed woodpecker, hairy woodpecker, western wood-pewee, brown creeper and yellow-rumped warbler were more common in unsalvaged stands.[54]

A 2017 meta-analysis of the effects of salvage logging on biodiversity found that

1. … Despite potential negative effects on biodiversity, salvage logging is often conducted, even in areas otherwise excluded from logging and reserved for nature conservation, inter alia because strategic priorities for post-disturbance management are widely lacking.

2. A review of the existing literature revealed that most studies investigating the effects of salvage logging on biodiversity have been conducted less than 5 years following natural disturbances, and focused on non-saproxylic organisms.

3. A meta-analysis across 24 species groups revealed that salvage logging significantly decreases numbers of species of eight taxonomic groups. Richness of dead wood dependent taxa (i.e. saproxylic organisms) decreased more strongly than richness of non-saproxylic taxa. In contrast, taxonomic groups typically associated with open habitats increased in the number of species after salvage logging.
4. By analysing 134 original species abundance matrices, we demonstrate that salvage logging significantly alters community composition in 7 of 17 species groups, particularly affecting saproxylic assemblages.

5. Synthesis and applications. Our results suggest that salvage logging is not consistent with the management objectives of protected areas. Substantial changes, such as the retention of dead wood in naturally disturbed forests, are needed to support biodiversity.[55]

Salvage logging lengthens the period that a forest remains inhospitable to wildlife.[56] Leaving a few snags behind does not adequately mitigate for the significant long-term loss of snags

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[53] The Oregon Conservation Plan. February 2006, available at http://www.dfw.state.or.us/-conservationstrategy/contents.asp.

[54] See Rebecca Cahall, *Influence of Salvage Logging on Forest Birds After Fire in the Eastern Cascades*. CFER News, Summer 2007, available at http://www.fsl.-orst.edu/cfer/pdfs/Vol7_2.pdfhttp://ir.library.oregonstate.edu/dspace/bitstream/1957/5898/1/Cahall_Thesis.pdf.

[55] Thorn, Bassler, et al 2017. *Impacts of salvage logging on biodiversity: A meta-analysis*. J Appl Ecol. 2018;55:279–289, available at https://www.researchgate.net/publication-/317045815_Impacts_of_salvage_logging_on_biodiversity_A_meta-analysis.

[56] Payer, D.C., and D.J. Harrison. 2000. *Structural differences between forests regenerating following spruce budworm defoliation and clear-cut harvesting: Implications for marten*. Canadian Journal of Forest Research 30(12): 196572. ("Summary: The authors looked at the use of clearcuts and areas where spruce budworm has caused mortality in relation to the American marten. When establishing new territories, martens avoid clearcuts but do not avoid stands with a history of extensive tree mortality caused by eastern spruce budworm.

caused by stand replacing disturbance and salvage logging. It may seem counterintuitive, but one of the most significant and lasting effects of stand replacing disturbance such as fire, wind, or regeneration logging is to bring the process of snag recruitment to a virtual standstill for many decades. Even if snags are not removed by the disturbance, snags created by the disturbance will fall down over time and few if any snags are created. After those snags fall down, the snag population remains low because the pool of green trees available for snag recruitment is greatly reduced. This results in a "snag gap" that has serious adverse consequences for habitat and many other ecological processes. The apparent abundance of large snags after a stand replacing disturbance masks a severe shortage of large snags down the road. Salvage logging will just make this snag gap worse, this is highly likely to cause significant effects on numerous wildlife that depend on abundant large snags.[57]

The agency must recognize the asymmetric nature of snag dynamics after all types of stand replacing disturbance. High rates of snag fall would be expected in the decades following

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Although live tree basal area was similar between stand types, the results showed that the vertical structure provided by large snags can offset the limited availability of live trees for the marten, particularly where coarse woody debris and understory vegetation are plentiful") available at http://www.umaine.edu/cfru/documents/payer.pdf.

[57] Dr. Jerry F. Franklin, Professor of Ecosystem Studies, College of Forest Resources, University of Washington. July 15, 2004. TESTIMONY FOR THE RECORD ON OVERSIGHT HEARING ON "RESTORING FORESTS AFTER CATASTROPHIC EVENTS" BY HOUSE COMMITTEE ON RESOURCES, SUBCOMMITTEE ON FOREST AND FOREST HEALTH, available at http://www.signaloflove.org/clearcutting/-reports/fire3/Franklin%20Jerry%20July%202004%20testimony.pdf ("It is sometimes argued that following a stand-replacement fire in an old-growth forest that snags and logs are present in "excess" of the needs of the site, in terms of ecosystem recovery. In fact, the large pulse of dead wood created by the disturbance is the only significant input of woody debris that the site is going to get for the next 50 to 150 years—the ecosystem has to "live" off of this woody debris until the forest matures to the point where it has again produced the large trees that can become the source for new snags and logs (Maser et al. 1988)"); see also, Dr. jerry Franklin, Comments on the Klamath NF, Westside Fire Salvage DEIS. 6 April 2015 ("The massive input of large dead wood is characteristic and critical to stand development processes and the ultimate provision of habitat for late-successional species following stand replacement fires (Maser et al. , 1988; Franklin et al. 2002). As noted these wood structures may persist and play functional roles for several centuries, particularly in the case of decay resistant species. Large pines may also persist as snags for several decades and additional periods as logs on the forest floor. In fact, the entire recovering forest ecosystem will depend upon this pulse of CWD until it reaches a point in its development where the new stand begins to generate snags and logs of comparable size and heartwood content-generally between 100 and 200 years (Maser et al. 1988; Franklin et al., 2002). Consequently, basing snag and CWD retention following salvage on levels of these structures found in existing mature and old forests is not appropriate; all of this initial pulse of wood is needed to reach those levels one to two centuries from now! Indeed, the use of mature forests as a standard for CWD is particularly inappropriate since this is the period when CWD levels are at their lowest level during the entire natural developmental sequence from stand-replacement fire to old growth (see diagram in paper by Spies in Maser et al. 1988). It certainly does not appear to me that the approach taken in the DEIS reflects an appreciation of the fact that this one-time input of large and decay resistant CWO is all that the recovering forest ecosystem is going to get for the next 100 to 200 years").

disturbance, while low rates of snag recruitment would be expected in the decades following a disturbance. This unavoidably results in a serious deficit of snags at some point in the future. In order for the NEPA analysis to fully address the snag habitat issue it must look carefully at the snag gap from both ends. The snag gap begins when too many of the current snags are gone. So the snag gap is exacerbated on the front end by salvage logging which removes too many large snags. The snag gaps ends when the next stand grows to the point that it contains large trees and some of them die, so the snag gap is exacerbated on the back end if there is a significant delay in tree regeneration.

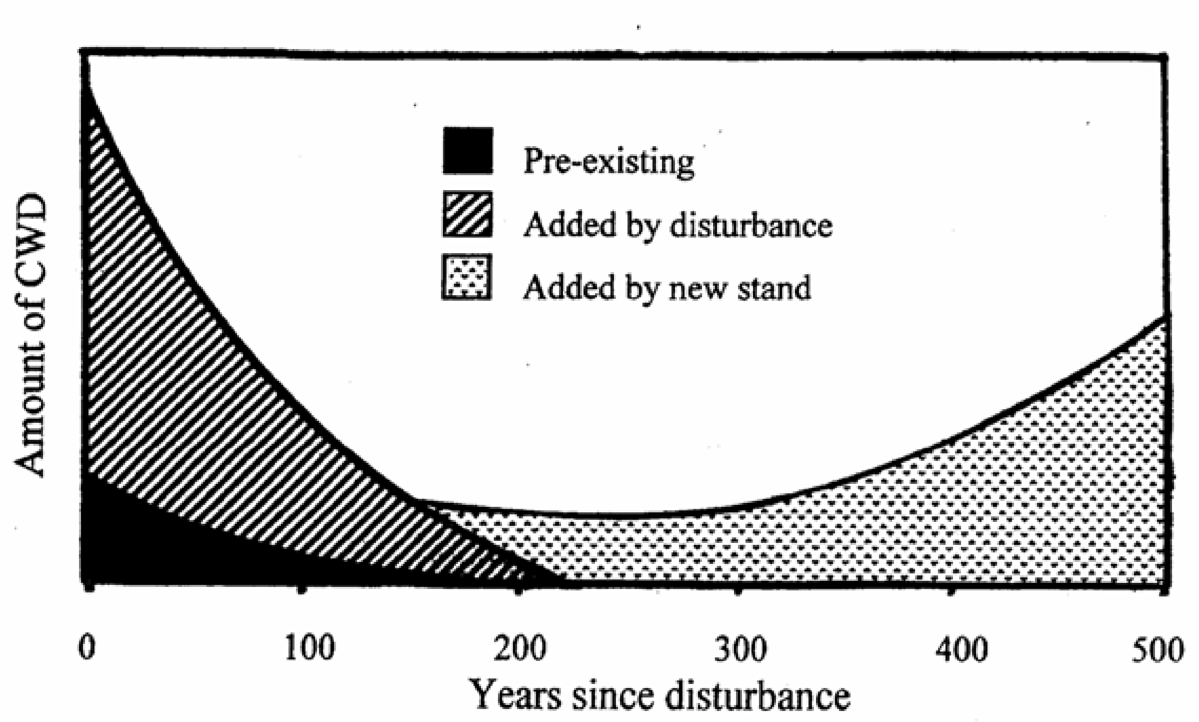
The agency has a tendency to focus on the back end of the snag gap which is allegedly mitigated by tree replanting, but this benefit is in the distant future and remains speculative. The agencies tend to ignore the effect of logging on the front end of the snag gap (which is concrete and unavoidable). Logging which retains only enough snags to meet snag requirements after harvest will not meet snag requirements in a few years after those few retained snags fall. Most BLM management plans require that snags be maintained through time, so the goal must be to manage snags to minimize the time period that there is a deficit of snags. The NEPA analysis must account for snag fall rates and figure out how to minimize the snag gap.[58]

There is a strong correlation between the size of the snags and the length of time it is likely to remain standing, so salvage must be designed to retain all the large snag and only remove trees from smaller size classes. Consider this example: Assume that the stands currently have 30 large trees/acre and 24 of those will be removed via salvage logging while 6 trees/acre will be retained for snag habitat. Further assume that in 50 years 2 percent of the large snags will remain standing as snag habitat. Two percent of 6 trees/acre is far less than 2 percent of 30 trees/acre, so there is a virtual statistical certainty that salvage logging will exacerbate the snag gap. The snag gap is really exacerbated by salvage logging in two ways — first by targeting removal of the large and most persistent component of the snag population, and second by accelerating the rate that remaining snags fall and are lost from the snag population.

This graphic shows the huge wedge of dead wood “added by disturbance” that is missing in stands subject to salvage and other forms of regen logging. Wildlife evolved with that pulse of wood available in a shifting mosaic across the landscape. That habitat is now largely missing as result of forest management practices on both public and private lands. Salvage logging will perpetuate this significant adverse effect on wildlife associated with snags and

[58] Models that may be used to analyze snag dynamics can be found here: https://web.archive.org/web/20120907194130/http://www.for.gov.bc.ca/hre/deadwood/DTmod.htm.

dead wood.



The agency often compares their proposed snag retention levels to the *average* number of snags across the landscape, without recognizing that after a significant disturbance such as fire "the rate of input [of snags] to the CWD [coarse woody debris] pool is 100-1000x the rate expected for an unburned steady-state forest (Harmon et al 1986). Even afterwards, in the next 5 or 6 years, the rate of input is still 5 or 10 or even 100 times that steady-state rate."[59]

Failure to retain the large pulses of dead wood following disturbance will result in significant adverse effects on wildlife plus a wide variety of other ecosystem services. The BLM did not consider these issues in its proposed salvage CX.

d. Big game, hiding cover, and quality forage.

Salvage logging will cause significant effects because it will make a bad situation worse for big game. Big game such as deer and elk are culturally important wildlife that are valued by diverse communities, including first nations, subsistence users, recreational hunters, and the general public. Salvage logging and conifer replanting harms big game populations by (1) removing tree boles that help provide big game hiding cover after the forest is so dramatically opened up after a fire, and (2) degrading forage values by truncating period when nutrient rich early seral habitat is allowed to flourish.

Fire kills vegetation and dramatically changes forage and cover quality for big game. Big game have also lived with fire for millennia. Deer are known to use areas affected by fire. The fire-created mosaic of forage and residual cover may be beneficial for big game. Forage will almost certainly improve following fire, but in order for the big game populations to take

[59] Brown et al., Forest Structure and revegetation in the first seven years after the Warner Creek fire, available at http://web.archive.org/web/20050428020846/http:/www.brownand-brown.tv/warner-presentation-2002-05-14b.pdf.

advantage of this new flush of forage, the agency must maintain an adequate amount of cover.

Fires provide two benefits for big game: improved forest and adequate hiding cover. Salvage logging will remove what little cover they have. Montana Fish & Game staff have observed big game using fire killed trees as security cover.[60] Although fire may have reduced big game habitat, salvage logging will make a bad situation worse by reducing cover and delaying recovery of vegetation species that are favorable for foraging and hiding cover. Even dead trees can provide hiding or thermal cover for a period of time. The NEPA analysis must assess the lost cover associated with salvage logging of dead trees, either those killed by the fire or that will die in the near term from fire-related damage.[61]

Following two wildfires in northern California that occurred 10 years apart, Grifantini et al compared vegetation response of areas that were unsalvaged and unplanted vs. areas that were clearcut salvaged, burned, and planted. They found that:

1. Unsalvaged sites had much more deerbrush cover, than did salvaged sites (measured 12 years after wildfire);

2. Unsalvaged sites had greater forb cover than did salvaged sites (measured 2 years after wildfire);

3. Unsalvaged sites supported more vascular plant diversity;

4. Unsalvaged sites had greater mean hiding cover values that salvages sites (measured both 2 and12 years after wildfire) "suggesting that salvage logging and reforestation resulted in less screening cover than if the stands would have been left unsalvaged." (p 166)

5. "Apparently postfire management influenced early seral stand development and the quantity and diversity of deer forage" (p 166)
6. "[W]e hypothesize that lack of cover may limit deer use. Maintaining a mosaic of unsalvaged stands, located adjacent to water sources, meadows, traditional migration corridors and staging areas (locations having potential for heavy deer use) would likely be an important post-fire mitigation." (p 167)

7. They recommend maintaining all available screening cover near potentially high deer-use areas, keeping patch size to a fraction of deer's average home range size, using a

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[60] Alexander Deedy (2015) *Elk numbers at or above target in north-central Montana*. Helena Independent Record. September 17, 2015, available at http://helenair.com/lifestyles/outdoors-/elk-numbers-at-or-above-target-in-north-central-montana/article_941cf307-8cc1-5370-876b-01aa2f921039.html.
[61] Grifantini (1990 and 1991) *cited* in McIver, James D.; Starr, Lynn, tech. eds. 2000. *Environmental effects of postfire logging: literature review and annotated bibliography*. Gen. Tech. Rep. PNW-GTR-486. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 72 p., available at http://www.fs.fed.us/pnw/pubs-/gtr486.pdf.

> variety of post-fire management options, and dispersing different management schemes across the landscape.[62]

Salvage logging is adverse to big game for two reasons – it removes hiding cover, and it increases adverse impacts related to construction and use of roads.[63] The BLM must address the adverse effects of salvage logging on big game habitat, especially in areas allocated for big game management in the applicable resource management plan. According to the Fire Effects Information System (FEIS), dead and dying trees do provide cover value for big game, but the agency does not explain why they can just destroy so much of what little cover remains in this winter range:

> Site preference studies show that elk usually prefer to graze on burned as opposed to unburned sites. … Fire in a Southwestern ponderosa pine forest increased forbs, grasses, and shrubs, created edge, and provided snags for cover. Elk increased in the burn, reaching a peak 7 years after fire when grasses were most abundant. … In Glacier National Park fires increased carrying capacity on winter range by creating a mosaic of thermal and hiding comver [sic] and forage areas. … Standing dead trees may provide adequate cover within burns.[64]

Similarly, the Fire Effects Information System narrative on Mule deer says "Deer seem to prefer foraging in burned compared to unburned areas … Small burns are more beneficial than large burns to mule deer because they tend to use burned areas close to cover."[65]

Regardless of whether "dying" trees that currently provide cover will die as predicted by the tree mortality guidelines, those trees do presently provide cover. Thus, it is undisputed that logging imposes a near-term loss of cover. That near-term cover loss should be disclosed in the NEPA analysis. The tree mortality guidelines must also be based on sound science (based on multiple-regression analysis using real data) and must be field verified before being applied.

Careful NEPA analysis is required to address the ways that salvage logging will affect big game and compliance with applicable RMP requirements. This analysis is unlikely to occur with a CX, but these effects *may* be significant, thus requiring the preparation of an EA or EIS. Therefore, the proposed salvage CX is arbitrary and capricious. 5 U.S.C. § 706(2)(A).

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[62] Grifantini, M.C., Stuart J.D., and L. Fox III, 1992. "*Deer Habitat Changes Following Wildfire, Salvage, Logging and Reforestation, Klamath Mountains, California*," Proceedings of the Symposium on Biodiversity of Northwestern California, Oct 28-30, 1991, Santa Rosa, CA. UC Wildland Resource Center Report 29. December 1992.

[63] M. Hebblewhite, R.H. Munro, E.H. Merrill. 2009. *Trophic consequences of postfire logging in a wolf–ungulate system*. Forest Ecology and Management 257 (2009) 1053–1062, available at http://www.cfc.umt.edu/heblab/PDFS/FORECO11394.pdf

[64] Fire Effects and Use Wildlife Species: Cervis elaphus | Elk, available at http://reference.allrefer.com/wildlife-plants-animals/animals/mammal/ceel/fire-effects-use.html

[65] *Id*. at Odocoileus hemionus | Mule Deer, available at http://web.archive.org/web/20060524192803/http://www.fs.fed.us/database/feis/wildlife/mammal/odhe/fire_effects_and_use.html.

6. Effects to water quality.

Salvage logging, and associated yarding, landings, and roads will directly disturb soil leading to erosion and degraded water quality. Salvage logging is also proven to reduce vegetation recovery after fire, this also increases erosion because it inhibits the natural role of vegetation in stabilizing soil. Salvage logging will increase soil erosion and sedimentation through the following mechanisms, each or which must be addressed in detail in the NEPA analysis:

- Soil disturbance
- damage to live and dead roots
- removal of organic material
- delay of revegetation
- construction of roads and landings
- increased channel erosion from peak flow caused by loss of large logs that help anchor snowpacks
- mobilization of fine soil particles that seal the soil surface and increase loss of dead tree canopy[66]

As researchers have concluded, "in short, by adding another stressor to burned watersheds, postfire salvage logging worsens degraded aquatic conditions accumulated from a century of human activity (CWWR 1996,NRC 1996, 2002,McIntosh et al. 2000). The additional damage impedes the recovery and restoration of aquatic systems, lowers water quality, shrinks the distribution and abundance of native aquatic species, and compromises the flow of economic benefits to human communities that depend on aquatic resources (Beschta et al. 2004)."[67]

The forgoing sample of research findings on the deleterious effects of post-disturbance logging highlights the fact that this land management practice is usually harmful to watershed function. The fact that BLM did not cite any of this literature indicates that the agency "failed to consider an important aspect of the problem," thus resulting in an uninformed and unsupported agency action (here, the purported creation of the 5,000 acre salvage CX). *Lands Council v. McNair*, 629 F.3d 1070, 1074 (9th Cir. 2010).

For example, Robichaud et al (2016) looked at the effects of salvage logging on run-off and erosion and found that salvage logging exacerbates fire effects and concluded that:

> Runoff volume, runoff velocities, and sediment concentrations increased with increasing levels of disturbance. The burned only plots had lower runoff rates and

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[66] McNabb and Swanson, "Effects of Fire on Soil Erosion," Chapter 14 in Natural and Prescribed Fire in Pacific Northwest Forests, Walstad, Radosevich, and Sandberg, editors, OSU Press.

[67] *Id.*; see also, Karr, J. R., J. J. Rhodes, G. W. Minshall, F. R. Hauer, R. L. Beschta, C. A. Frissell, and D. A. Perry. 2004. *The effects of postfire salvage logging on aquatic ecosystems in the American West*. BioScience 54:1029-1033, available at http://www.sierraforest-legacy.org/Resources/Conservation/FireForestEcology/SalvageLoggingScience/Salvage-Karr04.pdf (citing Beschta, ,R.L., J. J. Rhodes, J. B. Kauffman, R. E. Gresswell, G. W. Minshall, J. R. Karr, D.A. Perry, F.R. Hauer, C. A. Frissell. 2004. *Postfire Management on Forested Public Lands of the Western United States*. Conservation Biology 18: 957–967, available at: https://www.researchgate.net/publication/227654964_Postfire_Managemen-t_on_Forested_Public_Lands_of_the_Western_United_States?ev=prf_pub).

> sediment concentrations than any of the other disturbances. The salvage logged plots had greater responses than the burn only plots and the mitigation treatment had a marginal effect on runoff ratios, runoff velocities and sediment concentrations. These results suggest that additional disturbance after a wildfire can increase the erosional response.[68]

Wagenbrenner et all (2016) found that salvage logging increases erosion and reduces vegetation cover, explaining:

> We found that ground-based logging using heavy equipment compacted soil, reduced soil water repellency, and reduced vegetation cover. Vegetation recovery rates were slower in most logged areas than the controls. Runoff rates were higher in the skidder and forwarder plots than their respective controls in the Montana and Washington sites in the year that logging occurred, and the difference in runoff between the skidder and control plots at the British Columbia site was nearly significant (p = 0.089). Most of the significant increases in runoff in the logged plots persisted for subsequent years. … [R]ill sediment fluxes were 5 to 1900% greater in logged plots than the controls in the year of logging … Our results indicate that salvage logging increases the risk of sedimentation regardless of equipment type and amount of traffic, and that specific best management practices are needed to mitigate the hydrologic impacts of post-fire salvage logging.[69]

Marañón-Jiménez et al (2013) found that salvage logging harmd natural forest regeneration processes:

> salvage logging has a detrimental effect on the ecophysiological performance and growth of naturally regenerating pine seedlings, compared to alternative post-fire management practices in which burnt logs and branches are left in situ. Improved seedling growth and performance is associated with the amelioration of microsite/microclimate conditions by the presence of residual burnt wood, which alleviates seedling drought stress and improves nutrient availability through the decomposition of woody debris.[70]

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[68] Robichaud, Peter; Wagenbrenner, Joseph; Brown, Robert 2016. Rill Erosion in Post Wildfire Forests after Salvage Logging. Geophysical Research Abstracts. Vol. 18, EGU2016-17814, 2016. EGU General Assembly 2016, held 17-22 April, 2016 in Vienna Austria, p.17814, available at http://adsabs.harvard.edu/abs/2016EGUGA..1817814R; see also Joseph W. Wagenbrenner, Lee H. MacDonald, Robert N. Coats, Peter R. Robichaud, Robert E. Brown 2015. *Effects of post-fire salvage logging and a skid trail treatment on ground cover, soils, and sediment production in the interior western United States*. Forest Ecology and Management. Volume 335, 1 January 2015, Pages 176–193, available at http://www.fs.fed.us/rm/pubs_journals/2015/rmrs_2015_wagenbrenner_j001.pdf ("Highlights: Post-fire salvage logging increased soil compaction and decreased vegetative cover. Salvage logging greatly increased sediment production from more disturbed plots. Salvage logging delayed post-fire recovery of vegetation and sediment production").

[69] Wagenbrenner, Robichaud & Brown 2016. *Rill erosion in burned and salvage logged western montane forests: Effects of logging equipment type, traffic level, and slash treatment*. Journal of Hydrology. DOI: 10.1016/j.jhydrol.2016.07.049

[70] Sara Marañón-Jiménez, Jorge Castro, José Ignacio Querejeta, Emilia Fernández-Ondoño, Craig D. Allen 2013. *Post-fire wood management alters water stress, growth, and*

Leverkus et al (2014) also found that salvage logging sets back vegetation recovery after fire:

> Post-fire salvage logging was associated with reduced species richness, Shannon diversity, and total plant cover. Moreover, salvaged sites hosted different species assemblages and 25% lower cover of seeder species (but equal cover of resprouters) compared to the other treatments. Cover of trees and shrubs was also lowest in Salvage Logging, which could suggest a potential slow-down of forest regeneration.[71]

Other researchers have found that the quantity, quality, and rate of revegetation has a direct contribution to controlling erosion and sedimentation. USGS has described the role of vegetation in slope stability and erosion as follows:

> In a watershed, vegetation provides five major physical functions that help control soil erosion during rainfall events (Spittler, in press):
>
> - Interception of rainfall, which extends the time for water to reach the ground surface and absorbs raindrop impact energy.
> - Mulching of the ground surface to provide temporary water storage and slow release, slope roughness, and energy absorption.
> - Structural support of loose, surficial material.
> - Reinforcement of the deeper soil by roots, which increases the natural slope stability.
> - Maintains conditions necessary for soil micro-organisms that provide soil structure.[72]

Wagenbrenner et al (2015) further found that:

- Post-fire salvage logging increased soil compaction and decreased vegetative cover.
- Salvage logging greatly increased sediment production from more disturbed plots. ("Sediment production from the skidder plots was 10–100 times the value from the controls.")
- Salvage logging delayed post-fire recovery of vegetation and sediment production. ("The relative differences in sediment production between the disturbed plots and the

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performance of pine regeneration in a Mediterranean ecosystem. Forest Ecology and Management 308 (2013) 231–239.

[71] Alexandro B. Leverkus, Juan Lorite, Francisco B. Navarro, Enrique P. Sánchez-Cañete, Jorge Castro 2014. *Post-fire salvage logging alters species composition and reduces cover, richness, and diversity in Mediterranean plant communities*, available at http://www.californiachaparral.com/images/Leverkus_et_al_Salvage_logging_Med_climates_2014.pdf

[72] USGS, *Preliminary Evaluation of the Fire-Related Debris Flows on Storm King Mountain, Glenwood Springs, Colorado* (2004), available at http://web.archive.org/web/20040218052053/http://landslides.usgs.gov/html_files/ofr95-508/skrep2.html (citing Spittler, T.E., in press, *Fire and the debris-flow potential of winter storms*, in Proceedings of the Symposium on Brush Fires in California Wildlands: Ecology and Resource Management: International Association of Wildland Fire).

controls tended to increase over time as the controls exhibited more rapid regrowth." Data were taken 2-8 years post-harvest.)[73]

Salvage logging will set back vegetative recovery that has already started and thereby retard attainment of riparian and aquatic management objectives. In research on post-fire logging on the Winema NF, Sexton[74] (1998) found that salvage logged sites produced only about 38% of the understory biomass of that on the unlogged site; and one year later produced only about 27% of the understory biomass of that on the unlogged site.

The adverse effects of salvage logging on vegetative recovery described by Sexton are not unique to the Ponderosa pine forest type. The results are in fact quite consistent with the results found by Michael Grifantini et al after salvage logging in Douglas fir forests in northwestern California.[75]

The adverse effects described by Sexton appear to be long lasting. Busse at al 1996 found that the annual growth rate of pines was reduced by almost 20% where understory vegetation had been removed thirty years earlier.[76] In addition, research has shown a direct relationship between the level of on-site coarse woody debris and the amount active ectomycorrhizal root tips.

Monitoring after the School Fire on the Umatilla NF showed that "High severity plots that were salvage logged and not seeded with native grasses had the lowest species richness, diversity, and cover."[77] Similarly, Dan Donato looked at the effects of salvage logging at the Biscuit fire in SW Oregon and found that cutting down dead trees and hauling away logs

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[73] Wagenbrenner et al., 2015, *Effects of post-fire salvage logging and a skid trail treatment on ground cover, soils, and sediment production in the interior western United States*. Forest Ecology and Management. Volume 335, 1 January 2015, Pages 176–193, available at http://www.nrel.colostate.edu/assets/nrel_files/labs/macdonald-lab/pubs/Salvage-logging-Wagenbrenner%20et%20al-ForEcolMgmt-2015.pdf

[74] Sexton, Timothy O. 1998. *Ecological effects of post wildfire activities (salvage-logging and grass-seeding) on vegetation composition, diversity, biomass, and growth and survival of Pinus ponderosa and Purshia tridentata*. MS Thesis Oregon State University. Corvallis, OR. 121p.

[75] Grifantini, M.C., Stuart J.D., and L. Fox III, 1992. "*Deer Habitat Changes Following Wildfire, Salvage, Logging and Reforestation, Klamath Mountains, California*," Proceedings of the Symposium on Biodiversity of Northwestern California, Oct 28-30, 1991, Santa Rosa, CA. UC Wildland Resource Center Report 29. December 1992.

[76] Graham, R. T., Harvey, A. E., Jurgensen, M., F., Jain T. B., Tonn, J. R., and Page-Dumroese, D. S. 1994. *Managing coarse woody debris in forests of the Rocky Mountains*. Res. Pap. INT-RP-477. Ogden, UT: U. S. Department of Agriculture, Forest Service, Intermountain Research Station, 13 p.; see also Russell T. Graham, Theresa Benevidez Jain, and Alan E. Harvey, *Fuel: Logs, Sticks, Needles, Duff, and Much More, The Joint Fire Science Conference and Workshop*, available at http://web.archive.org/web/-20060829024013/http://jfsp.nifc.gov/conferenceproc/T-10Grahametal.pdf

[77] Penelope Morgan, Marshell Moy, Christine A. Droske, Sarah A. Lewis, Leigh B. Lentile, Peter R. Robichaud, Andrew T. Hudak, and Christopher J. Williams. 2015. *Vegetation Response to Burn Severity, Native Grass Seeding, and Salvage Logging*. Fire Ecology Volume 11, Issue 2, 2015. doi: 10.4996/fireecology.1102031, available at http://fireecologyjournal.org/docs/Journal/pdf/Volume11/Issue02/031.pdf

killed 71 percent of the naturally established seedlings which were abundant after the fire but scarce after logging.[78]

Shatford and Hibbs found similarly encouraging results of natural regeneration, explaining that

> Over the 2005 field season, natural regenerating conifers were sampled in 38 plots within 11 historic fires in the Klamath-Siskiyou Region … Years since stand replacing wildfire ranged from [18 years to 9 years] … The density of natural regenerating conifers ranged over three orders of magnitude … Although the abundance of natural regeneration was frequently high, the age and size of saplings ranged considerably … Frequently, the regenerating saplings were overtopped by shrubs and hardwoods. There was no evidence of recent conifer mortality (i.e. no dead or dying saplings) caused by competition … Saplings were generally in good condition with dominant trees having live crown ratios of 50% or greater.[79]

This data reveals that natural regeneration is not only demonstrably successful but also species diverse and variable both spatially and temporally. All of these attributes are highly beneficial in terms of both wildlife habitat and fuel hazard.

Salvage logging followed by replanting will have significant effects on water quantity similar to the effects of clearcutting followed by replanting, that is, dense young stands will significantly deplete summer low streamflow for several decades. Salvage logging and replanting will thus exacerbate the cumulative watershed impacts of past (and ongoing) management on federal and non-federal lands. The likely hydrologic effects include increased peak flows in the decade immediately after logging, followed by several decades of reduced summer stream flow, increased daily streamflow variation, and increased daily peak stream temperatures. These have potentially significant biological effects, and these effects are of particular concern in light of climate change. The same problem would likely be caused by dense replanting of conifers after fire. Data from the Caspar Creek paired watersheds in Northern California indicate that partial logging can also cause these effects.

Perry & Jones (2016) examined decades of hydrologic data from paired watersheds in the Western Cascades and found:

> Analysis of 60-year records of daily streamflow from eight paired-basin experiments in the Pacific Northwest of the United States (Oregon) revealed that the conversion of old-growth forest to Douglas-fir plantations had a major effect on summer streamflow. Average daily streamflow in summer (July through September) in basins with 34- to 43-year-old plantations of Douglas-fir was 50% lower than streamflow from reference basins with 150- to 500-year-old forests dominated by Douglas-fir, western hemlock, and other conifers. …. Young Douglas-fir trees, which have higher sapwood area, higher sapflow per unit of sapwood area, higher concentration of leaf

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[78] D. C. Donato, J. B. Fontaine, J. L. Campbell, W. D. Robinson, J. B. Kauffman, B. E. Law. *Post-Wildfire Logging Hinders Regeneration and Increases Fire Risk.* www.sciencexpress.org. 5 January 2006.

[79] Shatford, J., Hibbs, D.E. 2005. *Predicting Post-fire Regeneration Needs: Spatial and Temporal Variation in Natural Regeneration in Southwestern Oregon and Northern California*. Pp 29-32 in Cooperative Forest Ecosystem Research Program (CFER) 2005 Annual Report. http://www.fsl.orst.edu/cfer/pdfs/CFER_ar05.pdf.

area in the upper canopy, and less ability to limit transpiration, appear to have higher rates of evapotranspiration than old trees of conifer species, especially during dry summers. Reduced summer streamflow in headwater basins with forest plantations may limit aquatic habitat and exacerbate stream warming, and it may also alter water yield and timing in much larger basins. Legacies of past forest management or extensive natural disturbances may be confounded with effects of climate change on streamflow in large river basins. ...

Discussion - This study showed that, relative to mature and old-growth forest dominated by Douglas-fir and western hemlock or mixed conifers, forest plantations of native Douglas-fir produced summer streamflow deficits within 15 years of plantation establishment, and these deficits have persisted and intensified in 50-year-old forest stands . … This finding has profound implications for understanding of the effects of land cover change, climate change, and forest management on water yield and timing in forest landscapes. The size of canopy opening explained the magnitude and duration of initial summer streamflow surpluses and subsequent streamflow deficits, consistent with work on soil moisture dynamics of canopy gaps. … Together, the paired basin and experimental gap results indicate that even-aged plantations in 8 ha or larger clearcuts are likely to develop summer streamflow deficits, and these deficits are unlikely to be substantially mitigated by dispersed thinning or small gap creation. Relatively high rates of summer evapotranspiration by young (25 to 45 years old) Douglas-fir plantations relative to mature and oldgrowth forests apparently caused reduced summer streamflow in treated basins. Young Douglas-fir trees (in AND 1) had higher sapflow per unit sapwood area and greater sapwood area compared to old Douglas-fir trees (in AND 2; Moore, Bond, Jones, Phillips, & Meinzer, 2004). In summer, young Douglas-fir trees have higher rates of transpiration (sapflow) compared to old Douglas-fir trees, because their fast growth requires high sapwood area and because their needles appear to exercise less stomatal control when vapor pressure deficits are high. Leaf area is concentrated in a relatively narrow height range in the forest canopy of a forest plantation, whereas leaf area is distributed over a wide range of heights in a mature or old-growth conifer forest. In summer, these factors appear to contribute to higher daily transpiration rates by young conifers relative to mature or older conifers, producing pronounced reductions in streamflow during the afternoons of hot dry days (Bond et al., 2002). At sunset, transpiration ceases, and streamflow recovers. Hence, daily transpiration produces large diel variations in streamflow in AND 1 (plantation) relative to AND 2 (reference). … Reduced summer streamflow has potentially significant effects on aquatic ecosystems. Summer streamflow deficits in headwater basins may be particularly detrimental to anadromous fish, including steelhead and salmon, by limiting habitat, exacerbating stream temperature warming, and potentially causing large-scale die-offs … Reductions in summer streamflow in headwater basins with forest plantations may affect water yield in much larger basins. Much of the Pacific Northwest forest has experienced conversion of mature and old-growth forests to Douglas-fir plantations over the past century. Climate warming and associated loss of snowpack is expected to reduce summer streamflow in the region (e.g., Littell et al., 2010). Declining summer streamflows in the Columbia River basin may be attributed to climate change (Chang, Jung, Steele, & Gannett, 2012; Chang et al., 2013; Hatcher & Jones, 2013), but these declines may also be the result of cumulative forest change due to plantation establishment, … Despite summer streamflow deficits, young forest plantations in the Andrews Forest yield more water in winter, contributing to increased flooding (Harr

& McCorison, 1979; Jones & Grant, 1996; Beschta, Pyles, Skaugset, & Surfleet, 2000; Jones, 2000; Jones & Perkins, 2010).

> **Conclusions** … Long-term paired-basin studies extending over six decades revealed that the conversion of mature and old-growth conifer forests to plantations of native Douglas-fir produced persistent summer streamflow deficits of 50% relative to reference basins, in plantations aged 25 to 45 years. This result challenges the widespread assumption of rapid "hydrologic recovery" following forest disturbance....[80]

Another study found that while annual stream discharge increased as a result of fire (as one would expect), salvage and replanting caused stream flows to reduce compared to unmanaged burned areas.[81] This is consistent with the adverse effects of dense plantations found by Perry and Jones (2016).[82] The low flows caused by plantations are evident in the Oregon Coast Range:

> This study examined long-term changes in daily streamflow associated with forestry practices over a 60-year period (1959 to 2017) in the Alsea Watershed Study, Oregon Coast Range, Pacific Northwest, USA. We quantified the response of daily streamflow to (1) harvest of mature/old forest in 1966, (2) 43- to 53-yr-and 48- to 58-yr-old old industrial plantation forests in 2006–2009, and (3) logging of the plantations using contemporary forest practices, including retention of a riparian buffer, in 2010 and 2014. Daily streamflow from a 40- to 53-yr-old Douglas-fir plantation was 25 % lower on average, and 50 % lower during the summer (June 15 to Sept 15 of 2006 to 2009), relative to the reference watershed containing mature/old

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[80] Perry, T. D., and Jones, J. A. (2016) *Summer streamflow deficits from regenerating Douglas-fir forest in the Pacific Northwest, USA*. Ecohydrology, doi: 10.1002/eco.1790, available at http://onlinelibrary.wiley.com/doi/10.1002/eco.1790/full. Perry, T. 2007. *Do Vigorous Young Forests Reduce Streamflow? Results from up to 54 Years of Streamflow Records in Eight Paired-watershed Experiments in the H. J. Andrews and South Umpqua Experimental Forests*. OSU MS Thesis, available at https://ir.library.oregonstate.edu/-xmlui/bitstream/handle/1957/7683/Perry_Thesis.pdf?sequence=1 ("This study quantified the magnitude and timing of summer streamflow deficits in paired-watershed experiments in the Cascade Range of Oregon … Summer streamflow deficits of intermediate size and persistence developed in watersheds in which 25 to 30% of the area had been patchcut in the 1960s or 1970s. A sparse (12%) precommercial thin of a 27-year-old stand exhibiting summer streamflow deficits had comparatively little effect on streamflow deficits. Streamflow deficits emerged as early as March or April and persisted into October … These findings are consistent with previous studies demonstrating (1) increases in water use in certain conifer species relative to others (e.g. Douglas-fir versus pine); (2) higher water use in young (i.e., 10 to 50-yr-old) compared to old (100 to 250- yr-old) stands of many tree species; and (3) decreased interception capacity of young relative to old forest stands associated with loss of canopy epiphytes.")

[81] Ryan J. Niemeyer, Kevin D. Bladon, Richard D. Woodsmith 2020. *Long-term hydrologic recovery after wildfire and post-fire forest management in the interior Pacific Northwest*. Hydrological Processes, 2020:1-16, available at http://fews.forestry.oregonstate.edu/-publications/Niemeyer_HP_2020.pdf.

[82] *Summer streamflow deficits from regenerating Douglas-fir forest in the Pacific Northwest*, USA. Ecohydrology, doi: 10.1002/eco.1790, available at http://onlinelibrary.wiley.com-/doi/10.1002/eco.1790/full.

> forest. Low flow deficits persisted over six or more months of each year. Surprisingly, contemporary forest practices (i.e., clearcutting of the plantation with riparian buffers in 2009 and 2014) had only a minor effect on streamflow deficits. ... High evapotranspiration from rapidly regenerating vegetation, including planted Douglas-fir, and from the residual plantation forest in the riparian buffer appear to explain the persistence of streamflow deficits after logging of nearly 100 % of the forest plantation. Results of this study indicated that 40- to 50-yr rotations of Douglas-fir plantations can produce persistent, large summer low flow deficits. While the clearcutting of these plantations, with retention of riparian buffers, increased daily streamflow slightly, they did not return to pre-first entry conditions.[83]

The Segura et al. study is significant because if plantations are causing lower low flows, then, as the study says, "this finding has profound implications for understanding the effects of land cover change, climate change, and forest management on water yield and timing in forest landscapes."[84] A host of well-established ecological processes related to low summer flows are a huge issue for fish, other aquatic organisms, and ecosystem services provided by summer stream flows:

- High stream temperatures for example are very commonly a critical limiting factor for fish populations, and this problem is obviously worsening with global climate change. The period of low flow in streams corresponds with the highest temperatures (as well as return timing for salmon) in late summer, and less water in streams has profound effect on stream temperature.

- Lower low flows also relates to sheer amounts of aquatic habitat that are available, both to fish and other aquatic species. The impact of forest plantations on low flows is felt from the top down, i.e. the water volume is removed before it first arrives in headwater streams. Fish and other aquatic critters find their habitat from the bottom, up. Smaller headwater streams offer the bulk of the habitat for rearing fish, like juvenile Coho salmon or trout, who colonize streams as far up as they can find habitat. Lower flows are reduce pools and pool depth, limit migration, and otherwise restrict quality habitat.

- Low summer flows can cause water shortages and even interfere with established water rights. This implication is particularly pertinent here because there are nearby municipal water supplies, and private and agricultural users of limited surface water.[85]

A study in Canada showed that the compound effect of beetle-killed forest plus salvage logging had significant effects on peak stream flows.

> Salvage clearcut logging of grey-attack forest will affect peak flows and water yield significantly more than leaving the grey-attack forest standing. The grey-attack forest

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[83] Catalina Segura, Kevin D.Bladon, Jeff A.Hatten, Julia A. Jones, V.Cody Hale, George G. Ice. 2020 *Long-term effects of forest harvesting on summer low flow deficits in the Coast Range of Oregon*. Journal of Hydrology, available at https://doi.org/10.1016/j.-jhydrol.2020.124749.
[84] *Id.*
[85] *Id.*

> continues to play a role in snow interception, in reducing incoming solar radiation and reducing wind speed across the snowpack. As a result, the annual peak flows in the stream are delayed and of less magnitude than in clearcut watersheds. Leaving the MPB grey attack forest standing will result in lower peak flows than salvage harvesting the watershed....
>
> MPB-attack and salvage harvesting in Baker Creek, a 1570 km2 watershed, has been modelled using DHSVM to estimate the effects on streamflow. Flood frequency analysis was carried out for the baseline and three disturbance scenarios: conventional harvest, MPB epidemic and salvage harvest.
>
> In Baker Creek watershed, two major land use changes effect the streamflows: the MPB attack and the salvage of the attacked trees. Conventional harvesting in Baker Creek watershed before the MPB-attack did not substantially alter the streamflows. However, the combination of conventional harvesting and MPB attack, to 2006, has significantly increased the magnitude and timing of flood events. For example, former 20-year peak flow events can now be expected every 3 years. On average, peak stream flows will be 60% larger than baseline. As salvage harvesting takes place in the next few years, there will be further increases in peak flow and water yield, for example the 20-year peak flows will increase by 90% compared to baseline.
>
> These peak flow changes have implications on the channel stability and fish habitat of the stream network within Baker Creek watershed, as channel forming flows will occur more frequently.[86]

BLM cites none of these studies in the Verification Report or elsewhere in its rulemaking record. The fact that the foregoing studies were not addressed as part of the BLM's rulemaking indicate that the proposed CX is arbitrary, capricious, and not in accordance with law.

7. Salvage logging will cause significant cumulative effects.

The effects of salvage logging cannot be viewed in isolation. Salvage logging always follows a disturbance event which is itself associated with significant effects and management interventions. A NEPA analysis is needed to assess whether the incremental effects of salvage logging are significant in light of associated effects from wildfire/wind/snow/ice/beetles, fire suppression efforts, fire rehabilitation, salvage logging, slash piling, slash burning, site preparation, hazard tree felling, replanting, and climate change.

> Compound disturbances have the potential to fundamentally alter an ecosystem structure and function. This study examines the effects of a natural disturbance and a compounded natural and anthropogenic disturbance on soil properties,

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[86] *The Effect of Mountain Pine Beetle Attack and Salvage Harvesting On Streamflows Special Investigation*. FPB/SIR/16. March 2007, available at http://www.unbc.ca/assets/qrrc/the_-impact_of_climate_change_and_harvest_of_mountain_pine_beetle_stands_on_streamflow_in_northern_british_columbia.pdf.

biogeochemical cycles, and ecosystem reorganization in a windblown and salvage-logged ecosystem in northwestern Colorado. Areas of intact forest are used as a control to compare the disturbance effects. Results indicate that soils in the salvage-logged areas are drier, significantly warmer, denser, and contain less organic matter than soils in blowdown or control areas. Significant amounts of erosion occurred in the salvage-logged areas to produce these results. Furthermore, net nitrogen mineralization rates are lower in soils from salvage-logged areas than in blowdown areas. By contrast, net nitrogen mineralization rates are twice as high in blowdown areas than in control areas. Seedling density, herbaceous cover, and plant species diversity are greatest in blowdown areas, and least in salvaged-logged areas. The results of this four-year study indicate that the mitigation effects of salvage logging significantly alter ecosystem functions and retard the rate of recovery when compared to unlogged blowdown areas.[87]

Popular indirect fire-suppression methods are ecologically damaging. As Dr. Agee has found:

> *Fire managers should avoid trying to uniformly blacken wildfire landscapes through burnout and mop-up operations, especially in burn interiors.* As wildfire sizes have grown in recent decades, direct attack has been replaced with indirect attack, where fire lines are placed some distance from the active fire front, and then the area between is intentionally burned, often with high-severity fire, to reduce fuel and create a wider fire barrier. Unburned or partially burned patches are critical refugia that aid postfire recovery in forests of all fire regimes and should be conserved whenever possible.[88]

Studying the effects of wildfire and salvage logging on boreal forest insects and nutrient dynamics, Tyler Cobb found that "disturbance combinations … should be avoided whenever possible…"[89] Cobb (2007) explains that

> While many studies have examined the effects of single disturbances on biodiversity (e.g., Hunter 1999; Stelfox 1995), there is a growing awareness that independent consideration of disturbances may be insufficient from a sustainable forest management perspective (Lindenmayer and Noss, 2006). Today, forest ecosystems face multiple, often simultaneous, natural and anthropogenic environmental stressors. Disturbance regimes in most forest ecosystems now include environmental stress associated with increasing natural resource extraction (e.g., timber, natural gas, oil, minerals, etc.) (Kennedy 2002; Schneider 2002), pollution (Perry 1994) and global climate change (Flannigan et al., 1998; Li et al. 2000; Overpeck et al., 1990). Thus, forest management models based on emulating natural disturbances like wildfire (Attiwill 1994; Hunter 1993) may be overly simplistic and fail dramatically in application on many landscapes. … Research presented here suggests that combining

[87] Cristina M. Rumbaitis-Del Rio and Carol A. Wessman. *Impact of compound disturbances on N-cycling and forest reorganization in a wind-disturbed and logged forest*. Paper presented to the 86th Annual Meeting of the Ecological Society of America, August 6 –10, 2001, available at http://abstracts.co.allenpress.com/pweb/esa2001/document/28519.
[88] Stephens, Agee, et al 2013. Managing Forests and Fire in Changing Climates. Science, Vol 342, pp 41-42. DOI:10.1126/science.1240294, available at http://forestpolicypub.com/wp-content/uploads/2013/10/Stephens-et-al.-Science-Policy-Forum-10-13.pdf
[89] Tyler Cobb. 2007. *Boreal Mixed-wood Beetles and the Cumulative Ecological Consequences of Disturbance*. PhD dissertation. University of Alberta. Spring 2007.

> wildfire and forestry-related disturbances in boreal ecosystems may not only impact beetle diversity, but has significant potential to also impact decomposition and nutrient cycling processes. These effects, in turn, may well affect successional pathways and have broad effects on regeneration Thus, the ecological integrity of these ecosystems may depend, at least in part, on organisms we consider to be either economic "pests" or of no economic significance.…
>
> For saproxylic [dead wood dependent] beetle assemblages, the combination of wildfire and forest harvesting (postfire salvage logging) reduced species richness and altered species composition to a greater extent that either disturbance alone. Postfire salvage logging also altered the trophic structure of the saproxylic beetle assemblage and was particularly detrimental for wood- and barkboring species. Through a series of experiments, the abundance of one such species, *Monochamus scutellatus scutellatus*, was linked to decomposition processes in burned forests. Together, the results of these studies suggest that disturbance combinations should be avoided whenever possible because they may impact not only beetle diversity, but also decomposition processes in forests recovering from wildfire.…
>
> Broadly, my results showed that removal of dead wood from burned forests by postfire salvage logging has the potential to alter naturally occurring links between wood-feeding insects and nutrient dynamics in forests recovering from wildfire. … By feeding on burned dead wood, M. s. scutellatus larvae help to begin the process of gradually returning organic materials from standing burned coniferous trees to the soil. My data show that this feeding activity is linked to changes in soil microbial activity, N availability, and the germination and growth of colonizing plants in early postfire ecosystems. … [T]he fact that the development time for M. s. scutellatus is 1 or 2 years (Rose, 1957; Wilson, 1962) suggests that organic nutrient inputs in the frass of this species are somewhat gradual, which may also reduce leaching of N from burned stands. … While M. s. scutellatus and other wood-feeding beetle species may be considered "pests" that rapidly reduce the economic value of salvaged timber (Ross, 1960; Sessions et al., 2004), their role in nutrient cycling and food web dynamics (Hoyt & Hannon, 2002) in burned forests should not be overlooked in the development of guidelines for postfire management. By removing fire-killed trees, postfire salvage logging in boreal ecosystems may be as damaging to saproxylic insect diversity as have intensive forestry and fire suppression in Europe (Grove, 2002; Siitonen, 2001). In addition to biodiversity consequences, the results of this study indicate that postfire salvage logging may also influence nutrient dynamics and succession in regenerating burned forests. Therefore, the long-term persistence of boreal ecosystem function may require the retention of some burned timber.[90]

BLM needs an EIS to consider the additive and cumulative effects of salvage logging and associated activities. The agency must consider the additive effects of salvage logging, road construction, log hauling, activity fuel treatment (broadcast burning, pile burning, and mechanical fuel reduction), site preparation, tree planting, OHVs, as well as the cumulative effects of past logging, roads, fire effects, fight fighting, etc.

The agency must not adopt the reasoning that the effects of the fire are greater than the effects of the logging and are likely to mask the latter. The Ninth Circuit rejected precisely

[90] *Id.*

this type of analysis as faulty and violating NEPA in *Blue Mountains Biodiversity Project v. Blackwood*, 161 F.3d 1208 (9th Cir. 1998). There, the Court held that

> Despite the lack of data, the Forest Service asserts throughout the EA that the expected level of sediment delivery will be small in comparison to that caused by the fire. Whether the increased erosion from logging and roadbuilding is smaller or larger than that produced by the fire is irrelevant. *The proper evaluation should identify the impact of the increased sediment from the logging and roadbuilding on the fisheries habitat in light of the documented increases that have already resulted from the fire.*

161 F.3d at 1213 (9th Cir. 1998) (emphasis added). Researchers agree, explaining that

> In places where salvage logging occurs, the amount of snags that can be removed from the uplands without serious adverse effects on stream macroinvertebrate but ecosystem recovery is unknown and is likely to vary with forest type, geology, and topographical relief. However, it is known that virtually all forms of postfire logging can have various adverse effects on stream ecosystems (e.g., Mehahan, 1983; Smith et al., 1993a, b; Stout et al., 1993; Ketcheson and Megahan, 1996). Based on results from watersheds having various proportions of their areas burned by wildfire (e.g., Minshall et al., 1995, 2001b; Minshall, personal observation), **it is probable that the amount of timber removed should not exceed about 25% of the merchantable timber** (unless contradictory information is available). In addition, postfire removal should be appropriately spaced across the landscape and should be in proportion to the size classes (DBH) of trees present at the time of the fire (see also Beschta et al., 1995). This proportional harvesting is necessary because of the important graded inputs (Lyon, 1984) that a mix of such large woody debris contributes to streams over the extended recovery period (Minshall et al., 1989). In addition, fire lines should be obliterated prior to logging, and road construction or other major ground-disturbing activities should be avoided in order to prevent additional runoff and erosion. Salvage harvest yeilds responses (e.g., ground disturbance, woody debris removal, interruption of normal infiltration pathways, and acceleration of surface flows) that interact with the direct and indirect effects of fire to make these actions so potentially damaging. In addition, the negative effects extend many years beyond the actual time of salvage activities because of the harvest of snags that normally fall and become incorporated into stream channels and forest floors over several decades or more (Lyon, 1984). These wood inputs are important to create habitat, increase nutrients, and retard runoff and channel alteration during what is normally the most critical stage of stream and riparian vegetation recovery (Minshall et al., 1989; Lawrence and Minshall, 1994).[91]

Undisturbed litterfall after wildfire reduces soil erosion caused by both rain and overland-flow. By disturbing needle cover and effectively reducing the soil coverage, logging and yarding will cause increases in erosion compared to not logging.[92] Pannkuk found that a 50

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[91] Minshall, G.W. 2003. *Responses of stream benthic macroinvertebrates to fire*. *Forest ecology and management*. 178: 155-161 (NOTE: Volume 178, issues 1-2 was a special issue of Forest Ecology and Management on the effects of wildland fire on aquatic ecosystems in the western USA, available at http://www.famu.org/mayfly/pubs/pub_m/pubminshallg-2003p155.pdf).

[92] Pannkuk, C. D., and P. R. Robichaud. 2003. *Effectiveness of needle cast at reducing erosion after forest fires*, Water Resources Research, Vol. 39, No. 11,

percent ground cover of Douglas fir needles reduced water flow erosion by 20 percent and rain-induced erosion by 80 percent. A 50 percent ground cover of ponderosa pine needles reduced water flow erosion by 40 percent and rain-induced erosion by 60 percent.

Post-fire logging inevitably involves increases in road use, which increases erosion and sedimentation, especially at road crossings (Reid and Dunne, 1984; Roni et al., 2001). Roni et al. (2001) identified reductions in road traffic as a component of watershed restoration, indicating that increased road traffic works in opposition to watershed and stream restoration.

Salvage logging will adversely affect the ability of the land to absorb, store and release high quality water and the NEPA analysis fails to address these concerns. First, post-fire soils are fragile because the soil duff is often consumed by the fire and the carbon and other nutrients have been largely removed. Logging will further disturb the soils and litter and disrupt the natural soil recovery processes. Logging will also disturb and rearrange the soil protecting needle litter that will fall in the months after the fire. Second, large wood absorbs water and serves as a significant water reservoir that is especially critical during the drier summer months. Logging removes the wood and so reduces the potential water reservoir. Recent research indicates that much water is stored in buried wood. This buried wood is likely a result of trees that have fallen on hillslopes and become buried in natural sediment moving downslope. Salvage will adversely affect the recruitment of future buried wood. Third, road construction, reconstruction, and road use all adversely affect the ability of the land to "distribute quality water."

While these are significant effects from post-disturbance logging, the BLM failed to consider them in the development of the salvage CX.

C. Salvage logging accelerates carbon emissions and climate effects.

All forms of logging will accelerate the transfer of carbon from the forest to the atmosphere and exacerbate global climate change and ocean acidification. One might think that salvage logging is an exception but it is not. Wood products decompose at about the same rate as large wood in the forest, but the carbon effects of salvage logging go beyond wood products, it also involves rapid transfer of the carbon in small wood (as well as some soil carbon) to the atmosphere.

Campbell et al (2016) looked at carbon losses after the Biscuit fire and found that

> Decomposition was highest for fire-killed leaves and fine roots and lowest for large diameter wood. Decomposition rates varied somewhat among tree species and was only 35% lower for trees still standing than for trees fallen at the time of the fire. We estimate a total of 4.7 Tg C was killed but not combusted in the Biscuit Fire, 85% of which remains 10 years after.[93]

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doi:10.1029/2003WR002318, 2003, available at http://www.agu.org/pubs/crossref/-2003/2003WR002318.shtml.

[93] Campbell, J. L., J. B. Fontaine, and D. C. Donato (2016), *Carbon emissions from decomposition of fire-killed trees following a large wildfire in Oregon*, United States. J. Geophys. Res. Biogeosci., 120, doi: 10.1002/2015JG003165, available at http://onlinelibrary.wiley.com/doi/10.1002/2015JG003165/full.

Dunn et al. (2015) likewise found that

> Salvage logging to enhance ecosystem resilience may not be appropriate if multiple ecosystem functions and resources are considered, including; coarse wood use by wildlife (Cahall and Hayes, 2009; Hutto, 1995; Fontaine et al., 2009; Saab et al., 2005), functional attributes of early seral vegetation (Swanson et al., 2010), compounding effects on soil and nutrient pools (Brais et al., 2000; Triska and Cromack, 1980) and reduced water and carbon storage (Harmon et al., 1986).[94]

The authors suggested modifying salvage logging prescriptions to retain more snags, which would help retain fine fuels in the canopy longer and reduce the amount of fine fuels that are moved from the canopy to the ground.

Magnússon et al (2016) found that increased retention of dead wood may help increase the magnitude and stability of carbon storage in forests:

> Worldwide, forests have absorbed around 30% of global anthropogenic emissions of carbon dioxide (CO2) annually, thereby acting as important carbon (C) sinks. It is proposed that leaving large fragments of dead wood, coarse woody debris (CWD), in forest ecosystems may contribute to the forest C sink strength. CWD may take years to centuries to degrade completely, and non-respired C from CWD may enter the forest soil directly or in the form of dissolved organic C. Although aboveground decomposition of CWD has been studied frequently, little is known about the relative size, composition and fate of different C fluxes from CWD to soils under various substrate-specific and environmental conditions. Thus, the exact contribution of C from CWD to C sequestration within forest soils is poorly understood and quantified, although understanding CWD degradation and stabilization processes is essential for effective forest C sink management. This review aims at providing insight into these processes on the interface of forest ecology and soil science, and identifies knowledge gaps that are critical to our understanding of the effects of CWD on the forest soil C sink. It may be seen as a "call-to-action" crossing disciplinary boundaries, which proposes the use of compound-specific analytical studies and manipulation studies to elucidate C fluxes from CWD. Carbon fluxes from decaying CWD can vary considerably due to interspecific and intraspecific differences in composition and different environmental conditions. These variations in C fluxes need to be studied in detail and related to recent advances in soil C sequestration research.Outcomes of this review show that the presence of CWD may enhance the abundance and diversity of the microbial community and constitute additional fluxes of C into the mineral soil by augmented leaching of dissolved organic carbon (DOC). Leached DOC and residues from organic matter (OM) from later decay stages have been shown to be relatively enriched in complex and microbial-derived compounds, which may also be true for CWD-derived OM. Emerging knowledge on soil C stabilization indicates that such complex compounds may be sorbed preferentially to the mineral soil. Moreover, increased abundance and diversity of decomposer organisms may increase the amount

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[94] Christopher J. Dunn, John D. Bailey 2015. *Modeling the direct effects of salvage logging on long-term temporal fuel dynamics in dry-mixed conifer forests*. Forest Ecology and Management 341 (2015) 93–109, available at http://www.sierraforestlegacy.org/Resources/-Conservation/FireForestEcology/SalvageLoggingScience/Dunn&Bailey2015.pdf

> of substrate C being diverted into microbial biomass, which may contribute to stable C pools in the forest soil.[95]

New evidence reveals a counterintuitive result that beetles inoculate dead trees with diverse fungi that actually *reduce* the rate of decay and reduce the carbon emissions from dead wood:

> the kicker – the more species of fungi that were brought in by beetles or introduced in the lab, the lower the rate of decay.
>
> This outcome was not completely surprising to Skelton. "The majority of the fungi the beetles carry do not decay wood." But it wasn't just that. The diversity of fungi was key to lowering the rate of decay, irrespective of whether individual species could decay wood or not. This effect had been found in other studies in wood without beetles where researchers found that that as the number of fungal species increased, CO2 release declined. And again, it wasn't so much who was there but how many.
>
> Early models of CO2 release from beetle-killed forests were mostly tales of gloom and doom predicting a rapid mass release of carbon into the atmosphere. However, field-based studies have since helped define crucial factors affecting carbon release that were missing in the early models.[96]

BLM considered none of this information in the development of its proposed salvage CX.

D. Salvage logging reduces climate resilience.

BLM must recognize the role of fire (and natural recovery after fire) as an effective mechanism for ecosystems to adapt to a changing climate. Scientists recommend:

> *Use wildfires as an opportunity to facilitate establishment of current and future climate-adapted species and communities*
>
> While increased wildfires can be a threat to biodiversity, especially in landscapes where habitat has been altered by logging and land-use change, they also provide a benefit by creating diverse early successional conditions and opportunities for natural or artificial regeneration of new genotypes and species that may be better adapted to the climate than those in existing stands. The challenge to planners and managers is deciding when and where to allow fires to burn and what to do afterwards. The challenge is especially great where federal lands border state and private lands where wildfires can threaten commercial timber crops and homes.[97]

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[95] Rúna Í. Magnússon, Albert Tietema, Johannes H.C. Cornelissen, Mariet M. Hefting, Karsten Kalbitz 2016. *Tamm Review: Sequestration of carbon from coarse woody debris in forest soils*. Forest Ecology and Management Volume 377, 1 October 2016, Pages 1-15, available at http://www.sciencedirect.com/science/article/pii/S0378112716303309.

[96] Six, D. 2020. *How tiny fungi may be slowing carbon release from bark beetle-killed trees*. Blog post, available at https://eddycovarianceblog.wpcomstaging.com/2020/06/11/how-tiny-fungi-may-be-slowing-carbon-release-from-bark-beetle-killed-trees/.

[97] Spies, Geisen, Franklin, Swanson, Lach, Johnson 2010. *Climate change adaptation strategies for federal forests of the Pacific Northwest, USA: ecological, policy, and socio-*

Climate change is expected to increase the magnitude and intensity of rain events which can cause significant erosion, especially after disturbances such as fire and logging. It would be wise to retain extra material on site after fire in order to intercept and absorb the energy of rain drops, absorb and store water, stabilize soil, capture and store mobile sediment, etc.[98] The agency needs to ensure that the hydrology and erosion models used in the NEPA analysis accurately account for the expected increase in storm impacts due to climate change:

> Wildfire is a global Earth system process that both integrates and influences many other interactions between ecosystem and the climate system. Fire mediates other ecosystem responses to changing climate, for example by modulating forest density and composition, and thus providing a mechanism by which ecosystems adapt to changing climate conditions. Uncertainties in key elements of climate projections could be compounded by nonlinear responses of fire to climate variability. Fires may also act as triggers for abrupt and irreversible change to novel configurations under Direct and indirect controls on annual wildfire area burned future climate. As climate change progresses, the projected changes in the area affected annually by fire may be an important multiplier of these effects in coming decades.[99]

Salvage logging and conifer replanting will create conditions that are more homogenous, less biodiverse, with greater fuel continuity, and overall less resilient to disturbance and climate change.[100] Salvage logging and replanting will cause significant effects by reducing the area of complex biodiverse forests that are more resilient to climate change, while expanding the extent of simplified plantations that are less resilient to climate change. For example,

> ... [R]educing emissions from deforestation and degradation may also yield co-benefits for adaptation by maintaining biodiversity and other ecosystem goods and services, while plantations, if they reduce biological diversity may diminish adaptive capacity to climate change (e.g., (Chum et al., 2011). Primary forests tend to be more resilient to climate change and other human-induced environmental changes than secondary forests and plantations (Thompson et al., 2009). The impact of plantations on the carbon balance is dependent on the land-use system they replace, while plantation forests are often monospecies stands, they may be more vulnerable to climatic change (see IPCC WGII Chapter 4) ... Adaptation measures in return may help maintain the mitigation potential of land-use systems. ... Forest and biodiversity conservation, protected area formation, and mixed-species forestry-based afforestation are practices that can help to maintain or enhance carbon stocks, while

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economic perspectives. Landscape Ecol. DOI 10.1007/s10980-010-9483-0, available at https://www.fs.fed.us/pnw/pubs/journals/pnw_2010_spies001.pdf.

[98] Garbrecht, J. D., J. L. Steiner, and C. A. Cox (2007), *Climate change impacts on soil and water conservation*, Eos Trans. AGU, 88(11), 136, available at http://www.agu.org/-eos_elec/2007/11-136_climate.html.

[99] Kitzberger T, Falk DA, Westerling AL, Swetnam TW (2017), *Direct and indirect climate controls predict heterogeneous early-mid 21st century wildfire burned area across western and boreal North America*. PLoS ONE 12(12): e0188486, available at https://doi.org/-10.1371/journal.pone.0188486.

[100] See Harold S. J. Zald, Christopher J. Dunn. 2018. *Severe fire weather and intensive forest management increase fire severity in a multi-ownership landscape*. Ecological Applications. 26 April 2018, available at https://doi.org/10.1002/eap.1710; see also, Oregon State University, *High wildfire severity risk seen in young plantation forests, available at* https://phys.org/news/2018-04-high-wildfire-severity-young-plantation.html

> also providing adaptation options to enhance resilience of forest ecosystems to climate change (Ravindranath, 2007)....[101]

Other researchers concur, explaining that

> [W]e tested the hypothesis that species-rich forests show greater temporal stability of C capture, and are more resistant to drought, than monodominant plantations. Carbon stocks in monodominant teak (Tectona grandis) and Eucalyptus (Eucalyptus spp.) plantations were 30-50% lower than in natural evergreen forests, but differed little from moist-deciduous forests. Plantations had 4-9% higher average C capture rates (estimated using the Enhanced Vegetation Index – EVI) than natural forests during wet seasons, but up to 29% lower C capture during dry seasons across the 2000-18 period. In both seasons, the rate of C capture by plantations was less stable across years, and decreased more during drought years (i.e., lower resistance to drought), compared to forests. Thus, even as certain monodominant plantations could match natural forests for C capture and storage potential, plantations are unlikely to match the stability – and hence reliability – of C capture exhibited by forests, particularly in the face of increasing droughts and other climatic perturbations.[102]

Salvage often involves removal of "incidental" green trees, which are often mature trees that are valuable for habitat carbon storage and other purposes. Indeed, BLM's proposed CX allows for the harvest of "live trees needed for landings, skid trails, and road clearing." Salvage logging will thus replace larger resilient mature forests with less resilient small young trees, which has important global climate implications:

> Physiological sensitivity to climate also varies with tree size. The relative sensitivity of leaf stomata to high evaporative demand is greater in young than old ponderosa pine (Irvine et al., 2004), and young trees are more susceptible to soil water deficits due to shallower rooting and their greater vulnerability of their roots to broken water columns (Domec et al., 2004). Over the course of dry summers, 20%, 45% and 47% of water used by young, mature and old pine trees in sandy soils is extracted from below 80 cm depth (Irvine et al., 2004). Hydraulic redistribution from deep soil layers will be missed, along with the added storage capacity, if models that assume 1 m soil depth.
>
> … During the extreme drought years of 2001 and 2002, old ponderosa pine trees in Oregon showed only a small decline in water transport efficiency to leaves (11–24%) whereas in mature pine, the efficiency declined by 46%, and for young pine, by 80% (Irvine et al., 2004). The ability of young pine to open their stomata more widely than older trees, increases the rate that water flows through a unit of their sapwood. As a result, younger trees risk the breakage of a larger proportion of their water columns,

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[101] IPCC AR5, *Working Group III, Mitigation of Climate Change, Chapter 11 Agriculture, Forestry and Other Land Use (AFOLU)* (Final Draft 2014) pp 46-47, available tat https://www.ipcc.ch/pdf/assessment-report/ar5/wg3/ipcc_wg3_ar5_chapter11.pdf.

[102] Anand M Osuri, Abhishek Gopal, T R Shankar Raman, Ruth S DeFries, Susan C Cook-Patton and Shahid Naeem. 2020. *Greater stability of carbon capture in species-rich natural forests compared to species-poor plantations*. Environmental Research Letters, available at https://doi.org/10.1088/1748-9326/ab5f75; https://iopscience.iop.org/article/10.1088/1748-9326/ab5f75/pdf.

> which may account for the high mortality in a young ponderosa pine plantation in California (Goldstein et al., 2000).[103]

Lewis et al (2019) urge greater emphasis on restoring and protecting natural forests as a climate mitigation strategy:

> To stem global warming, deforestation must stop. And restoration programmes worldwide should return all degraded lands to natural forests — and protect them. More carbon must be stored on land, while recognizing competing pressures to deliver food, fuel, fodder and fibre.
>
> We call on the restoration community, forestry experts and policymakers to prioritize the regeneration of natural forests over other types of tree planting — by allowing disturbed lands to recover to their previous high-carbon state. This will entail tightening definitions, transparently reporting plans and outcomes and clearly stating the trade-offs between different uses of land....
>
> Natural-forest restoration is clearly the most effective approach for storing carbon. But clashing priorities are sabotaging carbon storage potential....
>
> Today's forest-restoration schemes must increase their carbon sequestration potential to meet global climate commitments. We suggest four ways in which this could happen.
>
> First and foremost, countries should increase the proportion of land that is being regenerated to natural forest....
>
> Second, prioritize natural regeneration in [forests] which all support very high biomass forest compared with drier regions....
>
> Third, build on existing carbon stocks. Target degraded forests and partly wooded areas for natural regeneration; focus plantations and agroforestry systems on treeless regions ...
>
> Fourth, once natural forest is restored, protect it....[104]

BLM's proposed salvage CX does not consider the climate implications of its CX, which is arbitrary, capricious, and not in accordance with law. 5 U.S.C. § 760(2)(A).

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[103] Law, B.E., Waring, R.H. 2015. *Review and synthesis - Carbon implications of current and future effects of drought, fire and management on Pacific Northwest forests*. Forest Ecology and Management 355 (2015) 4–14, available at http://people.forestry.oregonstate.edu/richard-waring/sites/people.forestry.oregonstate.edu.richardwaring/files/publications/Law%20and%20Waring%202015.pdf.

[104] Simon L. Lewis, Charlotte E. Wheeler, Edward T. A. Mitchard & Alexander Koch. 2019. *Restoring natural forests is the best way to remove atmospheric carbon*.

E. Post-fire logging does not reduce fire risk.

The BLM frequently alleges that post-fire logging, and salvage logging more generally, reduces future wildfire risk. However, the best available science does not support this contention.

1. Salvage logging accelerates the transfer of fine fuels from the canopy to the ground where they pose a greater fire hazard.

The best available science indicates that salvage logging increases small fuels that are most hazardous, and reduces large wood which is most valuable to wildlife:

> Our study examined fuel succession patterns by surveying downed woody fuels across a chronosequence of dry coniferous forest stands that burned with high fire severity (95–100% overstory tree mortality) within mixed- and high-severity wildfires in eastern Washington and Oregon, USA, between 1970 and 2007. We sampled forests in which ponderosa pine (*Pinus ponderosa*) and Douglas-fir
>
> (*Pseudotsuga menziesii*) are the dominant early-seral tree species … Relative to unlogged stands, post-fire logging initially increased surface woody fuel loads, increasing small diameter fuel loads by up to 2.1 Mg/ha during the first 5 years after fire and increasing medium diameter fuel loads by up to 5.8 Mg/ha during the first 7 years after fire. Logging subsequently reduced surface woody fuel loads, reducing large diameter fuel loads by up to 53 Mg/ha between 6 and 39 years after wildfire … The initial pulse of elevated surface fuels in logged stands was expected under our first hypothesis. Post-fire logging transfers woody debris in tree branches and tops from the canopies of fire-killed trees to the forest floor, producing well-documented conditions of higher surface woody fuels in logged stands than in unlogged stands in the first 1–4 years following logging (Donato et al., 2006, 2013; McIver and Ottmar, 2007; Monsanto and Agee, 2008; Keyser et al., 2009). Higher amounts of surface woody fuels – especially small and medium diameter woody fuels – can increase short-term fire hazards in logged stands by increasing potential rate of spread and fire-line intensity … Post-fire logging was most effective for reducing large diameter surface fuels, consistent with our second hypothesis. By removing tree boles, post-fire logging reduced maximum large diameter fuel loadings and produced a long period of reduced large diameter fuels, including both sound and rotten fuels. Although large diameter fuels may contribute little to fire spread rates (Hyde et al., 2011) and are typically disregarded in fire behavior modeling.[105]

This study showed that salvage logging is most effective at reducing large fuels, which contribute least to fire hazard. Recognizing that small fuels are the most hazardous and large fuels are the least hazardous, the best way to summarize the effects of salvage logging is to say that it increases hazardous fuel loads and increases fire hazard for several years, followed

[105] David W. Peterson, Erich K. Dodson, Richy J. Harrod 2015. *Post-fire logging reduces surface woody fuels up to four decades following wildfire*. Forest Ecology and Management 338 (2015) 84–91, available at http://www.firescience.gov/projects/06-3-4-16/project/06-3-4-16_Peterson_et_al_-_2015_-_FEM_-_post-fire_logging_and_fuels.pdf.

by a 40 year shortage of large woody habitat, along with high fire hazard associated with conifer plantations.[106]

Similar results were found in a "NecroDynamics" model that looked at 7 fires in the eastern slopes of the Oregon Cascades:

> Salvage logging immediately increased surface fine woody fuel loadings by 160–237% above maximum loadings observed in unmanipulated stands, and were higher during the initial 18–22 years post-fire … [O]ur modeling results suggest salvage logging has mixed effects on reducing hazardous fuel conditions since it increases fine woody fuel loadings and decreases coarse woody fuel loadings. … [P]rescriptions can be altered. For example, [to] retain a higher abundance of snags which would reduce the magnitude of difference in fine woody fuels between salvaged and unmanipulated stands during early in post-fire succession …. Although salvage logging reduces coarse woody fuel loadings, alone it does not mitigate re-burn hazard because it increases fine woody fuel loadings …. Additionally, intensive reforestation typically substitutes conifer biomass for shrub biomass, limiting hazardous fuels reduction unless additional efforts are employed … Understory woody vegetation reestablishes rapidly in these dry-mixed conifer forests (Dunn and Bailey, in press) and can be a highly-flammable fuel layer (Weatherspoon and Skinner, 1995), as well as a source of post-fire fine woody fuels when shrub crowns die (Table 4). This suggests salvage logging alone will not mitigate contributions to re-burn hazard from dead biological legacies when the temporal dynamics of multiple fuelbeds (e.g. fine woody fuels, coarse woody fuels, and regenerating vegetation) are evaluated. R … Salvage logging to enhance ecosystem resilience may not be appropriate if multiple ecosystem functions and resources are considered, including; coarse wood use by wildlife (Cahall and Hayes, 2009; Hutto, 1995; Fontaine et al., 2009; Saab et al., 2005), functional attributes of early seral vegetation (Swanson et al., 2010), compounding effects on soil and nutrient pools (Brais et al., 2000; Triska and Cromack, 1980) and reduced water and carbon storage (Harmon et al., 1986).[107]

The authors suggested modifying salvage logging prescriptions to retain more snags, which would help retain fine fuels in the canopy longer and reduce the amount of fine fuels that are moved from the canopy to the ground.

BLM does not address this issue.

2. Replanting conifers increases fire hazard.

Salvage logging followed by conifer replanting has effects similar to clearcutting followed by conifer replanting and in both cases it creates dense continuous fuel conditions that are highly conducive to high-severity stand-replacing fire. Naturally regenerated forests tend to have

[106] *Id*. ("Relative to unlogged stands, post-fire logging initially increased surface woody fuel loads, increasing small diameter fuel loads by up to 2.1 Mg/ha during the first 5 years after fire and increasing medium diameter fuel loads by up to 5.8 Mg/ha during the first 7 years after fire.")

[107] Christopher J. Dunn, John D. Bailey 2015. *Modeling the direct effects of salvage logging on long-term temporal fuel dynamics in dry-mixed conifer forests*. Forest Ecology and Management 341 (2015) 93–109, available at http://www.sierraforestlegacy.org/-Resources/Conservation/FireForestEcology/SalvageLoggingScience/Dunn&Bailey2015.pdf

more heterogeneous vegetation structure and composition which will be less conducive to high severity fire. This is a strong indication that salvage logging and replanting will cause significant effects.

Modeling done by the University of Washington scientists shows that post-fire landscapes are by far the least hazardous fuel profiles not just in the short-term but for several decades after wildfire. If the agency is following the National Fire Plan it will prioritize fuel reduction in areas that are suffering from fire suppression, not areas that have just burned.[108]

A study of the portions of the Biscuit fire that were previously burned by wildfire, reveals that salvage logging did not reduce the severity of subsequent fires, and in fact salvage logging appeared to increase the severity of subsequent wildfires.[109] This represents significant new information about salvage logging.[110]

Donato looked at the effects of salvage logging after the Biscuit fire and found that

> Postfire logging significantly increased both fine and coarse downed woody fuel loads (Fig. 1B). This pulse was comprised of unmerchantable material (e.g., branches), and far exceeded expectations for postfire logging-generated fuel
>
> loads (5, 6). In terms of short-term fire risk, a reburn in logged stands would likely exhibit elevated rates of fire spread, fireline intensity and soil heating impacts (7). Postfire logging alone was notably incongruent with fuel reduction goals. Fuel reduction treatments (prescribed burning or mechanical removal) are frequently intended following postfire logging, including in the Biscuit plan, but
>
> resources are often not allocated to complete them (8). Our study underscores that, after logging, mitigation of short-term fire risk is not possible without subsequent fuel reduction treatments.[111]

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[108] C. Larry Mason, Kevin Ceder, Heather Rogers, Thomas Bloxton, Jeffrey Comnick, Bruce Lippke, James McCarter, Kevin Zobrist, *Investigation of Alternative Strategies for Design, Layout and Administration of Fuel Removal Projects*; Rural Technology Initiative; July 2003, available at http://www.ruraltech.org/pubs/reports/fuel_removal/.

[109] See Jonathan R. Thompson, Thomas A. Spies, and Lisa M. Ganio. 2007. *Reburn severity in managed and unmanaged vegetation in a large wildfire*. Proceedings of the National Academy of Sciences, available at http://www.fs.fed.us/pnw/pubs/journals/pnw_-2007_thompson001.pdf ("In places that burned with high severity in the Silver Fire, areas that were salvage-logged and planted burned with even higher severity than comparable unmanaged areas.")

[110] *Id.* ("Some, including forest scientists, would have expected fire severity to be lower in the logged and planted sites, where large wood was removed, broadcast burning done to reduce fine surface fuels, and some vegetation management conducted possibly reducing the cover of flammable shrubs. That our findings were the opposite of this expectation indicates that the large diameter wood is not a major factor in flammability …").

[111] D. C. Donato, J. B. Fontaine, J. L. Campbell, W. D. Robinson, J. B. Kauffman, B. E. Law. *Post-Wildfire Logging Hinders Regeneration and Increases Fire Risk*, available at www.sciencexpress.org 5 January 2006.

There is little empirical support for the idea that salvage logging reduces the intensity or severity of subsequent fire. Recent data show an actual increase in fire severity where post-fire logging had occurred.[112]

Standing dead trees also do not represent a high wildfire risk. Where large numbers of standing snags were present in bug killed areas burned by the Hayman fire in Colorado, fire was generally less severe compared to other areas where large numbers of dead trees were absent.

> In addition to wildfires, the Hayman Fire burned over another type of natural fuel modification: an area affected by a spruce budworm outbreak. Most Douglas-fir in the area between points 47 and 48 on figure 63 were killed by spruce budworm in the early 1990s with subsequent mortality in remaining trees from Douglas-fir beetle. Surface fuel loads were not excessive, since most of the Douglas-fir snags remained standing. The only live trees remaining prior to the Hayman fire were scattered ponderosa pine and the reduction in crown cover due to insect mortality seemed to affect fire behavior. The fire spread towards the southeast through this area during the relatively inactive period between the runs of June 9 and 17. The fire burned mostly as a surface fire on both sides of Westcreek, with small patches of crown fire activity. From the air, the burn appeared less severe than in areas outside the budworm affected area (fig. 70).[113]

Zald & Dunn (2018) conducted a careful study of the effects of forest management on fire severity in SW Oregon and found that plantation forestry tends to increase fire severity under a wide range of weather conditions:

> ... [W]e found daily fire weather was the most important predictor of fire severity, followed by stand age and ownership, followed by topographic features. Estimates of pre-fire forest biomass were not an important predictor of fire severity. ...Our findings suggest intensive plantation forestry characterized by young forests and spatially homogenized fuels, rather than pre-fire biomass, were significant drivers of wildfire severity. … [W]e believe our results have implications across a much broader geographic area. First, it brings into question the conventional view that fire exclusion in older forests is the dominant driver of fire severity across landscapes. … [I]n the landscape we studied, intensive plantation forestry appears to have a greater impact on fire severity than decades of fire exclusion. Second, higher fire severity in plantations potentially flips the perceived risk and hazard in multi-owner landscapes,

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[112] McIver, James D.; Starr, Lynn; [Technical Editors] 2000. *Environmental effects of postfire logging: literature review and annotated bibliography,* Gen. Tech. Rep. PNW-GTR-486. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 72 p., available at http://www.fs.fed.us/pnw/pubs/gtr486.pdf; Harma K., and P. Morrison. 2002. *Analysis of Vegetation Mortality and Prior Landscape Condition, 2002 Biscuit Fire Complex.* Pacific Biodiversity Institute, available at http://web.archive.org/web/-20060518211529/http://www.siskiyou.org/issues/pbivegetative.pdf; Dennis C. Odion, Evan J. Frost, James R. Strittholt, Hong Jiang, Dominick A. Dellasala, and Max A. Moritz. 2004. *Patterns of Fire Severity and Forest Conditions in the Western Klamath Mountains, California*. Conservation Biology. Volume 18 Issue 4 Page 927 - August 2004, available at http://www.blackwell-synergy.com/links/doi/10.1111/j.1523-1739.2004.00493.x.

[113] Graham, Russell. 2003. *Hayman Fire Case Study*. Rocky Mountain Research Station Report RMRS-GTR-114. p 144, available at http://www.fs.fed.us/rm/pubs/rmrs_gtr114.html.

> because higher severity fire on intensively managed private lands implies they are the greater source of risk than older forests on federal lands.[114]

Similarly, Stone et al (2008) reviewed the conditions before and after the 2003 Cooney Ridge fire in Montana and found that

> Much more private land burned severely compared to public land [See Figures 3 and 4 below]. Heavily logged areas and tree plantations have been known to burn more extensively than intact forests (Brown 2002). Much of the private land within the fire perimeter had been recently heavily logged for timber extraction, not for the purpose of fire hazard reduction. ... Private lands in this area were recently harvested with large clear cuts.... A much lower proportion of the public land had been recently harvested.
>
> More research is needed to understand the relationship between ownership practices and severity. At the Cooney Ridge fire, patches of unburned vegetation and low severity remained after the fire, while much more of the private land burned uniformly with high severity. These results indicate that more diversified public lands management helped produce a much more diverse fire mosaic, thus better protecting this forested landscape. By comparison most private forested land burned with moderate to high severity, under likely similar weather conditions as on the public land. Our results show that, perhaps counter intuitively, heavy harvest can increase subsequent fire severity.[115]

Two fires in 2002 on the Umpqua National Forest were evaluated for their effect on the forest. Excerpts from the March 2003 Wildfire Effects Evaluation Project by the Umpqua N.F. make clear the impact of creating more tree plantations:

- Plantations had a tendency to increase the rate of fire spread and increased the overall area of stand-replacement fire effects by spreading to neighboring stands....
- Fire burned most plantations with high intensity and spread rapidly through the canopy of these young stands....
- Plantation mortality is disproportionately high compared to the total area that plantations occupied within the fire perimeter....

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[114] Harold S. J. Zald, Christopher J. Dunn. 2018. *Severe fire weather and intensive forest management increase fire severity in a multi-ownership landscape*. Ecological Applications. 26 April 2018, available at https://doi.org/10.1002/eap.1710; see also, https://phys.org/news/2018-04-high-wildfire-severity-young-plantation.html.

[115] Carter Stone, Andrew Hudak, Panelope Morgan 2008. *Forest Harvest Can Increase Subsequent Forest Fire Severity*. PSW-GTR-208, pp 525-534, available at https://www.fs.fed.us/psw/publications/documents/psw_gtr208en/psw_gtr208en_525-534_stone.pdf, *in* González-Cabán, Armando, tech. coord. 2008. *Proceedings of the second international symposium on fire economics, planning, and policy: a global view*. Gen. Tech. Rep. PSW-GTR-208, Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture. 720 p., available at https://www.fs.fed.us/psw/publications-/documents/psw_gtr208en/.

- Crown fire spreads readily through these young stands: rates of fire spread can be high, and significant areas or mortality can occur in and adjacent to these stands....[116]

Finally, the report says that the fire behavior in forest that had not been converted to tree farms was normal: "The pattern of mortality in the unmanaged forest resembles historic stand-replacement patch size and shape."[117]

The 2013 BAER Report for the Douglas Complex Fires in SW Oregon said "While the severity varied throughout the fire area, young timber plantations carried the fire while older stands tended to be more resistant. This is mostly due young timber plantations having a high density of ground fuels."[118]

BLM did not consider how creating highly flammable plantations as a result of increased salvage logging will affect future fire risk, particularly in landscapes – like that in southwest Oregon – that are highly fragmented and managed by multiple owners.

F. The proposed CX will have significant adverse effects as a result of temporary and permanent road construction and use.

The proposed CX would allow thoughtless expansion of the BLM's already bloated transportation system. The salvage CX would allow the construction of up to 1 mile of new permanent road and no limitation on new temporary road construction. This proposal is contrary to decades of BLM travel and transportation management policy requiring the agency to right-size its outsized system to one that is ecologically and fiscally sustainable and to ensure that all public motorized vehicle use occurs in accordance with various designation criteria that necessitate a public process and environmental review. Instead, science and policy dictate that the agency should focus its limited resources on *eliminating* unneeded roads and trails and reducing the deferred maintenance backlog for needed roads and trails, thereby enhancing the quality of recreation opportunities and access. Given the well-documented significant impacts associated with road building and motorized use on public lands, the BLM has not made, and cannot make, the requisite showing that the salvage CX will not have individually or cumulatively significant effects on the human environment.

Much of the BLM's road system suffers from inadequate maintenance. These roads – both system and non-system – are contributing sediment pollution to streams and water bodies, resulting in impacts to fish and other aquatic and riparian systems. On some lands, stream segments are listed under the Clean Water Act as impaired because of road-derived sediment pollution. These roads also fragment wildlife habitat, reduce wildlife connectivity, facilitate the spread of non-native, invasive species, increase the risk of fire ignitions, and increase opportunities for poaching and looting of archaeological sites.

The scientific literature, including numerous government reports and studies, document the many environmental problems attendant to the agency's large and under-maintained road system. A 2001 Forest Service technical report by Gucinski *et al.* entitled "Forest Roads: A

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116 *Wildfire Effects Evaluation Project*. March 2013, available at http://web.archive.org/web/-20041118062947/http://www.fs.fed.us/r6/umpqua/publications/weep/weep.html.
117 *Id.*
118 *Douglas Complex Fire Burned Area Emergency Rehabilitation Plan*. BLM Douglas Complex BAER Team. Sept 5, 2013. (p 12).

Synthesis of Scientific Information," still provides an accurate summary and description of the science regarding the myriad damaging impacts of roads on the landscape.[119] The Gucinski report followed on the heels of the Forest Service's final EIS on the Roadless Area Conservation Rule, which found significant ecological and other benefits to prohibiting the construction of new roads within roadless forest. In a 2010 technical report, the Forest Service summarized some of the problems associated with the road system:

> Expansive road networks, however, can impair water quality, aquatic habitats, and aquatic species in a number of ways, *often to a greater degree than any other activities conducted in forested environments* . . . . Roads intercept surface and subsurface flows, adding to the magnitude and flashiness of flood peaks and accelerating recession of flows . . . . Road networks can also lead to greater channel incision, increased sedimentation, reduced water quality, and increased stream habitat fragmentation. Modern road location, design, construction, maintenance, and decommissioning practices can substantially mitigate these impacts, but most forest roads were built using older methods and are not adequately maintained owing to a lack of resources. In addition, many critical drainage components like culverts, are nearing or have exceeded their life expectancy.
>
> These deteriorating road conditions threaten our ability to manage forests and pose significant risks to watersheds. Climate change elevates these risks by increasing the frequency and magnitude of large storm events and flooding.[120]

While these reports focused on the Forest Service's road system, the scientific conclusions are applicable to lands managed by the BLM as well.

Exhibit 1 to this comment letter[121] surveys the extensive and best-available scientific literature on a wide range of road-related impacts to ecosystem processes and integrity on National Forest lands, but it is applicable to BLM-managed lands as well. These adverse impacts are long-term, occur at multiple scales, and often extend far beyond the actual "footprint" of the road. For example, erosion, compaction, and other alterations in forest geomorphology and hydrology associated with roads seriously impair water quality and aquatic species viability.[122] Roads disturb and fragment wildlife habitat, altering species distribution, interfering with critical life functions such as feeding, breeding, and nesting, and resulting in loss of biodiversity.[123] Roads also facilitate increased human intrusion into sensitive areas, resulting in poaching of rare plants and animals, human-ignited wildfires, introduction of exotic species, and damage to archaeological resources.[124]

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[119] Gucinski, Hermann *et al.* 2001, Gen. Tech. Rep. PNW-GTR-509, *Forest Roads: A Synthesis of Scientific Information, available at* http://www.fs.fed.us/pnw/pubs/gtr509.pdf.
[120] USDA Forest Service, General Technical Report PNW-GTR-812, *Water, Climate Change, and Forests: Watershed Stewardship for a Changing Climate*, p. 72 (2010) (emphasis added), available at https://www.fs.fed.us/pnw/pubs/pnw_gtr812.pdf.
[121] Exhibit A, *Transportation Infrastructure and Access on National Forests and Grasslands A Literature Review* (May 2014).
[122] *Id.* at 2-4, 6-8.
[123] *Id.* at 4-8.
[124] *Id.* at 9.

The Forest Service has long acknowledged that temporary roads can have significant impacts. In its 2000 Final EIS analyzing the Roadless Area Conservation Rule – which generally barred the construction of both permanent and temporary roads – the agency stated:

> Although only used for relatively short periods, temporary roads present most of the same risks posed by permanent roads, although some may be of shorter duration. Many of these roads are designed to lower standards than permanent roads, are typically not maintained to the same standards, and are associated with additional ground disturbance during their removal…. While temporary roads may be used for periods ranging up to ten years, and are then decommissioned, their short- and long-term effects can be extensive to terrestrial species and habitats.[125]

The Final EIS on the Roadless Rule also noted that "[t]he use of temporary roads may have the same long lasting and significant ecological effects as permanent roads, such as the introduction of nonnative vegetation and degradation of stream channels."[126] Temporary "[s]kid roads and trails, log landings, and similar disturbances within the [timber] sale area are the main cause of soil erosion and can contribute up to 90% of the sediment generated by timber sale activity (Patric 1976; Swift 1988)."[127] The Roadless Rule Final EIS acknowledges that temporary road construction can cause increased risk of surface erosion and landslides, but that this varies widely and depends on local site characteristics.[128]

Climate change intensifies the adverse impacts associated with roads. For example, as the warming climate alters species distribution and forces wildlife migration, landscape connectivity becomes even more crucial to species survival and ecosystem resilience.[129] Climate change is also expected to lead to more extreme weather events, resulting in increased flood severity, more frequent landslides, altered hydrographs, and changes in erosion and sedimentation rates and delivery processes.[130] Many public land roads, however, were not designed to any engineering standard, making them particularly vulnerable to these climate alterations. Unauthorized non-system routes created by haphazard use were decidedly not designed to any engineering standard. And even those roads and trails designed for

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[125] USDA Forest Service, Final Environmental Impact Statement, Roadless Area Conservation Rule (Nov. 2000) at 3-150, available at https://www.fs.usda.gov/Internet-/FSE_DOCUMENTS/stelprdb5057895.pdf; *see also id.* at 3-30 ("temporary roads are not designed or constructed to the same standards as classified roads and are not intended to be part of the National Forest System Transportation System. The results can be a higher risk of environmental impacts over the short run."); *id.* at 3-164 (concluding that "[t]emporary roads present most of the same risks posed by permanent roads" to rare plants, "although some [impacts] may be of shorter duration.").
[126] *Id.* at 2-18.
[127] *Id.* at 3-45.
[128] *Id.* at 3-45.
[129] Exhibit A, Transportation Infrastructure and Access on National Forests and Grasslands A Literature Review (May 2014) at 9-11; *see also* USDA Forest Service, *National Roadmap for Responding to Climate Change* (2011), *available at* https://www.fs.fed.us/climatechange/pdf/Roadmapfinal.pdf (recognizing the importance of reducing fragmentation and increasing connectivity to facilitate climate change adaptation).
[130] Exhibit 1, 9.

storms and water flows typical of past decades may fail under future weather scenarios, further exacerbating adverse ecological impacts, public safety concerns, and maintenance needs.[131]

Motorized vehicle use on BLM roads and trails is also associated with a host of resource impacts. While dirt bikes, all-terrain vehicles, side-by-sides, and other off-road motorized vehicles (ORVs) can provide important access and recreational enjoyment, over four decades of research has documented significant adverse environmental and social impacts associated with their use on public lands. Impacts can include physical resource damage such as soil compaction, erosion, crushing of vegetation, spread of invasive species, stream sedimentation, and air pollution. ORV use can also degrade and fragment wildlife habitat, diminishing resilience to climate change, while ORV noise, dust, emissions, and the presence of humans can disrupt wildlife processes such as breeding, feeding, migration, and nesting. Damage to cultural and archaeological resources, including unintentional crushing of artifacts and increased vandalism and looting, is also associated with ORV use. Finally, ORV use poses public safety and user conflict concerns. In particular, the noise, dust, fumes, and physical resource damage associated with ORV use can seriously impair the experience of the majority of public lands visitors engaging in non-motorized forms of recreation.[132] Indeed, federal courts have recognized the importance of robust NEPA analysis in addressing resource impacts associated with ORV use. *Wilderness Soc'y v. U.S. Forest Serv.*, 850 F. Supp. 2d 1144, 1168 (D. Idaho 2012) ("It goes without saying that reducing ORV use is beneficial to resources. That conclusion, however, has already been reached by the laws and regulations requiring [travel management planning]. What is required of the agency is an analysis comprised of something more than restating that conclusion").

The proposed CX includes no limitations on or estimates of the number of times the salvage CX could be used, with its use potentially encompassing hundreds or even thousands of miles of additions to the road system each year. Indeed, the lack of a "cap" on this proposed CX provides some insight into why it is inappropriate in the first place: it would be impossible to create a CX that ensures the road system doesn't continue to swell while still allowing for new roads when needed. Road decisions require analysis and public input at multiple scales, from the risks and needs for particular roads to the sustainability of the road system as a whole. Such analyses do not fit into a CX, but instead requires the BLM to undergo a travel management planning process, as required under FLPMA. The BLM has provided no rational justification for its conclusion that the proposed category will not have individually or cumulatively significant impacts, and as a result the proposed CX is arbitrary, capricious, and contrary to the record.

G. The road mileage limitation is arbitrary and capricious.

The Verification Report explains that only one of eighteen salvage project EAs that the BLM reviewed involved construction of permanent new logging roads. Verification Report, 11.

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[131] USDA Forest Service 2010.

[132] *See generally* Switalski, Adam. 2018, Journal of Outdoor Recreation and Tourism, *Off-highway vehicle recreation in drylands: A literature review and recommendations for best management practices, available at* [*https://www.sciencedirect.com/science/article/pii/-S221307801830001X*](https://www.sciencedirect.com/science/article/pii/-S221307801830001X). *See also*, T. Adam Switalski & Allison Jones, *Off-road Vehicle Best Management Practices for Forestlands: A Review of Scientific Literature and Guidance for Managers*, Journal of Conservation Planning 8:12-24 (2012).

Thus, until this proposed rulemaking, approximately 95% of BLM's post-disturbance management decisions has forgone permanent road construction, and the BLM's policy shift to allow permanent road construction without detailed NEPA analysis is new. And yet the BLM can only cite to a single example to support this policy shift, which is a slender reed indeed upon which to base a nationwide rulemaking. 5 U.S.C. § 706(2)(A).

H. The definition of "dead and dying" is arbitrary and capricious.

The proposed CX states that "a dying tree is defined as a standing tree that has been severely damaged by forces such as fire, wind, ice, insects, or disease, and that in the judgement of an experienced forest professional or someone technically trained for the work, is likely to die within a few years." 85 Fed. Reg. 33,699. The proposed CX further expands this definition to include the "removal of dead or dying trees *and live trees* needed for landings, skid trails, and road clearing." *Id*. at 33,698 (emphasis added). This definition is not based on the best available science, and arbitrarily vests the line officer with unbounded discretion. This is arbitrary and capricious.

First, the best available science indicates that accurately determining the likely mortality from a disturbance event is extremely difficult. While there are some acceptable methods of estimating tree mortality, "for some models (e.g., Kobziar et al., 2006; Ryan and Amman, 1994) the lower confidence limit indicates that the average discriminatory ability can be only slightly better than a coin toss."[133] That said, key indicators of mortality, such as percent of crown volume scorched, cambium kill rating, and other metrics provide some benchmarks that foresters can use to estimate the likelihood that a tree will die from a disturbance event.[134] *Id*.

The proposed rule does not require the use of verified methodologies to estimate likely mortality, instead relying on "the judgment" of "an experienced forest professional" – the qualifications of which are not specified – or "someone technically trained for the work" – the qualifications of which are also not specified. "Someone technically trained for the work" is fatally vague, and undermines the BLM's expectation that it will receive deference to the interpretations of these individuals because they are clearly not "experts." *See*, *Lands Council v. McNair*, 629 F.3d 1070 (9th Cir. 2010).

Second, the proposed regulation is impermissibly vague because there is no metric against which to evaluate whether a tree is "likely" to die. Is "likely" a 50.1% chance? A 51% chance? Some other relative probability of occurrence? Without a definition, metric, or sideboards, there will be no limit to the responsible official's discretion, allowing the accumulation of negative impacts, although individually determined to be insubstantial, that are cumulatively significant. This is arbitrary and capricious.

I. The acreage limitation is arbitrary and capricious.

The Verification Report indicates that the BLM reviewed 18 projects for possible significance in developing the proposed CX. Verification Report, 10. On average, these projects were approximately 1,321 acres in size, with the largest project (8,700 acres)

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[133] Ganio and Progar, *Mortality predictions of fire-injured large Douglas-fir and ponderosa pine in Oregon and Washington, USA*, Forest Ecology and Management 390 (2017) 47–67.
[134] *Id.*

dramatically skewing the average upwards. Based on this nonrandom sample of projects, the BLM should have proposed a CX of no more than 1,321 acres, not 5,000 acres. There is no support for a CX of such a large size, when the size of reviewed projects was substantially smaller. 5 U.S.C. § 706(2)(A).

As the Verification Report explains, of the 779 BLM salvage projects conducted since 1986, only *ten* involved logging on more than 1,000 acres. Verification Report, 7. This evidence indicates that there is in fact no *need* for a new CX category, regardless of whether BLM *desires* such expansive authority. If the BLM desires to salvage more than 1,000 acres, the agency can utilize the existing NEPA mechanisms to do so through the preparation of a site-specific EA or EIS as it has in the past for projects larger than 250 acres, as it has done on average less than once every three years.

Moreover, the proposed CX would authorize the BLM to completely salvage log (i.e,. remove 100% of a disturbed forest) a 1,000-acre disturbance area. Verification Report, 15. Thus, for salvage logging projects up to 1,000 acres, every single area within the disturbance area could be logged. But the Verification Report states that "untreated areas were a factor in finding non-significance" in the EAs examined by the BLM, meaning that the BLM is rejecting the very mitigation measure (i.e., retaining unharvested areas) that it claims resulted in a FONSI. BLM cannot rely on this finding to justify the proposed CX.

Regardless, acreage is a poor indicator of significance. Some projects without significant impacts are greater than 5,000 acres, while some projects with significant impacts are less than 5,000 acres in size. *E.g.*, *Conservation Congress v. Forest Service*, 2013 WL 4829320, at *1 (E.D. Cal. 2013) (492 acres); *House v. Forest Service*, 974 F. Supp. 1022 (E.D. Ky. 1997) (EIS necessary for proposal to log 199 acres); *Sierra Club v. Bosworth*, 352 F. Supp. 2d 909 (D. Minn. 2005) (EIS necessary for proposal to log 1,689 acres); *Klamath-Siskiyou Wildlands Ctr. v. Forest Service*, 373 F. Supp. 2d 1069 (E.D. Cal. 2004) (EIS necessary for proposal to log 1,354 acres).

By omitting projects that required an EIS for harvest of fewer than 5,000 acres, the agency ignores the most important factor it should have considered: what factors explain the difference between projects with and without significant impacts. Each of those relevant differences must be reflected in the language of the CX or in the list of extraordinary circumstances. Failing this, the proposed CX is arbitrary, capricious, and not in accordance with law.

VI. The proposed CX would undermine Congressionally imposed limits.

The BLM suggests that "it is reasonable to conclude there is Congressional interest in facilitating the expeditious implementation of these kinds of projects" because Congress has given the Forest Service statutory authority to reduce hazardous fuels on national forestlands. Verification Report, 24. This is a spurious statement not supported by the facts or law.

The congressional CX authority BLM refers to is the 3,000-acre CX for addressing insect and disease (Healthy Forest Restoration Act, HFRA, CE) and the 3,000-acre CX for wildfire risk reduction projects (Farm Bill CE). Verification Report, 24. Importantly, had Congress intended to extend this authority to the BLM, it could have done so when it created these new authorities; but the fact that it did not evidences the fact that this exclusion was intentional and that Congress did *not* in fact express "interest" in expediting post-disturbance projects on the public lands managed by BLM. *Barnhart v. Peabody Coal Co*., 537 U.S. 149, 168 (2003) (the canon of construction *expressio unius unius est exclusio alterius* indicates that "items not mentioned were excluded by deliberate choice, not inadvertence").

Congressional categorical exclusions as a matter of law are irrelevant to the *administrative* determination of whether a category of action (here, salvage logging) will have significant impacts. Indeed, Congress enacted these authorities to incentivize the Forest Service to have a significant, albeit very specific, kind of impact on the landscape, and Congress declared as a matter of law (not fact) that the categories could be "considered" excluded from NEPA analysis and documentation.

In granting the Forest Service the authority to conduct hazardous fuels and forest health treatments at scale, Congress included a number of sideboards it believed were necessary to ensure that the projects would be in the public interest. While we do not agree that these congressional sideboards are adequate, they do serve to indicate congressional intent, specifically limiting the application of categorical exclusions in limited situations. Those sideboards include:

- Limits on project purposes (namely, to address risks caused by insect and disease and wildfire, but expressly not post-fire or post-disturbance logging); but as stated elsewhere in these comments, post-disturbance logging is highly controversial, indicating that the types of projects Congress had in mind when authorizing a CE for the Forest Service are not the same types of project that the BLM is proposing with its CX;

- A size limit of 3,000 acres; but 3,000 acres is an arbitrary number based on no information at all, and in no way suggests that BLM's 5,000 acre CX is based on any more rational grounds;

- Transparent and inclusive collaborative project development, which helps to ensure that the projects are focused on the highest-priority work;

- Procedural safeguards of public notice and scoping, which ensure that members of the public are aware of the project and can provide input through the collaborative process;

- A requirement to maximize retention of old-growth and large trees, which helps to protect rare ecological values;

- Prohibition of activities in wilderness and roadless areas or where there are extraordinary circumstances, which helps to avoid unintended harmful impacts;

- A prohibition of the construction of permanent roads, which can quickly lead to cumulative significant impacts;

- A requirement that temporary roads be decommissioned within 3 years, to ensure that those temporary roads are not eventually added to the road system through accretion;

- Reporting requirements to Congress on the use of the authority, to provide an extra measure of accountability.

16 U.S.C. §§ 6591b, 6591d. While we would not necessarily agree that these sideboards are adequate, at least Congress has seen fit to include them in its legislative CEs for the Forest Service. But BLM has not proposed similar restrictions on its administrative CX, further undermining possible support for it. As it stands, we do not and cannot support BLM's proposed CX.

It is important to note again that the actions authorized under these authorities, even with all their sideboards, will not necessarily prevent significant impacts as a matter of *fact*, but they are instead "considered" categorically excluded from further analysis and documentation as a matter of *law*. Indeed, Congress gave the Forest Service these authorities to make a significant change on the landscape. The sideboards are in place to balance Congress's national priorities against the reality that aggressive management can have locally unacceptable impacts.

By proposing a CX that is larger in scope and scale than the legislated CEs, the BLM is proposing to violate Congressionally imposed limits. Congress limited the referenced CX authority to 3,000 acres; but BLM provides no explanation for why its CX is "appropriately" sized at 5,000 acres. Thus the agency cannot rely on congressional CEs for benchmarking its proposed salvage CX.

VII. Cumulative Effects.

BLM proposes to retain its existing 250-acre CX, as well as to expand that authority to 5,000 acres. No where in the proposed rulemaking does BLM consider the cumulative environmental consequences of implementation of the 250-acre CX in addition with implementation of its new, much larger CX. Nor does BLM consider the cumulative effects of these two CX in addition to its recently proposed CX for pinyon-juniper removal, 85 Fed. Reg. 14,700 (March 13, 2020). NEPA requires this cumulative effects analysis.

VIII. Determinations of NEPA Adequacy are Arbitrary and Capricious.

The Verification Report suggests that the BLM may use determinations of NEPA adequacy (DNAs) to further the use of the proposed salvage CX. Verification Report, 13 ("Specific location, design, size, and timing of individual actions will be identified by the BLM through subsequent tiered NEPA analysis or through Determinations of NEPA Adequacy (DNAs) to support individual decisions for site-specific actions"). However, neither NEPA nor the CEQ regulations contemplate such a tool. BLM's use of DNAs began as a "best practice" as early as 1999 for the incorporation of previous "existing environmental analyses" by reference into a new decision document. *Pennaco Energy, Inc. v. U.S. Dep't of Interior*, 377 F.3d 1147, 1152 (10th Cir. 2004).[135] If it had been confined to that context, we would likely not be discussing it here. Its use quickly spread, however, to other types of decisions, because prior environmental analyses can be relevant to current decisionmaking in several distinct ways.

Using examples, BLM's NEPA Handbook (H-1790-1 at Ch. 5) describes three potential uses for a DNA, and identifies when public participation is required in preparing the DNA itself (as distinct from public participation required for a separate NEPA process):

[135] 68 Fed. Reg. 52,595, 52,599 (2003); 72 Fed. Reg. 45,504, 45,538 (2007); 73 Fed. Reg. 126 (2008).

- First, a DNA can be used to determine whether a prior decision can be used in support of a later, similar project. The example given is a permit for a second OHV race on the same route as a previously analyzed race. In these circumstances, the prior analysis can be incorporated by reference into a new decision. If there are differences between the projects—for example, if the type of vehicle was different in the second race—then BLM seeks public input on its use of the DNA to determine whether those differences are relevant to the type or degree of environmental impacts.

- Second, BLM allows the use of DNAs to determine whether a proposal is part of a broader ongoing action that was previously analyzed. As an example, BLM describes a particular timber sale that may have been previously analyzed in a landscape-level timber harvest project. The relevant question is whether a broader NEPA document has already identified and analyzed the impacts of the instant portion of the ongoing action—or, to paraphrase, did the previous decision "get all the way to the ground"? If the prior analysis did not address the specific locations for the timber sale, then BLM would seek public input on the use of the DNA to determine whether the newly identified location has unique or different considerations from what was disclosed more generally in the prior analysis.

- Third, BLM allows use of DNAs to determine whether there is new information requiring supplementation for an ongoing action. As an example, BLM offers a proposed road that has been analyzed in an older NEPA document, but for which a decision was delayed by "several years." The DNA would be used to determine whether new information or circumstances are relevant to the decision's potential impacts. BLM has broad discretion to seek public input in the use of the DNA if it believes the public may have relevant contributions with respect to new information or circumstances.

Of these uses for a DNA, the first relates to a *new* decision that relies on the analysis from a *separate* decision: the decisionmaker determines that the previous analysis is adequate to *support the subsequent decision*. In the second scenario, the decisionmaker evaluates whether the previous analysis is adequate *standing alone* because the later action was included (and adequately analyzed) in the prior decision. In the third scenario, the decisionmaker determines whether the previous analysis is adequate, again standing alone, because it is being used to support the *same decision* it was associated with in the first place.

These important differences have caused BLM to misuse DNAs and left it subject to litigation. Decisionmakers occasionally have the misperception that a finding that the previous analysis is *adequate* means that no additional NEPA process is required. That is true only with respect to the second and third scenarios. Specifically, in the second scenario, if the prior analysis *did* get all the way to the ground, then no additional NEPA documentation would be required. But if the prior analysis *did not* get all the way to the ground, then a subsequent "tiered" decision would be needed to address the previously unanalyzed facts or issues. Similarly, in the third scenario, if there was no new information, then the decision could be made on the basis of the previous but unconsummated analysis. If, on the other hand, there *is* new information, then the decision would require new analysis with a fresh NEPA process to seek public input on the new or supplemental analysis.

For the first scenario, however, additional NEPA documentation is required regardless of the outcome of the DNA process because there is a *new and distinct decision*. If the prior analysis is adequate to support the new decision in part or in full, then it can be incorporated by reference into the new decision. If the prior analysis is not fully adequate, then new analysis - potentially tiering to or supplementing the earlier analysis - is required to support the new decision. Either way, however, the new NEPA decision must be subject to applicable public notice and comment requirements.

BLM gets into trouble when it attempts to use a DNA to substitute for a new NEPA decision—i.e., when it finds that a previous analysis related to a previous decision is "adequate" and then fails to go through the NEPA process for a temporally or spatially distinct decision. *E.g.*, *Triumvirate LLC v. Bernhardt*, 367 F. Supp. 3d 1011 (D. Alaska 2019) (in forgoing an EA, BLM improperly relied on DNA to issue another outfitter's permit even though the permits would have had similar effects); *compare Friends of Animals v. BLM*, 232 F. Supp. 3d 53 (D.D.C. 2017) (approving use of DNA where the new gather was part of an ongoing action in the same herd management area), *with Friends of Animals v. BLM*, 2015 WL 555980 (D. Nev. 2015) (reliance on DNA violated NEPA where the new gather was an action of different scope and intensity); *W. Watersheds Project v. Zinke*, 336 F. Supp. 3d 1204, 1212 (D. Idaho 2018) (enjoining oil and gas leasing in sage grouse habitat via DNAs without additional public notice and comment).

The BLM's proposed CX rulemaking neither indicates the circumstances in which the utilization of a DNA would be appropriate, nor explains what additional process is "applicable" to those circumstances. Indeed, the use of DNAs is not even mentioned in the Federal Register notice proposing the salvage CX, but instead is only mentioned in a single sentence in the supporting Verification Report. As a result, the proposal is so vague and ambiguous that the public cannot fairly be expected to respond in comments. If the BLM intends to move forward with a DNA procedure applicable to the proposed CX, it must clarify its intent and re-notice the section for additional comment.

IX. The Proposed CX Would Violate Public Participation Requirements Under Section 106 of the National Historic Preservation Act.

Should the proposed CX be finalized, extensive post-disturbance salvage logging would affect historic and cultural resources thus triggering National Historic Preservation Act (NHPA) requirements. If the BLM proceeds with this rulemaking, the agency will no longer be able to use NEPA to comply with NHPA's requirements for public participation. While the agency could theoretically provide opportunities for input outside of the NEPA process, the proposed CX itself does not address this need.

Like NEPA, the NHPA is a "procedural statute requiring government agencies to stop, look, and listen before proceeding." *Dine Citizens Against Ruining Our Env't v. Bernhardt*, 923 F.3d 831, 839 (10th Cir. 2019) (citation omitted). Specifically, Section 106 of NHPA requires the BLM to consider the effect of its actions on any "historic property" before implementing that action. 54 U.S.C. § 306108. A "historic property" is "any prehistoric or historic district, site, building, structure, or object included on, or eligible for inclusion on, the National Register, including artifacts, records, and material remains relating to the district, site, building, structure, or object." *Id*. § 300308. There are four basic steps to complying with this requirement.

- First, the BLM must "[d]etermine and document the area of potential effects." 36 C.F.R. § 800.4(a)(1). The "area of potential effects" is "the geographic area or areas within which an [action] may directly or indirectly cause alterations in the character or use of historic properties." *Id.* § 800.16(d).

- Second, the BLM must "identify historic properties within the area of potential effects." *Id.* § 800.4(b). This requires a reasonable and good faith effort. *Id.* § 800.4(b)(1).

- Third, if the BLM determines that no historic properties are present it must convey that finding to State and Tribal Historic Preservation Offices. *Id.* § 800.4(d). If those Offices do not object to that finding, the Section 106 process is complete. If the BLM finds that historic properties are present, it must determine if those properties will be adversely impacted by the project. *Id.* § 800.5. "An adverse effect is found when [an action] may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association." *Id.* § 800.5(a)(1). An "adverse effect" "may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance or be cumulative." *Id.* It may also include "[i]ntroduction of visual, atmospheric or audible elements that diminish the integrity of the property's significant historic features." *Id.* § 800.5(a)(2)(v).

- Fourth, if the action will adversely impact a historic property, the BLM, in consultation with other parties, must "develop and evaluate alternatives or modifications to the undertaking that could avoid, minimize, or mitigate adverse effects on historic properties." *Id.* § 800.6(a). If consultation is unsuccessful, the Advisory Council on Historic Preservation, in most circumstances, is required to provide official advisory comments to the BLM. *See id.* § 800.7.

"The views of the public are essential to informed Federal decisionmaking in the section 106 process." *Id.* § 800.2(d)(1). As a result, to comply with Section 106, the BLM must "seek and consider the views of the public in a manner that reflects the nature and complexity of the undertaking and its effects on historic properties...[and] provide the public with information about an undertaking and its effects on historic properties *and seek public comment and input*." *Id.* § 800.2(d)(1)-(2) (emphasis added). Specific to step four – developing alternatives and modifications to mitigate adverse effects on historic properties – the BLM is explicitly instructed to "provide an opportunity for members of the public to express their views on resolving adverse effects of the [action to]...ensure that the public's views are considered in the consultation." *Id.* § 800.6(a)(4).

The most straightforward approach to meeting these requirements, and the approach specifically contemplated in the NHPA regulations, is to "coordinate compliance with section 106 . . . with any steps taken to meet the requirements of the National Environmental Policy Act." *Id.* § 800.8(a)(1). But that approach has limitations. First, even if an action has been categorically excluded from NEPA review, the agency must still provide public notice and comment opportunities pursuant to NHPA if the project constitutes "an undertaking." *Id.* § 800.8(c). Because an "undertaking" is any "project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a Federal agency," many BLM actions will qualify as undertakings necessitating public participation in Section 106 review. *See* §

800.16(y). Second, for non-CX actions, and CX projects that constitute “undertakings,” the BLM can rely on its NEPA procedures to fulfill Section 106’s requirements but only if, among other things, the BLM “[i]dentif[ies] historic properties and assess[es] the effects of the [action] on such properties,” “involves the public,” and “[d]evelop[s] in consultation with identified consulting parties alternatives and proposed measures that might avoid, minimize or mitigate any adverse effects of the [project] on historic properties.” *Id.* § 800.8(c). If the agency’s approach to NEPA does not meet those requirements, they must be provided separately to comply with NHPA.

Several elements of the proposed CX reduce the threshold of public involvement below that required by NHPA, preventing the BLM from using its NEPA process to comply with NHPA and requiring the agency to provide public participation opportunities beyond those contemplated in the proposed CX. Projects that are up to 5,000 acres in size are almost guaranteed to intersect historic properties in many parts of the country requiring the BLM to “seek public comment and input” under NHPA. *Id*. § 800.2(d)((2). Because the agency’s NEPA regulations would not provide that opportunity, the agency would have to provide other opportunities for public engagement, diminishing any supposed efficiency gains achieved by excluding the projects from public review under NEPA. Failure to involve the public in those circumstances would violate NHPA.

The use of “Determinations of NEPA Adequacy” also creates problems for NHPA compliance. Courts have upheld BLM’s use of DNAs for Section 106 purposes but only where the DNA independently fulfilled the agency’s NHPA obligations. *See Summit Lake Paiute Tribe of Nevada v. U.S. Bureau of Land Mgmt*., 496 F. App'x 712 (9th Cir. 2012). Use of DNAs does not allow agencies to escape their Section 106 responsibilities.

Finally, NHPA regulations require the BLM to consider an action’s likely effects on historic properties when determining whether to prepare an environmental impact statement. *See* 36 C.F.R. § 800.8. That is precisely that type of question that is appropriately considered in an EA. Even if the agency chooses not to complete an EA, with the hope that it can utilize a CX, it must consider a project’s effects on historic properties *before* making that decision. As a result, the agency must have some idea of the effect of its actions on historic properties before deciding to use a CX. This is not an efficiency gain – the agency will have to consider that same questions either before signaling its intent to use a CX or while preparing an EA. Failure to do so would violate both NEPA and the NHPA.

X. The Proposed CX is a “Major rule” for Purposes of the Congressional Review Act (CRA).

The Federal Register notice opening the proposed rule for public comment does not indicate whether the proposed CX is a major rule for the purposes of the Congressional Review Act, 5 U.S.C. § 801 et seq. Given the environmental and socioeconomic impacts likely caused by this rule, we believe the proposed rule would qualify as a “major” rule. 5 U.S.C. § 804. We remind the BLM that the CRA applies to both major and non-major rules, and that the agency has a statutory obligation to submit the final rule to congress for review.[136]

[136] *Id.*

XI. Conclusion.

The BLM will not conclude this rulemaking successfully. Rather than throw good money and time after its ill-conceived and unsupported proposal, the agency should abandon this effort.

Sincerely and with regards on behalf of the undersigned organizations and individuals,

Susan Jane M. Brown, Public Lands Director & Staff Attorney
Western Environmental Law Center
4107 NE Couch Street
Portland, OR. 97232
brown@westernlaw.org
503-914-1323

John Robison
Idaho Conservation League
PO Box 844
Boise, ID. 83701
208-345-6933
jrobison@idahoconservation.org

Northcoast Environmental Center
415 I St
Arcata, CA. 95521
240-418-0707
rangerdans@msn.com

Kristen Boyles
Earthjustice
810 Third Ave., Suite 610
Seattle, WA. 98104
206-343-7340 ext. 1033
kboyles@earthjustice.org

Gregory Haller
Pacific Rivers
1001 SE Water Ave, Suite 450
Portland, OR. 97214
503-228-3555
info@pacificrivers.org

Michael Dotson
Klamath-Siskiyou Wildlands Center
PO Box 102
Ashland, OR. 94520
541-488-5789
michael@kswild.org

Kimberly Baker
Klamath Forest Alliance
1477 Eastern Ave.
Arcata, CA. 95521
707-834-8826
klam_watch@yahoo.com

Thomas Wheeler
Environmental Protection Information Center
145 G. St., Suite A
Arcata, CA. 95521
707-822-7711
tom@wildcalifornia.org

Dave Werntz
Conservation Northwest
1829 10th Ave W suite b
Seattle, WA. 98119
(206) 675-9747
dwerntz@conservationnw.org

Kasey Hovik
Umpqua Watersheds
539 SE Main Street
ROSEBURG, OR. 97470
541-672-7065
kasey@umpquawatersheds.org

Joan Parker
Tulare Kings Audubon Chapter
P.O. Box 4402
Visalia, CA. 93278
559-359-0517
Tulareaudubon@yahoo.com

Chris Wright
Sierra CPR
PO Box 361
Glencoe, CA. 95232
209-256-6083
sierracpr9@gmail.com

Brenna Bell
Bark
351 NE 18th
Portland, OR. 97232
503-331-0374
brenna@bark-out.org

Dr. Florence Anoruo
Environmental Action Group
1043 Tolly Ganly Circle
Orangeburg, SC. 29118
803-997-0850
fcanoruo@gmail.com

Nick Jensen
California Native Plant Society
2707 K Street, Suite 1
Sacramento, CA. 95816
916-447-2677
njensen@cnps.org

Linda Castro
California Wilderness Coalition
520 Third Street, Suite 208
Oakland, CA. 94607
760-221-4895
lcastro@calwild.org

Donald Rivenes
Forest Issues Group
108 Bridger Ct.
Grass Valley, CA. 95945
530-477-7502
rivenes@sbcglobal.net

Laura Welp
Western Watersheds Project
15 Overlake Lane
McCleary, WA. 98557
435-899-0204
laura@westernwatersheds.org

Doug Heiken
Oregon Wild
PO Box 11648
Eugene, OR. 97440
541-344-0675
dh@oregonwild.org

Chris Krupp
WildEarth Guardians
10015 Lake City Way NE #414
Seattle, WA. 98125
206-417-6363
ckrupp@wildearthguardians.org

Dan Ritzman
Sierra Club
180 Nickerson St, #202
Seattle, WA. 98109
(206) 378-0114
dan.ritzman@sierraclub.org

Daniel Estrin
Waterkeeper Alliance
180 Maiden Ln Suite 603
New York, NY. 10038
212-747-0622
Destrin@waterkeeper.org

John Weisheit
Living Rivers & Colorado Riverkeeper
PO Box 466
Moab, UT. 84532
435-260-2590
john@livingrivers.org

David Whiteside
Tennessee Riverkeeper
50 Wilson Street
Decatur, AL. 35601
423-451-6807
dwhiteside@tennesseeriver.org

Steve Box
Environmental Stewardship
PO Box 1423
Bastrop, TX. 78602
512-300-6609
info@envstewardship.org

Jordan Macha
Bayou City Waterkeeper
2010 N Loop West, Ste 103
Houston, TX. 77018
713-714-8442
info@bayoucitywaterkeeper.org

Buck Ryan
Snake River Waterkeeper
2123 N. 16th St.
Boise, ID. 83702
864-630-6991
Buck@snakeriverwaterkeeper.org

Michael Mullen
Choctawhatchee Riverkeeper
207 Gail Street
Troy, AL. 36079
334-807-1365
riverkeeper@troycable.net

Susan Inman
Altamaha riverkeeper
127 , F St #204
Brunswick, GA. 31520
321-331-0912
Sue@altamahariverkeeper.org

Jesse Demonbreun-Chapman
Coosa River Basin Initiative/Upper Coosa Riverkeeper
5 Broad St
Rome, GA. 30161
706-232-2724
jesse@coosa.org

Steven Dudley
Coosa Riverkeeper
102-B Croft Street
Birmingham , AL. 35242
205-981-6565
steven@coosariver.org

Patricia Puterbaugh
Lassen Forest Preservation Group
1540 Vilas Rd.
Cohasset, CA. 95973
530-342-1641
pmputerbaugh@yahoo.com

Dean Wilson
Atchafalaya Basinkeeper
64200 L & L road
Plaquemine, LA. 70764
225-692-4114
enapay3@aol.com

Ben Lomeli
Friends of Santa Cruz River
P.O. Box 4275
Tubac, AZ. 85646
1-520-223-3935
riverfriends@foscraz.com

Earl Hatley
LEAD Agency, Inc.
19289 S. 4403 Dr.
Vinita, OK. 74301
918-520-5725
earlhatley77@gmail.com

Arthur Norris
Quad Cities Waterkeeper INC.
736 Federal St. #2426
Davenport, IA. 52803
309-721-1800
quadcitieswaterkeeper@gmail.com

Lee First
Twin Harbors Waterkeeper
PO Box 751
Cosmopolis, WA. 98537
360 389 2979
leefrider7@gmail.com

Charles Scribner
Black Warrior Riverkeeper
712 37th Street South
Birmingham, AL. 35222
205-458-0095
info@blackwarriorriver.org

Cheryl Nenn
Milwaukee Riverkeeper
600 E. Greenfield Ave
Milwaukee, WI. 53204
414-378-3043
cheryl_nenn@milwaukeeriverkeeper.org

Phil Hanceford
The Wilderness Society
1615 M Street NW
Washington, DC, DC. 20036
800-834-9453
phil_hanceford@tws.org

Aaron Peterson
Yaak Valley Forest Council
11896 Yaak River Road
Troy, MT. 59935
406-295-9736
aaron@yaakvalley.org

Jim Miller
Friends of the Bitterroot
Box 442
Hamilton, MT. 59840
406-381-0644
news@friendsofthebitterroot.net

Dave Willis
Soda Mountain Wilderness Council
P.O. Box 512
Ashland, Oregon. 97520
541-482-8660
sodamtn@mind.net

Tyson Miller
Stand.earth
650 California Street
San Franciso, CA. 94108
(360) 734-2951
info@stand.earth

Angela Shugart
Little River Waterkeeper
215 Grand Ave SW
Fort Payne, AL. 35967
256-634-8370
angie@littleriverwaterkeeper.org

Tom Sobal
Quiet Use Coalition
PO Box1452
Salida, CO. 81201
719-539-4112
quietuse@gmail.com

Rachel Bartels
Missouri Confluence Waterkeeper
121 W Adams Ave
St. Louis, MO. 63122
3148841473
rachel@mowaterkeeper.org

Barbara Ullian
Friends of the Kalmiopsis
1134 SE Allenwood Drive
Grants Pass, OR. 97527
541-474-2265
barbara@kalmiopsisrivers.org

Jessica Schafer
Wildlands Network
329 W Pierpont Ave Suite 300
Salt Lake City, UT. 84101
385-229-4849
jessica@wildlandsnetwork.org

Amy Robinson
Montana Wilderness Association
80 S Warren St.
Helena, MT. 59601
406-249-4408
arobinson@wildmontana.org

Gabriel Scott
Cascadia Wildlands
120 Shelton McMurphy Dr. #240
Eugene, OR. 97401
541-434-1463
gscott@cascwild.org

Jason Flickner
Lower Ohio River Waterkeeper
211 East Market Street
New Albany, IN. 47150
5022765957
jason@ohioriverwaterkeeper.org

Ashley Short
Tualatin Riverkeepers
11675 SW Hazelbrook Rd
Tualatin, OR. 97062
5032182580
ashley@tualatinriverkeepers.org

Sherry Pease
Foothill Conservancy
35 Court Street, Ste 1
Jackson, California. 95642
916-705-8950
sherry@foothillconservancy.org

Kimberly Baker
Klamath Forest Alliance
PO Box 21
Orleans, CA. 95556
707-834-8826
klam_watch@yahoo.com

Thomas Wheeler
Environmental Protection Information Center
145 G. St.
Arcata, CA. 95521
707-822-7711
tom@wildcalifornia.org

Ted Evgeniadis
Lower Susquehanna Riverkeeper Association
2098 Long Level Road
Wrightsville, PA. 17368
609-571-5278
lowsusriver@hotmail.com

Molly Whitney
Cascade Forest Conservancy
4506 SE Belmont Street, Suite 230A
Portland, OR. 97215
(503) 222-0055
lucy@cascadeforest.org

Randi Spivak
Center for Biological Diversity
1411 K Street NW, Suite 1300
Washington, D.C.. 20005
(310) 779-4894
rspivak@biologicaldiversity.org

Chris Rilling
Puget Soundkeeper Alliance
130 Nickerson Street
Seattle, WA. 98109
206-297-7002
chris@pugetsoundkeeper.org

Matt Reed
High Country Conservation Advocates
716 Elk Ave.
Crested Butte, CO. 81224
970-349-7104
matt@hccacb.org

Christine Canaly
San Luis Valley Ecosystem Council
537 Main St.
Alamosa, CO. 81101
719-589-1518
info@slvec.org

Christine Ellis
Winyah Rivers Alliance
301 Allied Dr
Conway, SC. 29526
843-349-4007
Christine@winyahrivers.org

Cara Schildtknecht
Waccamaw Riverkeeper/Winyah Rivers Alliance
301 Allied Drive
Conway, SC . 29526
8433494007
riverkeeper@winyahrivers.org

Mary O'Brien
Grand Canyon Trust
2601 N. Fort Valley Road
Flagstaff , Arizona. 84532
541-556-8801
mobrien@grandcanyontrust.org

Jason Christensen
Yellowstone to Uintas Connection
250 South Main ST
Mendon, Ut. 84325
4358816917
jason@yellowstoneuintas.org

Hilary Eisen
Winter Wildlands Alliance
PO Box 631
Bozeman, Montana. 59771
208-629-1986
heisen@winterwildlands.org

Shelley Silbert
Great Old Broads for Wilderness
PO Box 2924
Durango, CO. 81302
970-385-9577
shelley@greatoldbroads.org

Timothy Ingalsbee
Firefighters United for Safety, Ethics, and Ecology (FUSEE)
2852 Willamette #125
Eugene, OR. 97405
541-338-7671
fire@efn.org

Jake Kreilick
WildWest Institute
PO Box 7998
Missoula, MT. 59807
406-544-4962
jkreilick@wildrockies.org

Robert Weissler
Friends of the San Pedro River, Inc.
9800 E Highway 90
Sierra Vista, AZ. 85635
520-459-2555
fspr@sanpedroriver.org

Veronica Warnock
Greater Hells Canyon Council
P.O. Box 2768
La Grande, OR. 97850
802-578-4935
veronica@hellscanyon.org

Peter Nelson
Defenders of Wildlife
215 S. Wallace Ave.
Bozeman, MT. 59715
206-290-0267
pnelson@defenders.org

Eleanor Hines
North Sound Baykeeper at RE Sources
2309 Meridian Street
Bellingham, WA. 98225
215-287-0043
eleanorh@re-sources.org

Sandra Schubert
Tuleyome
607 North Street
Woodland, CA. 93428
530.350.2599
sschubert@tuleyome.org

Cindy Medina
Alamosa Riverkeeper
PO Box 753
La Jara, CO. 81140
719-274-4298
cmariver01@gmail.com

Matthew Davis
League of Conservation Voters
740 15th Street NW, 7th Floor
Washington, DC 20005
202-785-8683
matthew_davis@lcv.org

Chris Krupp
Wild Earth Guardians
301 N Guadalupe St #201
Santa Fe, NM. 87501
505-988-9126
ckrupp@wildearthguardians.org

Kya Marienfeld
Southern Utah Wilderness Alliance
425 East 100 South
Salt Lake City, UT. 84111
(435) 259-5440
kya@suwa.org

CC:

Edward Boling, Associate Director for the National Environmental Policy Act
Council on Environmental Quality
730 Jackson Place, N.W.
Washington, D.C. 20503
Edward_A_Boling@ceq.eop.gov

Brittany Bolen, Associate Administrator for the Office of Policy
U.S. Environmental Protection Agency
William Jefferson Clinton Building, Mail Code: 6101A
1200 Pennsylvania Avenue, N. W.
Washington, DC 20460
Bolen.brittany@Epa.gov

Robert Tomiak, Director
Office of Federal Activities
U.S. Environmental Protection Agency
William Jefferson Clinton Building, Mail Code: 2203A
1200 Pennsylvania Avenue, N.W.
Washington, DC 20460
Tomiak.robert@Epa.gov

Deputy Chief Chris French
United States Forest Service
Sidney R. Yates Federal Building
201 14th St SW
Washington, DC. 20227
cfrench@fs.fed.us