A SCIENCE-BASED CRITIQUE OF THE NATURE CONSERVANCY'S FOREST AND FIRE MANAGEMENT PROGRAMS WITH A FOCUS ON CASE-STUDY AREAS IN WESTERN FIRE-DEPENDENT FORESTS

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EXECUTIVE SUMMARY: The Nature Conservancy (TNC) is the nation's largest international conservation organization with an annual operating budget of over $1 billion (more than the annual GDP of 26 countries) and net assets >$6.6 billion. While the organization is responsible for many important conservation achievements, such as >119 million acres of new protected areas globally, in the US, TNC often operates without full disclosure regarding the effects of its fire management projects and policies on other NGOs. The lack of coordination with other NGOs has resulted in TNC's fire science and collaboratives causing major problems for conservation groups at the expense of conservation priorities. TNC almost never openly advocates for protected areas in the US, and most often teams with state and federal agencies, timber companies, and other extractive oriented industries in support of its Fire Learning Network (FLN). TNC's collaboratives - or collaboratives within which TNC is a member, providing input - are really "community of practice" groups whereby membership in the group or its governing board is restricted to those that accept TNC's "fuels" reduction work as a given (with minimal environmental restrictions) and TNC's limited view of "good fire" (e.g., low intensity burns) vs. "bad fire" (e.g., mixed severity burns and large fires).

We present primarily 4 case studies where TNC fire science is called into question and its "members only" collaboratives are a major obstacle for conservation groups seeking protection for and improved management of the under-appreciated biodiversity benefits of mixed-severity wildfires.

- **Rogue Basin of southwest Oregon** - the Southern Oregon Forest Restoration Collaborative (SOFRC) does not include a single conservation group on its governing board, but does include the vice president of a major regional timber industry lobby group, the Southern Oregon Timber Industry Association. With the backing of TNC advocacy, and despite the repeated opposition of seven conservation groups, SOFRC proposed substantial commercial logging, under the rubric of "thinning," of 1.1 million acres on "all lands," including protected areas (late-successional reserves), spotted owl critical habitat, mature forests, Research Natural Areas, National Monuments, roadless areas and other high priority conservation areas. The collaborative's thinning/logging proposals are based on disputable TNC claims that there is an overabundance of closed-canopy forest that needs to be converted to open canopy conditions at the expense of imperiled species like the spotted owl.

- **Sierra Nevada** - there are at least 3 TNC projects totally >2.4 million acres with collaboratives consisting of organizations having a pro-salvage logging agenda to convert 4,000 acres of complex early seral forests (or snag forests) on the Stanislaus National Forest to “feed stock” for woody biomass power plants. This involves advocating for clearcutting of post-fire wildlife habitats, bulldozing them into huge piles and incinerating them with accelerants, in order to facilitate conversion of complex early seral forests (snag forests) into tree farms for future short-rotation industrial logging.

- **Greater Santa Fe** - TNC supports the Greater Santa Fe Fireshed Coalition (no conservation groups are voting members; only “partners” can vote) that is backing large-scale forest clearing projects of ~50,000 acres on the Santa Fe National Forest. Notably, the Southwest Jemez Mountains Landscape Collaborative (which does include 3 conservation groups also within this region) is represented on a Forest Service kiosk illustrating a mistletoe logging project that resulted in large-scale clearcut and type conversion from pine forest to a savanna, weed-infested field that bears little resemblance to the forest that preceded it.

- **Eastern Oregon** - The Ochoco Collaborative (850,000 acres, although some of this maybe roadless and wilderness), led by TNC, submitted an objection pressing the Forest Service to increase large-tree logging while proposing to circumvent protective forest plan standards, while the Deschutes Collaborative (257,000 acres) is pushing to remove the “Eastside Screens” prohibition on logging large trees.

In addition, TNC fire management policies and science have often been cited by decision makers seeking to overturn forest protections nationwide. Collectively, these examples illustrate a growing rift between TNC and the scientific and conservation community over TNC’s aggressive “fuels reduction” projects and its limited view of “good” fires as being low-intensity and controllable burns. As such, many conservation groups are now treating TNC’s FLN as if it were a logging initiative. To close the gap between TNCs fire programs, current forest and fire ecology science, and conservation priorities of local groups, we recommend that TNC:

- Provide transparency and accountability in disclosing funding sources (especially from federal agencies, state forestry agencies and logging companies) and include a more NGO representative approach to collaboratives that reflects conservation interests and not mainly extractive and agency interests.
- Provide evidence-based comprehensive literature reviews to ensure that not just the science TNC uses to support collaboratives, but the full breadth of science, including studies that may conflict with TNC assumptions, uncertainties in models, empirical-based studies, and appropriate risks to biodiversity and means for eliminating risks from its logging proposals.
- Field-validate predictive fire models and use empirical evidence before widely applying questionable fire models at project and regional scales.
- Purge the good versus bad fire messaging and concentrate more on the ecological benefits of mixed-severity fires, including high-severity burn patches (large and small).

- Work with the broader conservation community to coordinate policy approaches and conservation priorities.
- Correct the record when politicians or the media use disproven scientific models or assumptions to perpetuate misinformation on forest-fire ecology or usher in sweeping changes to forest-fire policies inconsistent with biodiversity conservation.
- Support the inclusion of fully representative and large inviolate protected area networks on federal lands that meet bolder conservation goals (e.g., see Noss et al. 2012, Nature Needs Half), including connectivity among reserves, protection from logging of imperiled species/habitat, protection of all remaining primary (unlogged) forests and roadless areas from logging, protection of all snag forest habitat from so-called "salvage" logging, and reduce anthropogenic stressors from logging, roads, mining, grazing and other factors in fire-adapted forests (see DellaSala et al. 2017 for approaches).
- Assess and fully disclose carbon life cycle analysis associated with TNC proposed thinning and burning and abandon all efforts to convert burned forests into biomass energy.

We believe this report reflects not an isolated series of misunderstandings about TNC's fire approach but a general trend in TNCs approach that runs counter to current science and the conservation priorities of local and regional groups. While the focus is primarily on three case study areas where we conducted extensive reviews (using published sources and input from local conservation groups), we also provide a brief example of similar problems in in eastern Oregon (fourth case study, Appendix 3).

TNC IN THE SPOTLIGHT

Founded in 1951, TNC has over 1 million followers worldwide. TNC's mission "is to conserve the lands and waters on which all life depends." It employs many well-respected scientists and dedicated support staff that have protected >119 million acres in 35 countries.

As TNC reconstitutes its leadership (Sally Jewell, former Secretary of the Interior, is now interim CEO), by documenting the problems with its fire science and policy herein, we offer this critique as an opportunity to address escalating problems with local NGOs over its questionable and ecologically damaging fire approaches. Before we address the regional case studies, we provide the following broader based conservation issues that have contributed to a rift in the NGO community with TNC.

TNC lacks a science-based global protection area target and seldom advocates publicly for US protected areas on federal lands - At the global scale, TNC adopted a goal of preserving 10% of all major habitat types by 2015 even though this goal is below international protection targets of 17% established by the UN Convention on Biological Diversity (Aichi 2020 targets), and is far below the *at least 30%* target of Dinerstein et al. (2019), *at least 50%* target of Noss et al.

(2012), and the "Half Earth" and "Nature Needs Half" targets established by some of the leading conservation scientists of our time[1]. In other words, TNCs protected area targets are out of step with long-standing conservation biology approaches needed to prevent imminent biodiversity collapse (i.e., the United Nation's Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) estimated 1 million species extinctions in the coming decades[2]). Additionally, TNC's Natural Climate Solutions, which aptly estimates that improved land management practices can meet 37% of climate mitigation targets (Griscom et al. 2017), does not emphasize protection of carbon stored in primary (unlogged) forests especially in the US. TNC chooses instead to focus mainly on improved forestry, restoration, and afforestation even though primary and mature forests yield superior carbon and biodiversity benefits (Mackey et al. 2015, Moomaw et al. 2019).

TNC's Fire Learning Network (FLN) is a Members-Only Club - In 2002, TNC launched its FLN (Figure 1), developed through a cooperative and cost-sharing agreement with the USDA Forest Service and Department of Interior that provided over half the initial program operating budget to TNC ($900,000 total). According to TNC's "Conservation Gateway[3]", the FLN engages multi-agency, community-based projects designed to "accelerate the restoration of landscapes that depend on fire to sustain native plant and animal communities." They go on to say that "by restoring this balance, the ecological, economic and social values of the landscapes can be maintained, and the threat of catastrophic wildfire can be reduced." The website also states "while FLN projects have often worked from the *wildlands in* toward human communities, the new **Fire Adapted Communities Learning Network**—based on the FLN model—works from *communities outward* into the surrounding landscape" (emphasis added for discussion later on *wildlands-in* vs. *home-out* approaches).

[1] https://www.half-earthproject.org/; also see https://natureneedshalf.org/
[2] https://www.ipbes.net/global-assessment-report-biodiversity-ecosystem-services
[3] https://www.conservationgateway.org/ConservationPractices/FireLandscapes/FireLearningNetwork/Pages/fire-learning-network.aspx

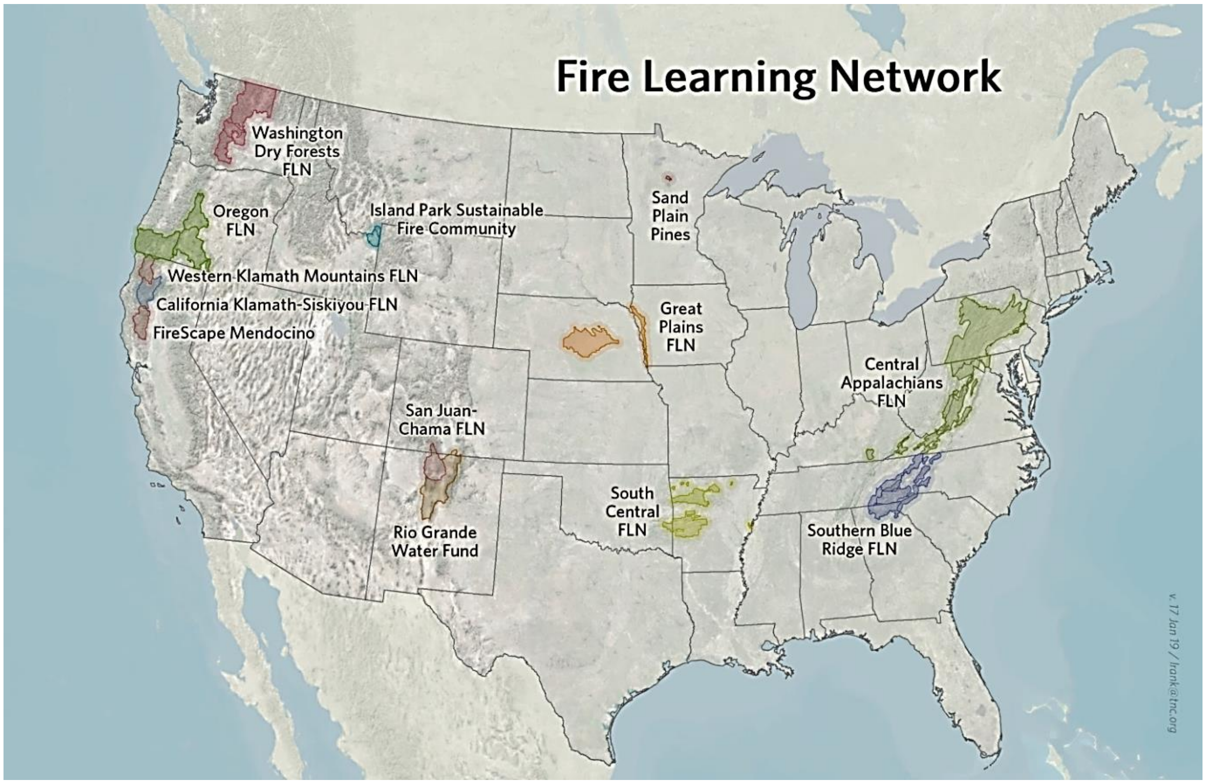

Figure 1. The Nature Conservancy's Fire Learning Network[4].

TNC uses a "collaborative", or more aptly known as a "community of practice," approach in its FLN projects and readily admits that "collaboratives may not be representative or stakeholder-based, since their principal objective is *not resolving intractable disputes* or *redressing a democratic legitimacy deficit* (emphasis added; Goldstein and Butler 2010). Further, the authors attempt to justify excluding many conservation organizations, as well as recreation-oriented interests from urban areas, claiming that "diverse participation might diminish this form of collaboration by making it difficult to define and sustain a practice model or practitioner identity." Implementing this approach comes with "an essential tension," but the authors do not address how this tension is to be resolved, especially disagreements over science and biodiversity conservation, the primary reasons for this evaluation piece and the need to help conservation groups dealing with the impacts of TNC's expansive reach and exclusive club-like approaches to fire-management. Conflicts with conservation interests stem mainly from TNC collaboratives either organized by TNC primarily or bolstered by TNC's approaches.

TNCs View of Good vs Bad Fire is Overly Simplistic, Outdated, and Ecologically Damaging - TNC justifies its "all lands" approach by ascribing to an overly simplistic, outdated, and command and control view of "managing wildfires at the right place and time"[5], or "good fires"

[4] https://www.conservationgateway.org/ConservationPractices/FireLandscapes/FireLearningNetwork/Pages/fire-learning-network.aspx
[5] https://blog.nature.org/science/2013/05/15/good-fire-bad-fire-an-ecologists-perspective/

instead of "bad fires." Good fires are generally defined by TNC as low-intensity burns and prescribed fires (including pile burning of logging slash debris); while bad fires are generally summer, mixed-severity wildfires and high-severity burn patches within mixed severity fire complexes, including so-called "megafires"[6]. Importantly, the level of command and control of nature envisioned by TNC's strategy of enabling "good" fires while suppressing "bad" ones has never been achieved, let alone in a rapidly changing climate (see Moritz et al. 2014, Abazataglou and Williams 2017, Schoennagel et al. 2017). By promoting this unrealistic world view of wildfire, TNC undercuts the ecosystem benefits of mixed severity wildfires, including large ones, that generate large and small high severity (fire-killed) burn patches. These habitats have been demonstrated to be the most ecological essential process affecting pre-management era forests throughout large portions of the western US (e.g., Hessburg et al. 2007; Odion et al. 2014, DellaSala and Hanson 2019). Importantly, large severely burned patches, if they are not subjected to post-fire logging, are known to sustain levels of biodiversity comparable to that of old-growth forests (pyrodiversity begets biodiversity; see Swanson et al. 2011, Donato et al. 2012, DellaSala et al. 2014, DellaSala and Hanson 2015, DellaSala and Hanson 2019).

TNC's fire policy reach is damaging to national forest conservation priorities - TNC routinely advocates state and federal policies to increase the scope and scale of "restoration" (mostly commercial logging under the rubric of "thinning" and prescribed fire) as perceived wildfire risk reduction. As an example, TNC reports have been widely cited by members of Congress to justify roll-backs of the nation's preeminent federal environmental law, the National Environmental Policy Act (NEPA)--rollbacks designed to reduce site specific scientific analysis of ecological and climate impacts and undermine public involvement in forest planning in favor of more logging, described as "active management"[7]. TNC has an obligation to correct the record when their science is misused by politicians (or the media) with an anti-environmental agenda. Yet to our knowledge TNC has never publicly spoken out when this occurs despite repeat requests from conservation groups that they do so.

FIRE PROJECT CASE STUDIES

At the case study level, the dispute with TNC and local groups has been over its treatment of large wildfires that do not fit TNC's world view of wildfire. Thus, TNC builds its overly simplistic messaging of "good fire" upon a narrative of "fuels reduction" and "resilience" approaches designed to prevent "bad" fires. Such TNC designed and funded projects propose logging within roadless areas, late-successional and old-growth forests (primary forests), Research Natural Areas, national monuments, and endangered species habitats ("all lands") long advocated for protection by local, regional, and national conservation groups and the

[6] http://www.ncprescribedfirecouncil.org/pdfs/GoodFire-BadFire.pdf
[7] https://walden.house.gov/media-center/press-releases/greg-walden-calls-forest-management-reforms-farm-bill

conservation biology community. Their teaming arrangements within collaboratives most often involve groups having strong ties to the timber industry and extraction-oriented state and federal agencies, including those that have championed well-funded, destructive postfire logging and biomass infrastructure developments in California (e.g., the Sierra Nevada Conservancy's Stanislaus National Forest biomass proposals in the Rim fire). As an example, at a 2016 Stanislaus National Forest field trip of the Rim fire area attended by DellaSala and Hanson and conducted by the Forest Service, TNC representatives were advocating for sending more "salvage logged" trees from burned biodiverse forests to local mills, sounding more like a logging company than a conservation organization, and at the vocal opposition of conservation groups and numerous scientists also attending the field trip.

To specifically illustrate and document some of the problems, we evaluated three of TNC's fire management using a standard of evaluation based on inclusivity, biodiversity conservation, and whether the science used by TNC presents areas of agreements, disagreements, limitations, uncertainties, trade-offs, and empirical evidence (and not just models) wherever possible. In a nutshell, the noted problems herein are not simply a matter of scientific discourse but are detrimental to fire-dependent ecosystems from TNC's overemphasis on logging and post-fire logging under the guise of "fuel" reduction and at all costs. TNC's activities in this regard have presented a major barrier to conservation involving protected areas campaigns via TNC's "all lands" approach, and is influencing national fire management policies that weaken environmental laws. In each of the case studies, we offer specific suggestions for how to bridge the growing divide between TNC and conservation groups/biologists and we recommend that TNC change its overly simplistic view of wildfire in consultation with conservation groups and conservation biologists having a biodiversity perspective. It is imperative that TNC include conservation groups, and not primarily pro-logging industries and agencies, in collaboratives and cease its actions working at cross-purposes with local and national conservation interests.

1. ROGUE BASIN STRATEGY CASE STUDY (SOUTHWEST OREGON)

Background – The 1.1 million acre "Rogue Basin Cohesive Forest Restoration Strategy (RB Strategy 2015, Figure 2) was developed as a land managers' decision-making tool. It is intended to inform and influence land management decisions throughout the Rogue River Basin and is being implemented by the Southern Oregon Forest Restoration Collaborative (SOFRC 2015, 2017), backed by TNC's science support (e.g., Metlen et al. 2018, Haugo et al. 2019). The RB strategy focuses mainly on federal lands where implementation would expand "treated" areas from 9,000 acres annually (without SOFRC) to 45,000 acres annually (with SOFRC, a five-fold annual increase). This includes 24,000 acres of commercial logging and road reconstruction each year in the Rogue Basin by participating federal agencies.

The RB Strategy assumes that contemporary forest density is excessive and is a product of fire suppression, ignoring current research indicating considerable areas of dense forest historically (see discussion, Appendix 1, and citations below), and further assumes that long-unburned forests will burn at higher severities when fires occur. This, despite the fact that current research in this region indicates that denser forests do not tend to burn at higher severities (and, in fact, often tend to burn at lower severities) (Zald and Dunn 2018), and the most long-unburned forests experience mostly low/moderate-severity fire and tend to burn at equal or lower severities than more recently-burned forests (Odion et al. 2010). Moreover, the RB Strategy ignores science indicating that more open forests in this region tend to burn at higher severities (Taylor and Skinner 2003, Odion et al. 2004, Odion et al. 2010), and research indicating that the commercial thinning so extensively proposed by TNC can often increase fire severity (e.g., Cruz et al. 2014).

In doing so, the RB Strategy proposes to convert substantial areas of closed canopy, mature or late successional forests to “open” (“park-like”) forest through expansive commercial logging prescriptions, as well as the removal of large fire-resistant trees by federal agencies (especially the BLM), and significant canopy reduction. This strategy uses an “all lands” approach that promotes commercial logging under the rubric of “thinning,” and prescribed fire (mostly pile burning of logging slash) in Inventoried Roadless Areas, National Monuments, Research Natural Areas, Botanical Areas, Late Successional Reserves (LSR) and Northern Spotted Owl habitat, elevating conflicts with well-established federal land management policies (e.g., Northwest Forest Plan standards and guidelines for reserves limit “thinning” more than TNC does) and local conservation groups that have prioritized these same areas for new or sustained protections (see below) (also Figure 2).

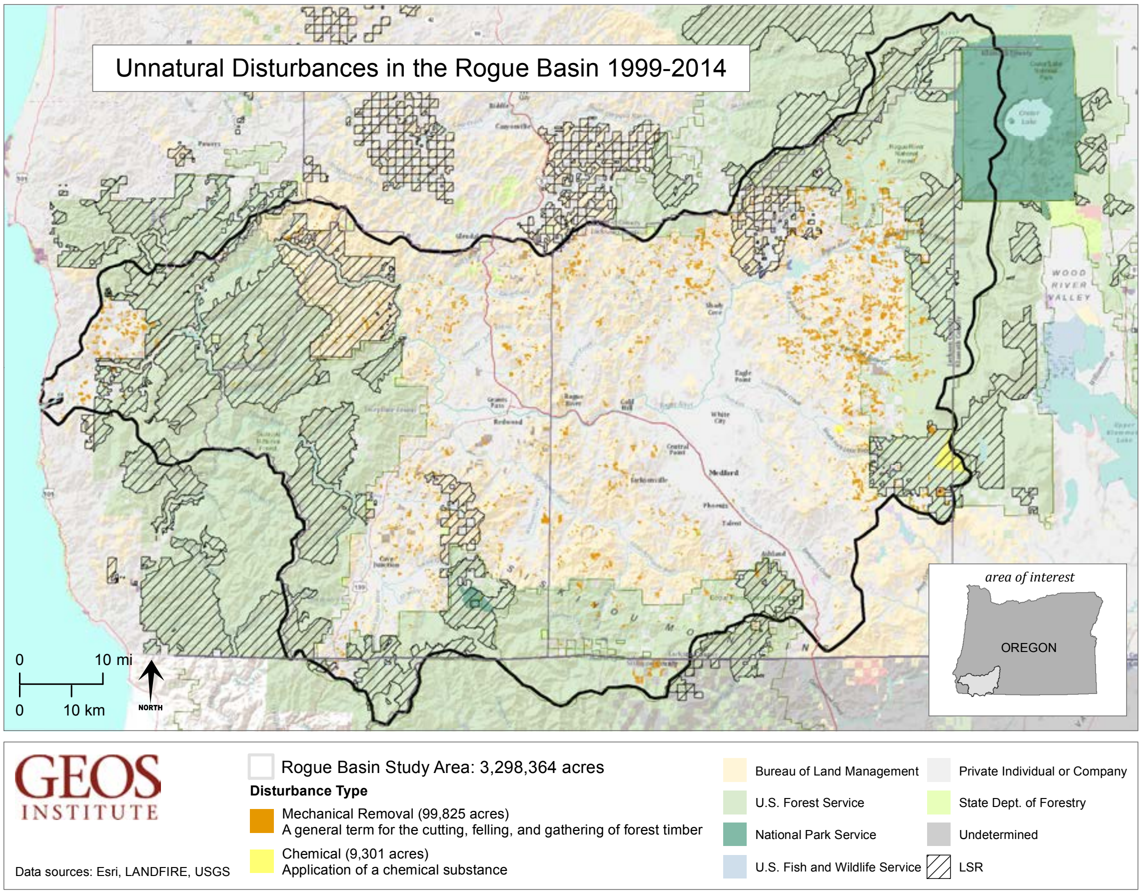

Figure 2. Rogue Basin Analysis Area showing cumulative disturbances (1999-2014) from logging and chemical treatments within which SOFRC/TNC is now emphasizing an “all lands approach” of more logging and road building. Note the inclusion of Late-Successional Reserves (LSRs, hatching) managed for spotted owls and hundreds of species requiring closed canopy forest conditions under the Northwest Forest Plan (NWFP). LSRs and late-seral forests (generally) receive the highest priority to be targeted for logging by TNC, with the objective of converting these ecologically vital closed-canopied forests to more open forest canopy conditions, despite the overarching federal management objective to protect late-successional forests from such logging. This is one of the many concerns regarding the RB strategy.

A list of SOFRC partners, primarily government agencies, can be found at SOFRC.org. Aside from the Klamath Bird Observatory (KBO, a research organization), not a single partner represents a local or regional conservation group. Thus, the collaborative follows the TNC “*community of practice*” approach (Goldstein and Butler 2010) in limiting access to only organizations that support TNC’s “fuels-centric” and logging-oriented perspectives (with the exception of KBO that intends to conduct as of yet unfunded monitoring).

SOFRC claims its strategy will reduce wildfire risks to homes and key natural resources by 50% and 70% respectively (based on TNC science), yet bases this claim on the assumption that continuing wildfires will lead to a near total loss of these resources. However, such perceived losses are completely inconsistent with the mixed severity pattern of contemporary wildfires in the region and their positive ecological effects. At the same time, claimed benefits of TNC's forest management approaches are not well supported scientifically, and impacts associated with management are not adequately or realistically addressed, as discussed below.

SOFRC also claims smoke levels and air quality will be dramatically reduced through implementation of the thinning and pile burning operations[8]. Newspaper accounts have made bold predictions that by following the SOFRC/TNC strategy "we can *prevent* forest fire smoke" (emphasis added, note – despite requests from local conservation groups to have TNC correct this misunderstanding on the part of the media, TNC never responded)[9]. Notably, during the summer of 2018 large amounts of smoke poured into the Rogue Valley from ~600 wildfires in British Columbia and, in late July 2019, the Rogue Valley was once again immersed in dense smoke from a wildfire started by an illegal campfire ~80 miles to the north (i.e., the Mile Post 97 Fire outside Canyonville, Oregon)[10]. Poor air quality was partially (2018) or mostly (2019) attributed to distant wildfires that sent smoke, carried by the Jetstream, into the Rogue Valley, where it was trapped by the surrounding mountains, restricting summer air flow (often with temperature inversions). In spite of such external forces, SOFRC continues to make claims about smoke prevention, linking clear blue skies to its proposed logging. This messaging is setting the public up for false expectations, will create collateral ecosystem damages from expansive logging, and has been influencing policy decisions supported by local politicians (note: in meetings with state politicians, we have often heard a strong desire to do something/anything to address smoke, even if the treatments do not work; when it comes to smoke, political optics replace scientific rigor and all fire politics are locally based). Unfortunately, the political landscape is primed for blindly accepting the SOFRC-TNCs RB strategy even if it will make the situation for biodiversity and wildfires much worse in both the short-term and the long run.

We focus now on two watershed examples of where the RB strategy is being implemented and widely endorsed by federal agencies and some in the media.

Applegate Project Area Rejected by Scientists and Community Members - On January 27, 2016, TNC presented the RB strategy to community members and scientists in the Applegate area (a tributary of the Rogue basin). Major disagreements (by the Applegate community and scientists) were raised over TNC's mischaracterization of fire regimes, and emphasis on logging, under the

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[8] https://www.sofrc.org/; https://fireadaptednetwork.org/how-healthier-forests-can-mean-less-smoke-the-science-tools-and-strategies-related-to-smoke-management-in-fire-adapted-forests/#.W7ZMKEXpZZY.email

[9] https://mailtribune.com/news/top-stories/we-can-prevent-forest-fire-smoke

[10] The Milepost 97 Fire was about half private timber and state lands and half BLM O&C Lands. Both had a history of commercial logging and management. To view map of the fire and land ownership: https://tinyurl.com/MP97InfoMap8-3. To view satellite imagery of the fire area demonstrating management/logging history: https://tinyurl.com/y6h3r7gd

rubric of “thinning,” in older closed-canopy forests, including impacts to threatened and imperiled species. At the time, a 22-page letter was sent to TNC signed by scientists and conservationists with extensive expertise in the region. However, no substantive response was received from TNC. We summarize five major outstanding issues detailed in this letter:

1. Lack of protection for roadless areas, LSRs, and other high conservation value areas from aggressive TNC/agency thinning;
2. Questionable assumptions (e.g., lacking empirical evidence) about the negative effects of fire and benign effects of thinning on spotted owls and other closed-canopy species not even assessed (e.g., Pacific fisher, tree voles, owl prey);
3. Inappropriate assumptions and utilization of fire models in treatment scenarios;
4. Problems and costs associated with keeping forest canopies artificially open; and
5. Numerous other impacts from aggressive thinning and canopy reduction actions.

Historical photos and published accounts of the region’s mixed severity fires and high variability in historic vegetation types were presented to TNC at this initial meeting (Appendix 1). In contrast to TNC’s assertion that historical forest conditions were mainly open and park-like, numerous historical photos (circa 1910s) showed the prevalence of closed canopy forests, and areas of complex early seral forest (“snag forest habitat”) from high-severity fire patches, all maintained by a mixed severity fire mosaic. Thus, TNC’s assumptions about low-intensity fire and excessive current forest density, derived mainly from limited and problematic fire-scar sampling, were questioned by scientists as having a sampling bias that selectively excluded published data that contradict TNC’s assumptions. Criticism was largely ignored and published studies that did not agree with TNCs perspectives were summarily dismissed by TNC (Metlen et al. 2018) without proper rebuttal permitted from the criticized authors.

TNC’s fire-scar sampling effort is focused on predominantly dry low elevation sites “located largely on midslopes and ridges with predominantly south, east, and west aspect” (Metlen et al. 2018) where fires are expected to be relatively frequent. These sites do not reflect the variability of the southwestern Oregon landscape. In fact, only 2 of the 13 TNC study sites were located on north, north-eastern, or north-western aspects that tend to produce cool, moist, closed forest types with more variable fire return intervals. The sampling also prioritized locations “within large patches of warm insolation” (Metlen et al. 2018), excluding areas that naturally produce more dense forest structures, closed canopy forest types, longer fire return intervals, and more mixed severity fires.

Due to sampling biases, the TNC approach articulated in the RB strategy, and by Metlen et al. (2018), utilizes a reference condition unsupported by research into historical conditions or natural historic vegetation in the region. Numerous studies demonstrate a tendency towards closed canopy vegetation throughout the Rogue Basin (Leiberg 1900, Hosten et al. 2007, Colombaroli and Gavin 2010, Baker 2011, DiPaolo and Hosten 2015, Duren et al. 2012, Hickman and Christy 2011), rather than the open conditions promoted by TNC and used to support so-called "restoration" logging. Moreover, extensive research into historical U.S. government forest surveys has found that forests of this region (as well as the Sierra Nevada) were much denser and included more high-intensity fire than assumed in previous work, which excluded most historical tree density and high-severity fire data (Baker and Hanson 2017, Baker et al. 2018). Further, variety of historical documentation and photographs in Klamath-Siskiyou Mountains also depict a more diverse, mixed severity fire mosaic of both open and closed forests interspersed with fire-mediated chaparral, grassland or hardwood species (Appendix 1).

Problematic fire assumptions are also reflective of TNC's regional fire mapping. Using similar fire-scar and LANDFIRE methodologies, Haugo et al. (2019, Fig. 1) claimed that nearly the entire Klamath Mountain is within Fire Regime Group I (generally low-severity on frequent fire return intervals). While accounting for "some" mixed-severity effects (Haugo et al. 2019), such broad-scale LANDFIRE-based generalizations do not comport with current science and the extraordinary variability in fire effects substantially responsible for the region's globally significant biodiversity ("pyrodiversity begets biodiversity," DellaSala and Hanson 2015). Fire effects at the landscape scale in this region are highly variable due to the interaction of slope, aspect, elevation, plant association groups, time since fire, and local/regional climatic factors (e.g., near coast vs. inland; Odion et al. 2004, 2014, Donato et al. 2012, Perry et al. 2011). Much of this variability has a strong climatic influence (top down) that governs fire activity on extremely long timelines (centuries), especially high severity fire rotations that operate on multi-century timescales (see Colomborali and Gavin 2010, Odion et al. 2014, Odion et al. 2016, Whitlock et al. 2015, DellaSala and Hanson 2019). Not accounting for this spatio-temporal variability presents accuracy problems for LANDFIRE and fire scar sampling/mapping methodologies. The modeling used by TNC to support the RB Strategy therefore grossly underestimates closed canopy forests in the baseline/historic dataset, leading to the assumption that closed forests are currently over-represented, and thus an artifact of contemporary fire suppression and a lack of indigenous burning practices. This assumption is then used to justify widespread logging across large areas, converting closed canopy forests to "open" forest conditions especially targeting late-seral forests and reserves.

TNC further assumes that the period of effective fire suppression in the Rogue Basin began around 1905. In doing so, TNC assumes fire suppression was equally effective ~circa 1905 as it is today. Therefore, back-dating stand conditions to this early fire suppression era means any stand up to ~115 years old has supposedly had fire suppression influences and should be thinned. This is contrary to what most scientists assume to be the period of mechanized fire suppression that began shortly after WW-II (or during the start of the Smokey Bear campaign around 1940) in this region. That means, following TNCs fire suppression timeline, trees up to 115 years old can be logged even though those trees are generally considered to be mature enough to constitute late-successional conditions (under the NWFP).

Recognizing that these differences still had not been properly resolved by SOFRC/TNC, we sent a follow up 35-page letter[11] to them in September of 2018 (complete with more historic photos), requesting an in-person meeting. On October 18, 15 individuals representing local, regional, national NGOs and scientists met with SOFRC and TNC for a facilitated discussion. Seven NGOs then followed this meeting up with a request to SOFRC to revise the RB strategy by focusing on two central themes: (1) *community protection* – concentrated fire risk reduction near homes, ingress/egress escape routes; and (2) *biodiversity/ecosystem integrity protection* - exclude from commercial logging roadless and unroaded areas, national monuments, Research Natural Areas, Botanical Areas, Wild and Scenic (and proposed) areas, Areas of Critical Environmental Concern, spotted owl habitat, LSRs (except where permitted under the standards and guidelines of the Northwest Forest Plan), mature forests (closed and open), chaparral and shrubby oak woodlands. Generally, these conservation priorities in the area were identified by using NatureServe and local organizations whose mission is more in line with biodiversity conservation and the ecosystem benefits of wildfires in the Rogue Basin.

Fire safety measures were also recommended to TNC for inclusion in a modified RB Strategy, such as focusing efforts within and adjacent to communities rather than in the backcountry, providing community smoke protection shelters and air filtration systems, reforming forestry practices to prohibit particularly climate-unfriendly and fire-unsafe logging (e.g., clearcutting, postfire logging, plantations), and seasonal road closures and road obliterations to reduce human-caused fire ignitions. With no further response from TNC, conservation groups submitted these and other recommendations to Oregon Governor Kate Brown's fire council as a *community wildfire protection alternative*[12].

Despite our best efforts to improve the scientific shortcomings of the RB strategy, it is now in full implementation mode, receiving funds from the Oregon Watershed Enhancement Board and repeated editorial praise from local newspapers and politicians. TNC is marketing the RB Strategy as a national model for fire resilience, and Oregon congressional members (e.g., Rep. Greg Walden, R-OR) routinely make unsubstantiated claims that the TNC approach will curtail wildfires by 70% and improve the climate by reducing fire emissions by 85%[13].

Ashland Forest Resilience (AFR) Projects Pros and Cons – On May 23, 2019, local conservation groups and fire ecologists did a self-organized tour of the AFR Project that is being hailed as a national model by SOFRC, TNC, the Forest Service and others. The AFR Project is promoted as a "*ten year stewardship project designed to reduce the risk of severe wildfire in the watershed and to protect water quality, older forests, wildlife, people, property, and quality of life*[14]"

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[11] https://www.forestlegacies.org/images/projects/fire-tnc-roguebasin-180914.pdf
[12] https://www.forestlegacies.org/programs/fire-ecology/1476-community-fire-protection-alternative-for-fire-safety
[13] https://mailtribune.com/news/top-stories/us-rep-greg-walden-says-enough-is-enough-on-wildfire-smoke
[14] https://www.ashland.or.us/Sectionindex.asp?SectionID=503

(emphasis added). In total, some 7,600 acres of thinning and pile burning is planned within the watershed, including portions of the McDonald Peak Inventoried Roadless Area, the cities drinking water supply, late-successional forests, an LSR and owl critical habitat.

During our site visit, we noted examples of plantation thinning (Figure 3); however, stand-level prescriptions produced heavy canopy commercial "thins" in owl critical habitat (Figure 4). Thinning was ostensibly designed to reduce competition from surrounding trees within the "dripline" of large, canopy dominants (pines), and to reduce the chance of a crown fire killing large trees. However, thinning noticeably reduced overstory canopy below the critical 60% canopy cover threshold for spotted owl habitat in many of the visited units.

Figure 3. Thinning of very small trees in a plantation on the Rogue River National Forest within the Ashland Forest Resilience Project as recommended by SOFRC/TNC. Plantations have higher amounts of severe fire effects due to tight spacing of small trees (Odion et al. 2004, Bradley et al. 2016, Zald and Dunn 2018). Forestry reforms are needed to curtail clearcutting that results in producing these plantations in the first place.

(a)

(b)

(c)

(d)

Figure 4. (a,b,c) Although not measured in the field, thinning around large canopy dominants within owl habitat clearly reduced overstory canopy cover below the 60% threshold. (d) SOFRC/TNC prides itself on not taking the biggest trees, which is noteworthy for the AFR project, but some large trees like this stump are beneath the canopy. Older trees – even if they are not canopy dominants – provide important structural features for late-successional species, including the spotted owl and other raptors, as well as habitat for prey species such as flying squirrels and tree voles.

(a)

(b)

(c)

(d)

Figure 5. (a) Thinning within an older forest within the Ashland Forest Resiliency Project. While some important habitat structures were maintained, increased light penetrance will result in rapid vegetation in-filing and the need for repeat thinning to keep "fuels" at desired levels. Each timber stand entry that removes smaller trees typically does so at the expense of large trees that are also removed and used to make the logging economically attractive. (b) Reduced understory vegetation from thinning within the Ashland Forest Resilience Project may lead to increased wind penetrance, soil desiccation, and rapid-fire spread. (c) Slash piles like these are prevalent throughout the area and are either burned, resulting in carbon emissions and localized soil damage from intense heating, or left to rot (d) also increasing emissions from rapid decomposition. No analysis of emissions has been conducted despite requests to do so.

Notably, the SOFRC/TNC approach was presented at Oregon Governor Kate Brown's Wildfire Council[15] that included a budgetary request for $6.8 million by Oregon state Representative Pam Marsh as Oregon's forest fire and resilience investment package[16]. In other words, despite serious concerns from scientists and opposition from community and conservation groups, the SOFRC/TNC strategy has become deeply embedded in Oregon fire politics while TNC makes no

[15] https://www.oregon.gov/gov/policy/Documents/3.18.2019_GovernorsWildfireCouncil_PresentationsCompressed.pdf
[16] https://www.oregonlegislature.gov/marsh/Pages/forest-fire-resilience.aspx

public statements about the problems noted or the deepening rift with conservation groups and current science. Thus, because of widespread conservation concerns about the RB Strategy and disagreements over TNC science have repeatedly been ignored or unresolved by TNC and SOFRC, seven conservation groups announced the community wildfire protection alterative[17], also sent to Oregon Governor Kate Brown and local politicians in April 2019.

The community alternative is a combination of local conservation priorities and a comprehensive approach of community safety via defensible space, reasonable treatments adjacent to communities, smoke shelters, HVAC air filtration systems, low-interest loans to disadvantaged communities to make homes fire-safe, road closures/obliterations, and forestry reforms. We submit that this alternative is much more comprehensive, more ecologically in tune with the region's fire regimes, and less impactful to forests than the RB strategy. The Community Fire Protection Alternative focuses on lower-impact treatments in plantations and home ignition reduction strategies implemented within and adjacent to homes and communities at risk (from the home- outward instead of the wildlands-inward). The community-based strategy provides far more benefits to local communities, addresses the ongoing loss of infrastructure and homes in wildfire events, sustains ecological values, and protects important conservation areas such as roadless areas, owl habitat, LSRs, post-fire habitat, and others.

In summary, while the AFR Project contains some important elements that can be considered ecologically appropriate, the collateral ecological damages associated with widespread commercial logging in late successional forests, roadless areas, and owl habitat has been largely ignored by TNC and its collaborators. Logging that removes or downgrades owl habitat would increase under the RB Strategy and potentially reduce resilience to wildfire and degrade late successional habitats (Lesmeister et al. 2019). Under the RB strategy, many existing late successional, closed canopy forests would be converted to open forests by removing most of the owl habitat elements and requirements.

The level of canopy cover reduction proposed in the RB Strategy would not only degrade late successional forests, but it would also require the removal of large fire resistant trees and, without continual maintenance, proposed "restoration" treatments will increase fire risks by creating logging slash (some of which may go untreated due to access problems and costs), regenerating woody shrubs, and young trees in the understory. Reduced canopy cover will also increase solar radiation, enable stand penetration by drying winds, and increase ambient air temperatures creating stand desiccation conditions and extending fire seasons. Regionally appropriate research has shown a correlation between open forest conditions and increased fire severity (Taylor & Skinner 2003), consistent with other research indicating that commercial thinning more often results in higher fire severity (Cruz et al. 2014), and increased logging in general is associated with more severe fire (Bradley et al. 2016). Other research has shown a

[17] https://www.forestlegacies.org/programs/fire-ecology/1476-community-fire-protection-alternative-for-fire-safety

correlation between time since fire, closed canopy forest associations and lower severity fire effects (Taylor & Skinner 2003, Odion et al. 2004) – meaning, in this region, as stands mature and canopies close, forests are actually less - not more, as assumed by TNC - susceptible to high intensity burns.

Importantly, outside of the AFR Project area, the RB strategy is elsewhere being implemented in even more damaging ways. For example, the Medford District BLM is implementing aggressive logging prescriptions under the guise of the RB Strategy. These prescriptions include the logging of large fire-resistant trees in stands 180 to 240 years old, and reducing canopy cover to as low as 30% in the Pickett West Timber Sale. This particular logging project was designed with "the Rogue Basin Cohesive Forest Restoration Strategy… in mind." (Pickett West Environmental Assessment). FOIA documents obtained by conservation groups demonstrate that TNC scientist, and the author of the RB Strategy, Kerry Metlen, even helped edit portions of the Pickett West Environmental Assessment and provided citations to support destructive logging under the guise of "restoration" in late successional stands, even though such actions would impact spotted owls (FOIA documents cited in DellaSala et al. 2018).

At a minimum, we recommend that the RB Strategy be amended, in consultation with local NGOs, to protect important conservation areas from logging, maintain owl habitat, retain large trees and sufficient canopy cover (>60%) in managed stands, and focus on community fire safety and home ignition reduction by prioritizing treatments and strategies that work from the home or community outward instead of wildlands-in. Maintenance of defensible space and community protection treatments should also be prioritized to protect homes from negative wildfire interactions. This strategy will provide far more benefits to local communities and will reduce fire suppression costs by preparing communities for the inevitable wildfire event.

Finally, monitoring protocols should be established and fully funded before and after management activities to quantify project-related effects on owl territories and owl demographics, Barred Owl interactions, spotted owl closed canopy prey, invasive species encroachment and effects on fire intensity, and soil damages. This should be factored into project costs *a priori* to provide the public with transparent financial accounting and documentation of cumulative ecosystem effects and how they are being properly addressed.

SOFRC/TNC also needs to provide an analysis to the public on the carbon emissions from its logging proposals on 1.1 million acres of "all lands" in the Rogue Basin. Emissions from logging over large landscapes have been repeatedly shown to eclipse that of forest fires and such studies should be appropriately referenced (Mitchell et al. 2009, Oregon Global Warming Commission 2018, Law et al. 2018).

II. SIERRA NEVADA REGION

Much like in the Rogue Basin, TNC uses a "*community of practice*" approach to promote large-scale thinning/logging and prescribed fire (also referred to as "ecoforestry" or "ecological thinning") that fits within TNC's dichotomous key of "good" vs. "bad" fire. And like the Rogue Basin, TNC collaboratives lack local and regional conservation group representation. Instead, TNC partners with state and federal agencies, private landowners, land trusts (acquisitions), and organizations with ties to logging, including the Sierra Nevada Conservancy, which is promoting expansive postfire clearcutting and biomass energy projects across thousands of acres in the Rim fire area of the Stanislaus National Forest[18]. TNC's project website supports biomass logging as an energy source[19], despite the significant carbon emissions associated with on-site logging, off-site transportation, and processing of woody biomass into fuels (Fargione et al. 2008, Searchinger et al. 2009, Mellilo et al. 2009, Wise et al. 2009, National Research Council 2009, Manomet Center for Conservation Science 2010, DellaSala and Koopman 2015, Fanos and Moomaw 2018; Dogwood Alliance 2018; also see letter from 800 scientists to the EU Parliament opposing forest biomass as fuel[20]).

(a)

[18]According to the John Muir Project, disaster release funds from the Housing and Urban Development (HUD) were routed through the California Department of Housing and Community Development (HCD), and then to the Forest Service to support a massive logging project in response to the 2013 Rim fire on the Stanislaus National Forest, as well as creation of new logging-related infrastructure, while the Sierra Nevada Conservancy (SNC) would function as the primary advisory agency on this post-fire clearcutting project. In February 2018, HUD gave final approval for use of $50 million, including: (a) $28 million to fund intensive post-fire clearcutting (much of it to feed industrial "bioenergy" facilities, which incinerate trees and other forest "biomass" for kilowatts); and (b) $22 million for construction of a new forest biomass incineration plant west of Yosemite National Park (see also: https://www.eenews.net/eenewspm/2019/09/17/stories/1061131047). Further, during a May 30, 2019 site visit to the Rim fire project area, a TNC representative gave a presentation promoting the Rim post-fire clearcutting project.

[19] https://www.nature.org/en-us/about-us/where-we-work/united-states/california/stories-in-california/californias-wildfire-future/

[20] http://www.pfpi.net/wp-content/uploads/2018/04/UPDATE-800-signatures_Scientist-Letter-on-EU-Forest-Biomass.pdf

(b)

Figure 6. (a) Naturally-regenerating complex early seral forest habitat, planned for clearcutting for biomass on the Stanislaus National Forest in the Rim fire, as promoted by SNC and TNC; and (b) recent biomass clearcutting in the Rim fire project, as promoted by SNC and TNC (photos C. Hanson).

TNC claims that its "ecoforestry" and managed wildfire approaches can significantly reduce the risk of "megafires" and that such measures will create "healthier forests" more resilient to fire, drought, and climate change with "benefits to air and water quality, carbon storage, and wildlife habitat." We examined these and other TNC claims based on their scientific and conservation biology merits.

As stated by TNC's Sierra website, "our work to curb the cycle of megafires is far from over. TNC is uniquely positioned to protect our fire-adapted forests and help communities prepare for climate-exacerbated natural disasters. Let's stop making history and start fixing the problem[21]." Notice here – "protect" is never defined by TNC nor does it actually include protecting forests from logging and developments. Ostensibly, protection in this context means from fire.

The approaches taken by TNC have far-reaching policy implications given TNC's influence with landowners, logging companies, and government agencies through its national FLN and influence on state (California in this case) and federal-fire policies/politics.

According to TNC, "the state is stepping up by making a $1 billion commitment to forest health and fuels reduction over the next five years, a commitment that we hope the Governor and legislature will affirm and expand[21]."

The following are three brief case study write ups representing TNC's Sierra projects as summarized and interpreted from TNC's project website[21]:

- Independence Lake TNC Preserve (2,325 acres) – Located in the northern Sierra near Truckee, California, TNC's demo site proclaims high-severity wildfire as "a significant threat to the water supply, neighboring communities and wildlife….", and claims that TNC has used thinning and controlled burning to "reduce wildfire risk and promote *healthier*, more *resilient* forests at the preserve" (emphasis added), ostensibly by preventing natural mixed-severity fire mosaics.
- French Meadows Forest "Restoration" Project (28,000 acres) – Located at the headwaters of the Middle Fork of the American River (west of Lake Tahoe), TNC is partnering with the Forest Service, Placer County Water Agency, Placer County, *Sierra Nevada Conservancy* (emphasis added due to extreme postfire logging proposals in the Rim fire area), American River Conservancy and the Sierra Nevada Research Institute at UC Merced.
- Tahoe-Central Sierra Initiative (TCSI) –An August 2017, MOU announced this 2.4 million acre project around Lake Tahoe and the central Sierra Nevada involving the Forest Service, USFS Pacific Southwest Research Station, California Tahoe Conservancy, *Sierra Nevada Conservancy*, *California Forestry Association*, University of California Natural Reserve System-Sagehen Creek Field Station, and the National Forest Foundation (emphasis added). TNC's logging project claims to reduce significant risks of large severe wildfires and "unnatural levels of tree mortality, given the overgrown, unhealthy forest conditions….." This project includes biomass infrastructure development and "creative funding and planning approaches." TNC markets this case study as "a real game-changer-lessons learned from the TCSI can be applied across the Sierra Nevada to increase the pace and scale of restoration [sic]." The project also professes to address "barriers to the support of biomass utilization."

While TNC states that its approach "does not mean clearcutting, old-growth forest logging or extensive salvage logging after fires," the TNC project website[21] supports biomass subsidies and involves partnering with the Sierra Nevada Conservancy, the recipient of a grant from the US Department of Housing and Urban Development (HUD) to support 4,000 acres of postfire logging for biomass conversion on public lands. TNC justifies this approach as a means for "protecting the forests" ability to store carbon over the long term, an important tool in our fight against climate change" and as "protecting important wildlife species like the California spotted owl from critical habitat loss." Not a single project life cycle analysis on carbon emissions is provided to justify TNC's climate change claim, particularly its support for biomass, nor does TNC cite studies showing harmful impacts of logging on spotted owls or habitat benefits to spotted owls from mixed severity fires (DellaSala and Hanson 2015).

Just like the Rogue Basin strategy, TNCs fire management approaches have an underlying and questionable scientific foundation reflected in its online report "Wildfires and Forest Resilience: the case for ecological forestry in the Sierra Nevada" (Rodd 2019). Appendix 2 describes major scientific flaws in TNC's Sierra fire management approach, summarized herein as follows:

- Lack of recognition for the importance of mixed severity fires that produce ecosystem benefits (i.e. pyrodiversity begets biodiversity, DellaSala and Hanson 2015); instead large fires are mainly discussed as "megafires" having so-called "catastrophic" effects;
- Lack of attention to importance of large and small high severity burn patches that produce complex early seral forests essential to the region's extraordinary biodiversity (Swanson et al. 2011, DellaSala et al. 2014, DellaSala and Hanson 2019);
- No mention of robust reserve design approaches rooted in conservation biology (generally, TNC does not advocate for reserve-based approaches on federal lands as explained in DellaSala et al. 2017);
- No mention of published studies that contradict assumed increases in high-severity fires (citations provided in Appendix 2);
- Lack of recognition for effect of extreme fire weather on fire behavior; instead it is assumed that thinning can reduce fire intensity with no discussion of uncertainties or limitations;
- No discussion of research indicating that increased logging in general, and commercial "thinning" in particular, can increase fire severity (Cruz et al. 2014, Bradley et al. 2016);
- No discussion of regional conservation priorities and species intolerant of widespread thinning - thinning is assumed to be less impactful to owls than wildfires, yet no evidence is provided and studies contradicting claims that fires are detrimental to owls (Jones et al. 2016) are not even referenced (e.g., Lee 2018);
- No discussion of the carbon emissions that will be produced by TNC's large-scale thinning projects or biomass use.

In closing, on the one hand, TNC claims its fire management approaches are climate friendly because they will curtail fires and therefore emissions, on the other hand, TNC supports large-scale biomass burning projects (e.g., Stanislaus National Forest) that will release substantial (yet undisclosed) emissions. TNC claims that "ecological thinning" will restore habitat for spotted owls without acknowledging published evidence to the contrary (Odion et al. 2014a). There is no acknowledgement of studies that conflict with their limited view of fire-dependent ecosystems in the Sierra, the current debate over whether high severity is increasing (see Odion and Hanson 2008, DellaSala and Hanson 2019), or whether wildfires, as opposed to logging, are the real threat to spotted owls (see Lee 2018). TNC's fire management policies conflict with the protection of complex early seral forests from logging, and provision of habitat for imperiled species that use these habitat areas such as California Spotted Owl, Northern Goshawk, Great Grey Owl, and Black-Backed Woodpecker, among other regional conservation priorities (see DellaSala et al. 2017; also see http://johnmuirproject.org/).

III. Santa Fe National Forest

TNC's work in the Santa Fe case study area claims "landscape resilience" as the goal for the forests of the Sangre de Cristo Mountains via its involvement with the Greater Santa Fe Fireshed Coalition (GSFFC) and Santa Fe National Forest. As in other case studies, TNC is on message advocating for the "right fire" and "good fire" (see PREFACT 2018). TNC again follows its "community of practice" approach (Bassett 2018) with voting members of the "coalition" consisting of forest industry groups and practitioners, watershed associations, and government agencies[21]. As in other examples, local conservation groups are not part of the inner club membership circle of voting partners, although some can participate as non-voting "advisors."

An example of how this approach is playing out is the US Forest Service's "Santa Fe Mountains Landscape Resiliency Project," which proposes thinning and prescribed fire mainly in closed canopy forests to achieve presumed ecosystem benefits following the good/bad fire doctrine. The project covers the Espanola and Pecos/Las Vegas Ranger Districts of the forest and includes landscape-scale thinning (21,000 acres) and burning (43,000 acres). Note the widely scattered, few retained trees (susceptible to blow down) and lack of an understory in these recently cut areas (Fig. 7).

(a)

[21] http://www.santafefireshed.org/

(b)

Figure 7. (a) Black Canyon project thinned in 2002 and burned twice (photo: F. King); and (b) La Cueva fuel break thinned in 2015 on the Santa Fe National Forest (photo: L. Barron). Note lack of large trees, sparse understory, and excessive overstory removals. Also – DellaSala has numerous photos from several locations in the region showing similar "thinning" impacts.

In addition to the above heavily thinned areas, I visited the Santa Fe National Forest where more thinning, burning, and even clearcutting was taking place under the guise of "restorative" actions. Notably, the Forest Service provided grants of up to $360,000 to stakeholders in the Southwest Jemez Mountains Landscape Collaborative to implement projects designed through the collaborative process[22].

As an example of the type of management publicized by the Forest Service, consider the kiosk display in Figure 8 that promotes a large clearcut as a restorative action ostensibly to reduce the spread of mistletoe (which is a native species), and includes mention of the Southwest Jemez Mountains Landscape Collaborative.

Figure 8. US Forest Service display ad attempting to portray clearcutting as restoration. What is not seen on the display is the large clearcut resulting from these actions.

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22 https://www.fs.usda.gov/detail/r3/workingtogether/grants/?cid=fsbdev3_022022

Behind the kiosk, an ecological story unfolds quite unlike what is being claimed, as most trees in eyesight were clearcut, and a weed-infested field with little conifer establishment remains, with obvious soil damage from intense pile burning heat (Figure 9). The area is no longer a pine forest but is a weed infested grassland. Type conversion rather than restoration would have been more aptly displayed on the kiosk given the outcomes.

(a)

(b)

(c)

(d)

Figure 9. Santa Fe National Forest mistletoe treatments mentioning the Southwest Jemez Mountains Landscape Collaborative. This was once a pine forest but has been type converted to

a grassland (mainly invasive, non-native weeds) for decades (D. DellaSala). Soils are irreplaceable in human lifetimes.

Much of TNC's programmatic emphasis on wildfire risk reduction for the GSFFC derives from the "Greater Santa Fe Fireshed Coalition Wildfire Risk Assessment" (Bassett 2018) as funded by the Forest Service (referenced in Davis 2018, as TNC provides no publicly available funding source data on its website[23]). And while this assessment aptly notes the occurrence of mixed- and high-severity fire in portions of the region, TNC still claims (without analysis of wildlife response – i.e. no wildfire analysis layers were provided in the risk assessment) that plants and animals are somehow "not resilient to the current, higher-intensity fire regime" (Bassett 2018).

The risk of wildfire for the GSFFC is mainly assessed by combining assumptions regarding the influence of fire likelihood and fire intensity (640,000 simulated scenario runs) with fire susceptibility (derived by TNC from consultation with GSFFC members, Bassett 2018). Susceptibility is assigned 0 to 1 as the value lost (negative) or gained (positive) when it is burned based on participants' personal views, rather than on ecological values. Thus, the assignment of values and risks yields highly subjective and questionable rankings that cannot be replicated nor are they likely to be robust (consistent) if the makeup of the group was somehow changed, especially to include more wildlife experts and analysis.

Aerial photos also are provided from 1935 to 2016 to assess historic vs. contemporary conditions related to land changes, which include noticeable logging impacts. However, nothing is recommended by TNC or the collaborative to limit additional logging that has contributed to the problems TNC would like to resolve (lack of resilience, fire severity changes, habitat fragmentation– see Bradley et al. 2016 for logging and wildfire increases). That is, TNC's "resilience" treatments involve thinning and prescribed fire and not increased forest protections from logging. High intensity burns are also incorrectly assumed to represent 100% loss to associated forest values with no recognition of spatial and temporal heterogeneity in fire effects, and no acknowledgement of the myriad positive ecological effects of intense fires for biodiversity through creation of biological legacies and complex early seral habitat (Swanson et al. 2011, DellaSala et al. 2014, DellaSala and Hanson 2015, DellaSala et al. 2017).

A core assumption of this approach is that burn probability (likelihood) can be "reduced with regulatory changes (i.e. fire restrictions and area closures during periods of high fire danger) and decreasing the homogenous nature of forests through which fires can rapidly spread." In doing so, Bassett (2018) claims that the GSFFC can "seek to improve the health and long-term resilience of forested watersheds and communities by addressing wildfire risk using a proactive, collaborative approach." Bassett (2018) aptly notes that projected climate change influences on weather and fire behavior will increasingly render the risk assessment less reliable but makes no

[23] https://www.nmconservation.org/data-publications/2018/2/7/santa-fe-fireshed-wildfire-risk-assessment

mention of how this too will affect the efficacy of thinning treatments in extreme fire weather (droughts, high winds, low fuel moisture, high temperatures greatly limit thinning; DellaSala 2018).

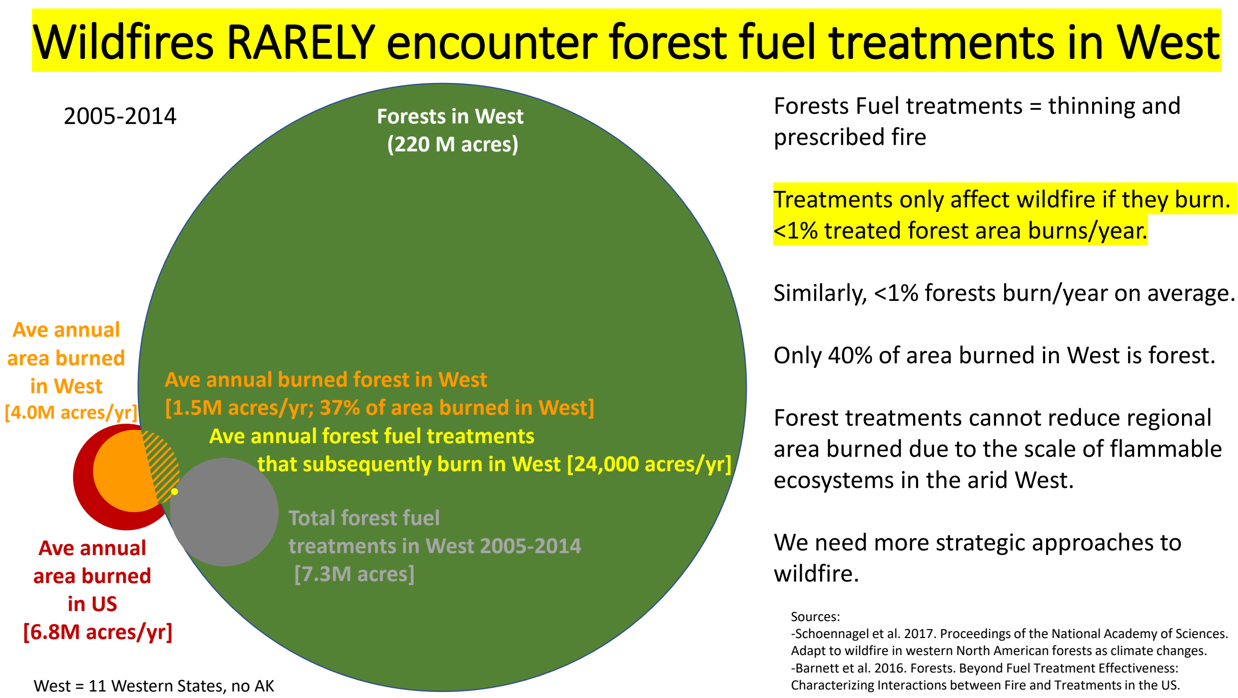
While the risk assessment approach yields an array of maps and value risk assessment (VRA) characterizations, its problematic assumptions have not gone unnoticed. For instance, Davis (2019) examined the assumptions that went into the risk assessments, particularly the combination of likelihood and consequences of a wildfire, concluding that the approach was useless in supporting decisions concerning wildfire risk reduction treatments. Davis (2019) summarized the following modeling deficiencies:

- The TNC Risk Assessment did not estimate the actual chance of a wildfire occurring within the greater Santa Fe Fireshed because it only calculated the consequences of 640,000 simulated wildfires. It did not take into consideration actual probabilities available via empirically based studies (see below).
- The public is left not knowing the current probability of a wildfire.
- Without knowing the current probability of a wildfire, the value of reducing the wildfire "risk" is not only unknown but unknowable.
- Costs of the consequences of a wildfire affecting a community (homes burned, infrastructure destroyed, etc.) are not provided, nor are proven solutions for creating fire-safe communities (by focusing on making homes more fire-safe, and conducting defensible space pruning of vegetation within 100 feet of homes—DellaSala and Hanson 2015) provided in any meaningful way.
- Costs and benefits (effectiveness) of thinning activities are not provided and several subjective valuation indices are used.

Problematic factors with Bassett's (2018) assessment include: (1) there is no information provided on the "experts" interviewed in setting the VRAs (again – this cannot be replicated); (2) ostensibly 53 VRAs were initially selected and then narrowed down to 19 with no criteria given (cannot be replicated), (3) no accuracy determination is provided for forest canopy, surface fuels, and other factors used in the risk assessment; and (4) private land structures within the WUI are all assumed to have the highest risk regardless of other factors (e.g., vegetation type).

Additionally, Bassett (2018) under-represented the importance of mixed severity burns, which were incorrectly assumed to be uncharacteristic (only low severity is considered characteristic) and therefore not part of a "resilient" landscape even though many lines of evidence indicate that ponderosa pine and mixed-conifer forests of this region historically had a mixed-severity fire component, including high severity patches (Odion et al. 2014, DellaSala and Hanson 2015). For example, Bassett (2018) estimates that ~60,000 acres of the ~150,000-acre 2011 Las Conchas fire in New Mexico was high severity, yet, others place that component at 31,318 acres (analysis by Bryan Bird and Kurt Menke[24]). The difference apparently is due to Bassett combining moderate with high severity into a single "high severity" category considered "uncharacteristic," which inflated the susceptibility factors and VRAs (again no specific wildlife analysis is provided, only subjective valuations based on inflated severity estimators).

Another important missing component of Bassett (2018) is the actual probability of wildfire encountering a stand in any given time frame (Figure 10). This needs to be estimated empirically at the project scale – and not just by modeling – as exemplified by Schoennagel et al. (2017; see illustration below) in their wildfire-thinning probability assessment (using empirical data). Schoennagel et al. (2017) determined that of the 7.3 million acres of treated forests (2005-14) <1% of treated forest area per year actually encountered a fire. These data can be used to cross-validate scenario-modeling, using empirically and locally derived probability estimates to more narrowly focus thinning treatments by taking into consideration the exceedingly low probabilities that thinned sites will even encounter a fire. Using this empirical approach, TNC should aptly target the focus of treatments to a narrow defensible space area to protect homes (Schoennagel et al. 2017, also see Moritz et al. 2014) and not in the backcountry.



[24]http://pdf.wildearthguardians.org/site/DocServer/2011_Fire_Severity_Report_Final.pdf

Figure 10. Putting so-called “fuel treatments” (thinning and other forms of logging) in spatial and temporal context.

In conclusion, Davis (2019) states that the TNC Wildfire Risk Assessment (Bassett 2018), while a useful first step toward rationale planning, cannot be used as a tool for planning wildfire risk reduction treatments without knowing: (1) current risk of wildfire; (2) actual probabilities that each value will be affected (also how they will benefit from fire); (3) cost and benefit to each value; and (4) reduction and costs (ecological and economical) from wildfire risk reduction treatments. We add to this the need for more robust risk assessments that actually analyze wildlife response based on empirical evidence and not highly subjective valuations.

IV. ADDITIONAL PROBLEMS WITH TNC-COLLABORATIVES

In addition to the 3 comprehensive case studies reported above, TNC has participated/led collaboratives funded by the Forest Service on the Deschutes and Ochoco National Forests in the Blue Mountains of eastern Oregon. TNC and others have been involved in the Ochoco collaborative, that according to local conservation groups, proposes to change protective (“Eastside”) standards for large, old trees >21 in diameter in order to log larger trees in thinning timber sales. The Forest Service also has apparently funded a TNC representative to address most of its questions about the collaborative to TNC. Full details of these problems are presented in Appendix 3 with a Box 1 summary below.

Box 1. The Nature Conservancy Role in the Black Mountain Timber Sale (observations by Paula Hood, Co-Director, Blue Mountains Biodiversity Project, League of Wilderness Defenders).

Many of the ‘dry’ forests for which TNC and the collaborative are promoting large tree logging 1) show clear evidence of historic old growth fir and pine/fir co-dominance and/or 2) are surrounded by plantations, young forests, and previously heavily logged forests. In other words, these forests contain some of the last old and large trees and some of the last high-quality wildlife habitat in many of these areas. In recent timber sales on several Forests, large Ponderosa pine and large Douglas fir were also logged with collaborative approval.

The implications of the collaborative group’s position, led by TNC and supported by timber interests, are huge and threaten to put many thousands of large and old trees at risk of being logged. In addition, the TNC position undermines Forest Plan standards, and the process by which Forest Plans are designed to operate. The proposed circumvention of the Forest Plan, as suggested by TNC, sets a dangerous precedent and encourages ignoring both the intent and substance of ecological protections in Forest Plans.

During one of the collaborative meetings in which the wildlife GIS information was being discussed, it came to light that the TNC representative was also working for the USFS. As a result, the TNC representative could get the wildlife GIS layers without a FOIA-- even though the USFS would not give the information to me without a FOIA. I asked the representative to share the information, but did not receive a response. The TNC representative was able to get this information quickly; I had to go through the FOIA process. I am not sure what sort of work the TNC representative was doing for the USFS.

The TNC representative being paid for work by the USFS is one of two examples I know of in which a person who is very USFS and logging-friendly on a collaborative group is also being paid, at least in part, by the USFS. Neither of these examples were put forth in a particularly transparent manner-- in both cases it just happened to come up one day while I was present at a collaborative meeting. Such ties seem like an undisclosed conflict of interest to me, but I'm not a lawyer and don't understand the legal requirements in place for such issues as they relate to the collaboratives.

CLOSING FINDINGS AND RECOMMENDATIONS

During this time of unprecedented climate change and cumulative land-use impacts poised to now place over 1 million species at the brink of extinction worldwide, it would be prudent for the world's largest conservation organization to lead by example in curtailing its own project-related footprint and emissions by joining the conservation science community in advocating for large-scale biodiversity protections in order to slow the imminent catastrophic-global loss of biodiversity (e.g., Noss et al. 2012, Dinerstein et al. 2018, Half Earth, Nature Needs Half). Unfortunately, while seemingly well intentioned, TNC's approach is likely to do more harm to ecosystems than good, its communication and outreach strategies on wildfire are riddled with highly biased and subjective fear-of-fire approaches that promote destructive logging, its fire science uses questionable models and biased sampling, and its collaboratives are membership only clubs inclusive of mainly those groups that support its practices (i.e., thinning, "good fire," biomass). These problems in sum illustrate TNC's expansive policy reach, which has been consequential to conservation groups and biodiversity conservation in general.

To close the growing divide between TNC and conservation groups/scientists, TNC should:

- Provide transparency and accountability in disclosing funding sources and include a more inclusive approach to collaboratives that represents local and regional conservation interests and not mainly extractive and agency interests.
- Provide evidence-based comprehensive literature reviews to ensure that not just the science TNC uses to support collaboratives but the full breadth of science (including those that contradict TNC assumptions) is presented and uncertainties/limitations/impacts of proposed management aptly addressed and minimized.
- Field-validate predictive fire models and use empirical evidence before widely applying questionable models at project and regional scales.
- Purge the good vs bad fire messaging and concentrate more on the ecological benefits of wildfires, including high-severity burn patches (large and small) characteristic of low and mixed-severity fire systems.
- Work with diverse members of the conservation community to coordinate policy and conservation priorities.

- Correct the record when politicians or the media use TNC science to usher in sweeping changes to forest-fire policies inconsistent with biodiversity conservation.
- Include or endorse fully representative and large inviolate protected area networks on federal lands with bolder conservation goals (e.g., see Noss et al. 2012, Nature Needs Half), maintain connectivity among reserves, protect imperiled species/habitat from logging, protect all remaining primary (unlogged) forests and roadless areas from logging, protect complex early seral forest habitat from logging, and reduce anthropogenic stressors in fire-adapted forests (see DellaSala et al. 2017 for approaches).
- Assess and fully disclose life cycle analysis associated with TNC proposed thinning and burning and abandon all efforts to convert burned forests into biomass energy.

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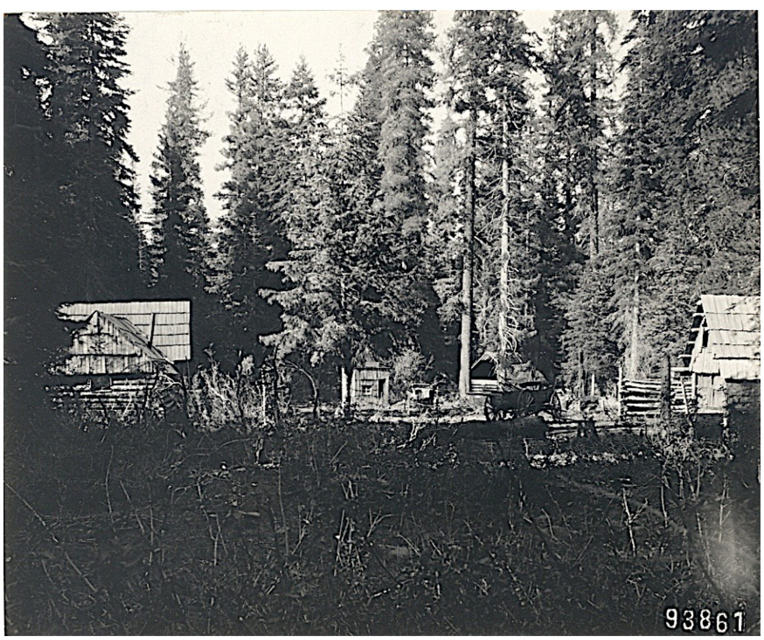
Appendix 1. Historical photos (provided by Dominic DiPaolo) of the Rogue Basin circa 1900s showing areas in the vicinity of the Cascade-Siskiyou National Monument, Southern Oregon Cascades, and Applegate Valley (these areas generally have been proposed by TNC and its partners for logging under the rubric of "fuel" treatments, based on the assumption that they are uncharacteristically dense, too prone to severe fire, and should be more open) (Note: TNC's open stand assumptions not only are contradicted by these photos but also by pollen analysis (Colomborali and Gavin 2010, cited above) and General Land Surveys (Baker 2011, Baker 2012, Hickman and Christy 2011, DiPaolo and Hosten 2015, cited above) conducted in the area that show open conditions were not predominant).

It is a commonly held assumption that prior to the federal policy of fire suppression (beginning in 1905 per TNC's assumptions) the vegetation of southwest Oregon was maintained by frequent low severity fires that underburned forests and woodlands in a self-reinforcing feedback that sustained open canopy forests and woodland and perpetuated low severity fire effects. It is further assumed that the disruption of these frequent low severity fires has led to an unprecedented build-up of vegetation that now fuels wildfires of much greater intensity and extent than that of previous centuries. This assumption of cause and effect has led to federal and state land management agencies, as well as their local government and non-profit partners, using southwest Oregon as a model landscape to promote and institute a policy of landscape level logging, under the euphemistic term of "thinning", in an attempt to "restore" forests to their historic condition and return wildfire to its perceived historic level of low intensity in landscapes dominated by natural vegetation. So powerful is the promise of this idea that it has become the dominant approach embraced by federal land managers, politicians, and local jurisdictions to address the problems associated with protecting life and property from the impacts of the increasing occurrence of wildfires in the American west. However, an examination of numerous historical photographs taken at various locations across southwest Oregon at the time the federal policy of fire suppression was instituted show that dense vegetation structural types were common across the landscape of southwest Oregon at all elevations and that large mixed and high severity fires are not unprecedented on these landscapes but instead were relatively common events. The following are a small sample of hundreds of photographs taken by Forest Service employees between 1909 and 1924 that show forest, woodland and shrubland vegetation structures and fire effects that were common across the landscape of southwest Oregon around the early 20th century. While the following photos were selected for quality and geographic representativeness, they are typical of the vegetation structures and fire effects visible across the available historic photo sets and they contradict TNC's assumptions of predominately open canopy forests. Many of these photos were shown to TNC at meetings with conservation groups and in comments but were ignored.

1a.

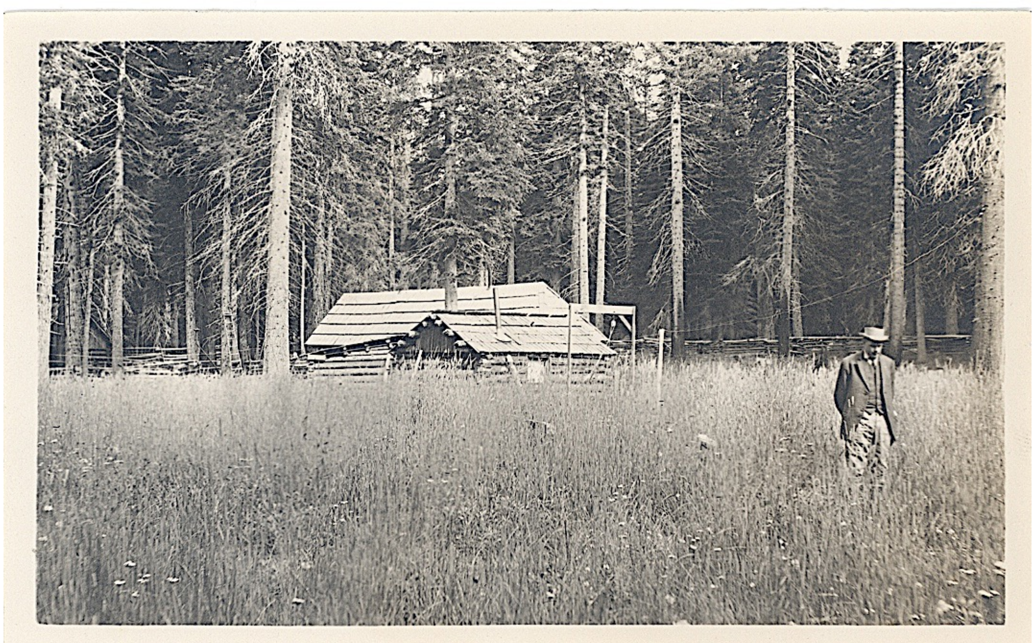
1b.

1c.



1d.

1e and 1f.



1g and 1h.

Figure 1a - 1h: **Cascade-Siskiyou National Monument (CSNM)** – 1a. Douglas-fir forest one mile north of the CSNM, July 15, 1915, 4,600 ft. elevation.; 1b. Near Moon Prairie in CSNM, July 9, 1910, 4,600 ft. elevation. Note dense conifer forest beginning at meadow edge. 1c. Dense conifer forest on Soda Creek just outside northwest boundary of CSNM, July 6, 1910, 4200 ft. elevation. 1d. Douglas-fir forest 2 miles north of northeast portion of CSNM, July 21, 1910, 5,200 elevation. 1e and 1f. Taken at same location. Top photo showing dense closed canopy Douglas-fir forest. Bottom photo showing more open fire affected forest with shrubby understory. One mile north of CSNM, November 8, 1909, 4,800 ft. elevation. 1g and 1h. Both photos taken near the same location. Dense, closed canopy Douglas-fir/White fir forest and meadow. One mile north of CSNM, 5,200 ft. elevation, July 16, 1910.

2a.

2b.

2c.

2d.

2e and 2f.

2g and 2h.

2i.

2j.

2k and 2l.

2m.

2n.

2o.

2p.

2q.

2r.

Figures 2a – 2p. S**outhern Oregon Cascades -** 2a. In the area of Big Butte Creek, Jackson County, OR. 1917. Description accompanying this photo: “The timber (in the Big Butte Creek area) consists of a rather dense stand of Douglas –fir, sugar pine, yellow pine and a variety of other firs.” 2b. Big Butte Creek watershed, 3 ½ miles northwest of Butte Falls, OR. Dense, closed canopy, multi-story Douglas fir forest beyond forest clearing. 3,400 ft. elevation, March 31, 1910. 2c. Near North Fork of Big Butte Creek, 2 ½ miles northeast of Butte Falls. Dense, closed canopy, multi-story Douglas fir forest. 3,000 ft. elevation, March 29, 1910. 2d. Big Butte Creek watershed 6 miles northwest of Butte Falls. Dense Douglas-fir forest behind clearing and beyond (note upper right corner of photo). 2,600 ft. elevation April 11, 1910. 2e and 2f. Both photos taken from nearby locations. Big Butte Creek watershed 4 ¼ miles northeast of Butte Falls. Closed canopy old-growth Douglas-fir forest. Note extensive tree cutting in foreground and dense multistory forest in background. 4200 ft. elevation, March 24, 1910. 2g and 2h. Both photos taken from same location. Near North Fork of Big Butte Creek. Fire affected Douglas-fir forest showing mixed severity fire effects. Note tree densities of fire killed and surviving trees and dense post-fire shrub growth. 3,300 ft. elevation, September 13, 1912. 2i. Big Butte Creek watershed 3 ¼ miles north of Butte Falls. A portion of this area burned just before this photo was taken. Note the large legacy snag in the foreground surrounded by dense mid-seral/mature Douglas-fir forest. 3,200 ft. elevation, July 8, 1911. 2j. Rogue River Burn near Middle Fork of the Rogue River, approx. 3 miles southwest of Prospect. 1910’s. Note high density of mature trees and downed wood of this fire killed forest. 2k and 2l. Both photos taken near same location. Near North Fork of Big Butte Creek. Note the high former stand density and dense post fire shrub growth in this large high severity burn patch. 3,300 ft. elevation, Sept 9, 1912. 2m. Mixed severity fire in dense forest taken from Anderson Mountain near the Rogue-Umpqua Divide. Photographed area within the High Cascades Complex fire that burned in 2017. Taken in 1923. 2n. Continuation of panorama from previous photo. 2o. Photo taken from Anderson Mountain near the Rogue-Umpqua Divide looking down Jackson Creek on the Umpqua River side. Photographed area within the High Cascades Complex fire that burned in 2017. Note the vast expanse of unbroken dense conifer forest cover extending down to at least to 3,000 ft. elevation and high severity patch at bottom of meadow. Taken 1923. 2p. Near the South Fork of the Rogue River, Northeast Jackson County, Approx. 4000 ft. elevation. Photo taken 1917. Caption with photo reads “1915 burn within 1910 Rustler Peak burn. The brush above ground killed but new sprouts coming from roots.” 2q. Northern part of the Huckleberry Mountain burn of 1910. Northern Jackson County. Approx. 5,000 ft. Taken 1917. 2r. Four Bit Creek. Jackson County, 3 ¼ miles northeast of Willow Lake Reservoir. Open ponderosa pine with ceanothus integerrimus understory, California black oak in foreground. 3,300 ft. elevation. 1925.

3a.

3b.

3c.

3d.

The first phase of forest depletion.
Frequent large patches of mature conifers remain on the area.

The second phase of forest depletion.
A few conifers are scattered over the entire burnt area.

3e and 3f.

3g.

3h.

3i.

3j.

3k.

3l.

3m.

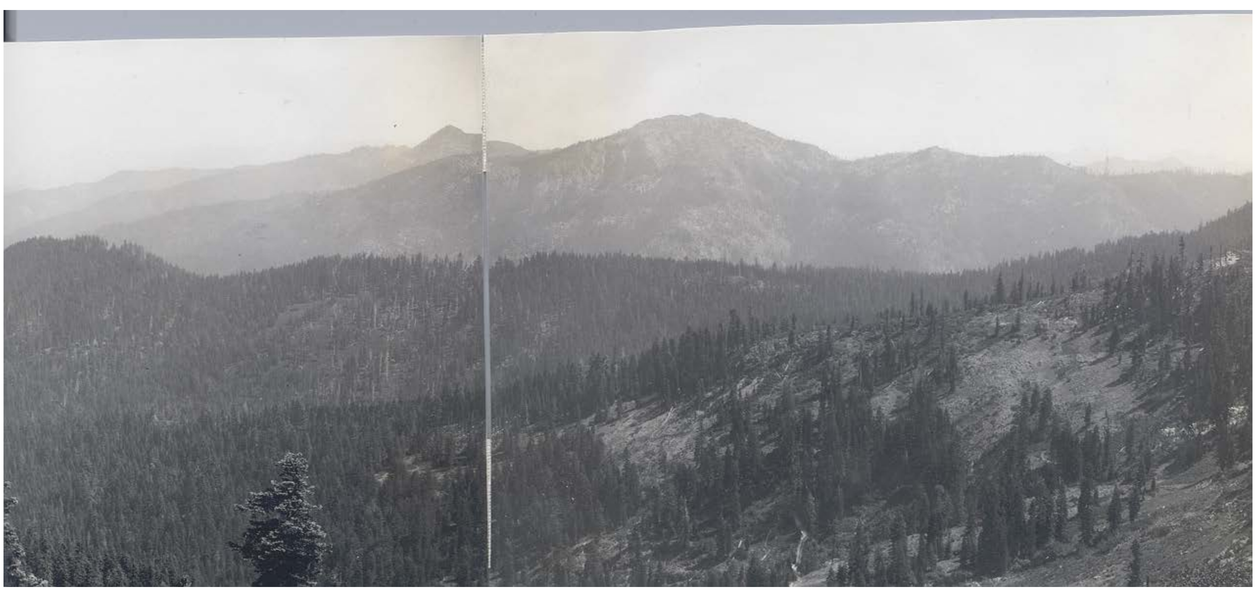
3n.

3a -3n. **Applegate Valley –** 3a. General view of the lower Applegate Valley. 1917. Note dense conifer forest in foreground, shrubland with young trees covering slope in mid-ground, and grassland and open woodland concentrated on valley floor. 3b. Upper Applegate Valley. 1916. Dense forest left of the river, mix of open areas, open woodland and dense forest on valley floor to the right of river and dense shrubland and forest on slopes in the background. 3c. North slope shrub type below 3,000 ft. elevation. 1916. Caption attached to photo, "They (the north slope types) vary from pure, dense stands of conifers through all intermittent stages to dense brush. Open stands without brush are rare on the low range (foot hills below 3,000 ft.)" 3d. Buckbrush chaparral at about 2,000 ft. elevation. Grazed slightly by cattle. 1916. 3e and 3f. Upper Applegate Valley, 1916. Upper photo showing stands of dense Douglas-fir forest and various ages intermixed with shrubland and hardwood woodland. Bottom photo showing fire affected area with dense forests, scattered trees and dense shrubland throughout. Captions under these photos reveal the Forest Service's sentiments regarding wildfires at the time. 3g. Yale Creek and Kenney Meadows. Note evidence of tree cutting. 2,500 ft. elevation, January 9, 1913. 3h. Yale Creek and Kenney Meadows. 2,500 ft. elevation, January 7, 1913. 3i. The Straight Gulch – Kinney Creek Divide burns of 1915. Photo taken 1916. Shrubs recovering on recently burned area. Note unburnt dense brush within burn on slope to the right and dense conifer forest on slope to the left. 3j. Intermixed shrubland and conifer forest (in foreground and valley). 1916. 3k. The 1915 Randal burn in whiteleaf manzanita-Oregon white oak shrubland/woodland near the valley floor. Photo taken 1916. 3l. Native vegetation in 1920 recovered from 1915 burn. 1,700 ft. elevation. 3m. Caption accompanying photo, "Typical low range (below 3,000 ft.) shrubland at the edge of burn." Taken 1916. 3n. Caption accompanying photo, "Area where 91 whiteleaf manzanita seedlings are growing in one square yard following burn." Taken 1916.

4a.

4b.

4c.



4d.

4e.

4f.

4g.

4h.

4i.

4j.

4k.

4l.

4m.

4n.

4a -4h. **Western Siskiyous –** 4a. In the area of Briggs Creek. 1917. Intermixed shrubland and conifer forest showing past fire affects. In the vicinity of the 2018 Klondike Fire. 4b. Briggs Valley, Ferran Ranger Station. 2,000 ft. elevation, September 9, 1919. The Klondike Fire burned through this area in 2018 4c. Steep north slope in the Illinois River watershed. 3,000 ft. elevation, August 4, 1919. 4d. Taken from top of Steves Creek near Oregon Caves National Monument. Prominent points from left to right are Whisky Peak and Arnold Mt. Photo taken in 1922. 4e. Top of Sturgis Fork. Steve's Peak in the distance. Near Oregon Caves National Monument. August 24, 1922. 4f. Top of Sucker Creek near Oregon Caves National Monument. Old burn, brush and patches of conifer forest. August 26, 1922. 4g. On north slope of Craggy Mt. Photo taken August 26, 1922. 4h. On ridge of Peavine Mt. 2,500 ft. elevation. Photo taken September 7, 1919. 4i. Top of Mule Creek watershed, lower Rogue River. Caption accompanying photo, "An almost pure stand of Rhododendron in heavy timber (Douglas-fir and western hemlock). Photo taken September 26, 1919. This area is in the vicinity of the Big Windy Fire that burned in 2013. 4j. Caption accompanying photo, "Heavy brush in timber (Douglas-fir and Hemlock) near Ninemile Mt. of Douglas-Josephine County Divide. A result of repeated ground fires." Photo taken September 26, 1919. This area is in the vicinity of the Big Windy Fire that burned in 2013. 4k. The lower Oak Flat on the Illinois River and the brush and dense forest covered slopes above it. Photo taken 1917. The Checto Bar fire burned through this area in 2017. 4l. Chetco River area. Photo taken 1917. In the vicinity of the Checto Bar fire that burned in 2017. 4m. Salmon Creek near Powers, Oregon. Photo taken around 1924. 4n. View of the South Fork of the Coquille River above Powers Oregon. Photo taken around 1924.

Appendix 2. TNC science used to justify large-scale logging projects described as thinning" in the Sierra Nevada and a counter point argument.

TNC Claim (from Rodd 2019)	Counter Point (based on my assessment)	Source material
1. Forests of the Sierra Nevada and across the western U.S. are experiencing an unprecedented increase in the size and severity of wildfires along with widespread tree mortality due to drought and insect outbreaks	Whether high-severity fire is increasing is the subject of much recent debate. For instance, the spatial extent and proportion of high severity fire within large fire complexes have not changed markedly in recent decades in most forested regions of the West, but results are equivocal in the Rocky Mountains and southwest. In the Sierra Nevada, some studies have reported increasing trends for high-severity fire, while subsequent research indicated no increases. Most research indicates that currently have less overall high-severity fire in Sierra Nevada forests than we did historically.	Hanson et al. 2009, Dillon et al. 2011, Mallek et al. 2013, Baker 2014, Odion et al. 2014, Hanson and Odion 2014, DellaSala and Hanson 2015, Hanson and Odion 2015, Law and Waring 2015, Keyser and Westerling 2017, DellaSala and Hanson 2019.
2. Over the last six years alone, five separate wildfires in the Sierra Nevada have burned 100,000 acres or more with unusually large patches of forest burned at high-severity (where most trees are killed). The fire behavior observed during some of these fires is unlike any experienced in recorded memory, uncharacteristic of the way that forest fires burned in these forests before Euro-American arrival in California, and detrimental to forest sustainability as the climate continues to warm.	The Sierra Nevada region is vast, running 400 miles north-south and 70 miles east-west (28,000 sq, miles). Five large fires (no severities provided) over a region this large are not necessarily unprecedented or uncharacteristic. In fact, fire rotation intervals for large (>1,000 ac) high severity patches in this region occur on average every 1,181 years at the landscape scale currently. Large patches >8000 to >9000 acres have been reported in historical accounts. The statement also has no historical basis and involves a shifting baseline perspective (the baseline is moved to a more recent time period instead of longer time series baselines); the statement about fires being unlike any in recorded memory is hyperbole	Papworth et al. 2008 (shifting baselines), Baker 2014, DellaSala and Hanson 2019

	(shifting baseline); reference to the pre-European colonization period has no empirical or historical basis or citations.	
3. These developments not only threaten lives and communities but also seriously compromise *forest health* and resilience, degrading many important benefits forests provide to people more broadly (emphasis added).	Forest health is mentioned repeatedly yet never defined. This term is used for forestry and timber-based perspectives and has no ecological basis – it is a highly biased and subjective view point. From an ecological standpoint, a healthy forest is one that reflects the heterogeneity and habitat complexity of historical forests, including many dense stands, snags, and snag forest habitat (complex early seral forest) patches created by high-intensity fire. Patches of complex early seral forest, created by high-intensity fire, rival old growth forest in native biodiversity and wildlife abundance, and many species evolved to depend on this habitat primarily. Further, current science is clear that logging in remote forests does not protect communities, and the only effective way to protect homes from wildland fire is to help homeowners make their homes more fire-safe, and help them conduct annual defensible space pruning of vegetation within 60-100 feet of homes—vegetation management beyond this distance provides no additional benefit, and dangerously diverts scarce resources and attention away from true home protection.	DellaSala and Hanson 2015; also see DellaSala et al. 2013 for similar concerns related to ecoforestry concepts invoking forest health terminology.
4. We know how to manage forests so they are less prone to large, severe wildfires and drought and to decrease likelihood of large tree mortality events from	There is no discussion of the limitations of thinning especially in extreme fire weather, or discussion of extensive research indicating that increased logging, including thinning, can often	See review of thinning limitations in DellaSala and Hanson 2015 and DellaSala 2018. See regional and meta-analysis reviews that delink increased fire intensity from insect outbreaks (Bond et al. 2009, Donato et al. 2012, Black et al. 2013, Meigs et al. 2016, Hart et al. 2016, Six et

insect and disease outbreaks. Through use of targeted ecological thinning, prescribed fire, and managed wildfire we can reduce the accumulated high fuel loads, promote healthier, more resilient forests, reduce the risk of high-severity wildfire at large spatial scales, and protect sensitive species.	increase fire intensity. There is no discussion regarding how thinning cannot reduce or contain insect outbreaks, nor how outbreaks are not coupled to increases in fire intensity. The reference to "*healthier*" reflects a forestry and timber bias.	al. 2018). See Bradley et al. 2016 and Cruz et al. 2014 regarding the potential of logging, including thinning, to increase fire intensity.
5. Many private timberlands are characterized by relatively homogenous, even-aged stands of trees. Overall, these uncharacteristically uniform, dense and young forests are more prone to high-severity	While this statement is generally true, not a single citation is provided. Additionally, there is no mention of the need to reform forestry practices that continue to generate homogenous landscapes, including post-fire clearcutting, as well as intensive commercial thinning (which eliminates most of the understory, often creating plantation-like stands, in terms of their structure, where little is left after logging but widely-spaced trees) on national forests.	Citations that support the statement about plantations being prone to more severe fire include Odion et al. 2004, Bradley et al. 2016, Zald and Dunn 2018.
6. As a consequence, while fire frequency overall remains lower than prior to fire suppression, in recent decades we have experienced a rapid increase in burned area and fire size, with strong evidence for an increase in severity of fires, as measured by trends in fire-driven tree mortality and the minimum area of high severity burns.	For the reasons noted in #1, this statement is contradicted by the most recent and most comprehensive studies.	See citations in #1
7. The King Fire burned 30 spotted owl territories. An average of 53% of each territory	Notably, 2015 breeding owl surveys for the Jones et al (2016) study cited were conducted after post-fire	Hanson et al. 2018, Lee 2018

burned at high-severity and 14 of these territories had an average of 89% high-severity burn area (Gavin Jones, personal communication). The result was sevenfold higher abandonment of territories compared to unburned and low-severity burned territories.	logging had begun. Logging levels within spotted owl sites far exceeded the "only 2%" reported in the Jones et al. study. The Jones et al (2016) paper, by the same authors who wrote Peery et al (2019), is problematic mainly because of inaccurate estimates of post-fire logging, as well as failure to account for the fact that many of these territories were not occupied prior to the King fire, and many had not been occupied in years, often due to extensive logging. The Jones et al. (2016) study itself (e.g. Fig. 1) directly contradicts the claim of 14 owl territories with 89% high-severity fire. In fact, as Hanson et al. (2018) found, only 2 owl territories in the King fire were occupied prior to the fire, had over 50% high-severity fire but were not post-fire logged, and were not reported as occupied after the King fire.	
8. It can take decades if not hundreds of years for large patches of severely burned forests to recover; some of the forests may be permanently converted to shrub fields if the sizes of high severity patches are very large (like in the King Fire) or if they repeatedly burn during the warmest, driest periods of subsequent years	This statement is contradicted by a wealth of scientific studies finding vigorous and heterogeneous natural conifer regeneration in large high-severity fire patches. Further, this is a very narrow view that fails to recognize the importance of high severity fire patches (large and small) for species that require complex early seral forests. It is highly unlikely that the King fire, if repeatedly burned, will burn into a brush field given fire rotation intervals are landscape scale estimates of large high severity fire patches that occur on time scales of millennia, compared to fire return intervals that are scale dependent and mostly	See Swanson et al. 2011, DellaSala et al. 2014, DellaSala and Hanson 2015, DellaSala et al. 2017, Fontaine et al. 2009, Hutto et al. 2015, Hanson 2018

	localized. Large high-severity patches are known to support varied levels of conifer establishment – even the largest patches support natural post-fire conifer regeneration, especially when time since fire is taken into account (often, sampling is done too soon or plot size was too small to pick up conifers). Many woodpeckers (especially black-backed woodpeckers), songbirds, small mammals, plants, insects, and other wildlife depend on complex early seral forest habitat. For them, the complex early seral forest represents *recovery* from the green forest.	
9. Further, the many imperiled species that depend on older, closed canopy forests and suffer from the legacy of past logging—like California spotted owls—are increasingly threatened by the impact severe fires can have on the little remaining old forest they occupy. Thus, ecological thinning must minimize disturbance and balance the trade-offs between potential short-term impacts of treatment with the longer-term benefits from reduced risk of large, high-severity fires. There remains some uncertainty about the relative impacts to sensitive species from severe wildfire com-pared to ecological thinning. For example, further research is needed on how spotted owls respond to ecological thinning in	While it is true that many imperiled species have declined due to loss of older closed canopy forests from logging, the statement about fire and owls is not true. In addition, reducing closed canopy forests via TNC thinning will only accelerate habitat loss, particularly for spotted owls, because thinning degrades habitat whereas mixed severity fire, in the absence of post-fire logging, creates important foraging habitat for spotted owls, often associated with increased reproduction. Further, the assumption that logging, conducted as "thinning" will consistently or reliably reduce fire severity has been refuted.	Odion et al. 2014, Hanson et al. 2018, Lee 2018 regarding spotted owls and fire. Cruz et al. 2014 and DellaSala 2018 regarding thinning and fire.

their territories relative to how they respond to varying amounts and severities of fire.		
10. Given that our fire-adapted forests need more of the right kind of fire, but existing conditions and a warming climate make it unsafe for people and nature to allow all fires to burn under unmanaged conditions.	"Right kind of fire" is subjectively biased terminology based on TNC's narrow view that fires in this and other regions were mostly low or low-moderate and that large high severity patches are an anomaly (shifting baseline) or represent a loss of habitat. This view does not comport with the literature on the biodiversity importance of mixed-severity fires, including large and small high severity patches in the Sierra and elsewhere. There is also an overly simplistic view of "allowing all fires to burn." Managing wildfires for ecosystem benefits involves compartmentalization of wildfire complexes that can include a mixture of suppression (if approaching towns), monitoring, directing/corralling and setting backburns, Minimum Suppression Impacts in Wilderness), and cutting fire lines to protect communities is also part of comprehensive fire management strategies employed by land managers. No-one is practicing unmitigated wildfire management and this is a red-herring argument that is unsupportable.	See Swanson et al. 2011; Fontaine et al. 2009; Odion et al. 2014; DellaSala and Hanson 2015; Ingalsbee and Rojan 2015; Hutto et al. 2015; Bond 2015; DellaSala et al. 2014, 2017 – also see - The national cohesive wildland fire management strategy implemented by federal agencies[25]
11. Given current conditions, healthy fire cannot be safely re-introduced to some forested areas without some preliminary fuels reduction.	The term "healthy fire" has no ecological basis – we assume what is meant here is the good vs bad fire dichotomous approach that TNC advocates which is subjective and lacks a biodiversity perspective.	See #3, #8, and #10 above.

[25] https://www.forestsandrangelands.gov/strategy/

12. This is particularly important in areas that are closest to homes and communities and in areas that can transport high intensity fire to the wildland-urban interface, as happened in the 2018 Camp Fire	The Camp fire unfortunately destroyed the town of Paradise not because of a lack of logging in the surroundings or the transport of high intensity fire to the wildland-urban interface; rather, it spread rapidly from the point of origin to the town through thousands of acres that had been intensively post-fire logged and mechanically thinned in the previous years, and the embers from these logged areas, borne on winds in advance of the Camp fire, ignited homes that had not been made fire-safe, leading to extensive structure to structure fires.	For an analysis of logging effects on the Camp fire spread see http://johnmuirproject.org/2019/01/logging-didnt-stop-the-camp-fire/
13. However, given the degree to which forests have been modified and current fire trends it is clear that some thinning in strategic areas will be needed to reduce the risks that high-severity wildfire poses to these species. Otherwise, there is the risk that the benefits of avoiding near-term impacts from ecological thinning will be overwhelmed by the devastating loss of habitat due to high-severity wildfires.	While small tree thinning in plantations may reduce fire intensity under moderate fire weather, thinning under extreme fire weather is ineffective. Large fires escape containment not because of a lack of thinning or suppression forces but because of extreme weather. The claim about devastating loss of habitat is inconsistent with literally hundreds of current studies, as summarized in DellaSala and Hanson 2015. This only harkens back to the "good" vs. "bad" fire perspective that underlies TNC's approach to fire and misses the importance of fire-mediated biodiversity (i.e., pyrodiversity begets biodiversity).	See DellaSala and Hanson (2015) for ecosystem benefits of mixed-severity fire and the pyrodiversity concept.

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<u>Appendix 3.</u> Problems with TNC-Ochoco Collaborative as Documented by Paula Hood, Co-Director, Blue Mountains Biodiversity Project.

The most obvious and documented issues with The Nature Conservancy (TNC) in the collaborative groups in the forests we work on has been in the Deschutes and Ochoco National Forests:

1) <u>TNC is pushing for logging of large trees (and for changing how the USFS has traditionally understood the Eastside Screens and the prohibition on logging large trees-- in order to make it easier to log large trees):</u>

A very recent example is the objection submitted this month on behalf of the Ochoco collaborative group that pushes the USFS for ***more logging of large trees in the Black Mountain timber sale***. Bryce Kellogg of TNC was one of two lead objectors for the collaborative group's objection.

Blue Mountains Biodiversity Project (BMBP), with the help of Tom Buchele at Earthrise Law Center and other attorneys and law students, has fought hard to uphold the Eastside Screens prohibition of logging trees equal to or greater than 21" dbh. The actions of TNC go directly counter to and undermine our efforts and legal wins, such as our 2014 win on the Snow Basin case in District Court. I've attached the collaborative's objection.

BMBP extensively field surveyed nearly all of the commercial logging units within the Black Mountain timber sale. We shared our field survey data with the USFS, and they reviewed and considered our survey data in their final Environmental Impact Statement. BMBP field surveys every major timber sale in our work area, which includes the Deschutes, Ochoco, Malheur, and Umatilla National Forests. We've been active in eastern Oregon since 1991. Based on our unparalleled field experience in the region, we are very much opposed to the logging of large trees, especially given that the region that has already experienced widespread logging.

Upholding the Forest Plan prohibition on logging large trees-- including large and old fir--is critically important for wildlife and ecosystem processes in eastern Oregon. Large trees (and eventually large snags) provide crucial wildlife habitat, benefit forest hydrology, microclimates, provide carbon storage, and more. According to the Interior Columbia Basin Ecosystem Management Project (ICBEMP), there is a regional deficit of large trees in eastern Oregon. ICBEMP summaries, such as the *Historical and Current Forest and Range Landscapes in the Interior Columbia River Basin and Portions of the Klamath and Great Basins* note that "[t]imber harvest minimized old forest area and area with remnant large trees to a fraction of the historical area and reduced the availability of medium and large trees in all structures." ICBEMP "was initiated by the Forest Service and the Bureau of Land Management to respond to several critical issues….The charter given to the project was to develop a scientifically sound, ecosystem-based strategy for managing the lands of the interior Columbia River basin administered by the Forest Service and the Bureau of Land Management."

Many of the 'dry' forests for which TNC and the collaborative are promoting large tree logging 1) show clear evidence of historic old growth fir and pine/fir co-dominance and/or 2) are surrounded by plantations, young forests, and previously heavily logged forests. In other words, these forests contain some of the last old and large trees and some of the last high-quality wildlife habitat in many of these areas. In recent timber sales on several Forests, large Ponderosa pine and large Douglas fir were also logged with collaborative approval.

The implications of the collaborative group's objection, with TNC as a lead objector and supported by timber interests, are huge and threaten to put many thousands of large and old trees at risk of being logged. In addition, the TNC-led objection from the collaborative undermines Forest Plan standards, and the process by which Forest Plans are designed to operate. The proposed circumvention of the Forest Plan, as suggested by the objection, sets a dangerous precedent and encourages ignoring both the intent and substance of ecological protections in Forest Plans.

In their push to increase logging, the USFS has routinely tried to evade their own Forest Plan standards through the illegal and inappropriate use of "site specific" Forest Plan amendments. The Snow Basin ruling essentially said that the Forest Service cannot continue to evade the rules and standards in their own Forest Plans. The ruling made it clear that only truly unique circumstances constitute appropriate conditions for site-specific amendments. It largely put a stop to the Forest Service mooting the ecological protections in their Forest Plans through the repeated and widespread use of site-specific amendments across the region—at least in many circumstances. The ruling included upholding the Forest Plan prohibition on logging large trees (those over 21" dbh) and has saved tens of thousands of large trees on National Forests in eastern Oregon, as most of these Forests have finally stopped logging large trees.

In addition to attempting to illegally use site-specific Forest Plan amendments to log large trees, the Forest Service has repeatedly used such amendments to circumvent standards including those protecting mature and old forests, canopy cover for deer and elk, and scenic views in order to increase logging. If National Forests do not adhere to their own Forest Plan standards, then Forest Plans will cease to provide meaningful ecological protection for forests across the region. It is essential that the carefully crafted, science-based standards designed to provide ecological protections in Forest Plans across the region are respected and followed. The TNC-led objection from the collaborative directly undermines BMBP's efforts to ensure that the Forest Service is following Forest Plan standards and direction.

2) <u>Problematic and unequal access to USFS info, and influence over the sharing of that info, by TNC collaborative member on the Deschutes DCFP collaborative:</u>

In 2016, I tried to get GIS wildlife habitat information that the USFS had recently created, and which they were presenting at collaborative group meetings. I did eventually get this information, though I had to submit a FOIA. In the course of my attempts to get this info, a couple of problematic issues came to light:

* The USFS wildlife biologist deferred to the TNC representative and the collaborative facilitator, and suggested I check in with them to ask if it was OK to give me the GIS wildlife information. This seemed wildly inappropriate to me-- the USFS should not be asking permission from the collaborative group in order to share public info with other members of the public.

* During one of the collaborative meetings in which the wildlife GIS information was being discussed, it came to light that the TNC representative was also working for the USFS. As a result, the TNC representative could get the wildlife GIS layers without a FOIA-- even though the USFS would not give the information to me without a FOIA. I asked the representative to share the info, but did not receive a response. The TNC representative was able to get this information quickly; I had to go through the FOIA process. I am not sure what sort of work the TNC representative was doing for the USFS.

The TNC representative being paid for work by the USFS is one of two examples I know of in which a person who is very USFS and logging-friendly on a collaborative group is also being paid, at least in part, by the USFS. Neither of these examples were put forth in a particularly transparent manner-- in both cases it just happened to come up one day while I was present at a collaborative meeting. Such ties seem like an undisclosed conflict of interest to me, but I'm not a lawyer and don't understand the legal requirements in place for such issues as they relate to the collaboratives.

* The USFS response documents to my wildlife GIS FOIA mentioned not having some of the info presented at the collaborative meeting (I had requested the powerpoint, including the very helpful and informative maps presented as part of the powerpoint). I was told that the TNC representative on the collaborative had added to/modified the presentation information. When I received the FOIA it did not include the additions and the modifications made by the TNC representative.

* I also asked for meeting notes from the collaborative meetings in which this information was discussed. Apparently they don't have an official note taker and so couldn't give me any notes for those meetings. I was told to ask the TNC representative for the meeting notes; the TNC representative never responded to my emails requesting notes or maps from the powerpoint presentation.

Thank you for your work on bringing to light some of these problematic issues. We are very concerned that larger nonprofit groups often do not have on-the-ground familiarity with the forests for which they are making decisions, and that they are undermining the more ecologically minded, biocentric groups that have long-standing and intimate experience with these forests.

Sincerely,
Paula Hood, Co-Director
Blue Mountains Biodiversity Project