GRAND CANYON TRUST

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Dear Lois,

Thank you for the opportunity to provide initial scoping comments on the Warm Fire Recovery project. We fully appreciate your attempts to restore natural forest conditions across the Kaibab Plateau with Wildland Fire Use fire. Across the Southwest and for many years to come WFU will be a very important and efficient management tool for restoring natural forest conditions. We see a unique opportunity to learn from this fire – and use lessons learned to guide future Wildland Fire Use decision-making.

We also appreciate initial communications from U.S. Forest Service staff indicating that the post-Warm Fire planning process would be an open and collaborative one. While we have taken advantage of opportunities to briefly discuss post-fire rehabilitation strategies with several stakeholders prior to the release of the proposed action, we feel that this issue deserves significant additional collaborative discussions – and we look forward to partaking in such discussions.

While we fully appreciate the complexity of this issue, and the difficult task you have in balancing ecological, economic, and social factors within this planning process, we are very concerned that the Proposed Action's Purpose and Need have been insufficiently and/or inappropriately defined, and that activities outlined in the proposed action will not, in fact meet the specified Purpose and Need. Our comments on these aspects of the Proposed Action follow.

I. The Purpose and Need specified in the proposed action is insufficient/inappropriate:

Given its ecological diversity, isolation, proximity to Grand Canyon National Park, critical wildlife habitat for numerous species, and relatively extensive remaining old growth, we feel the Kaibab Plateau should serve as a landscape within which science-based collaborative approaches to ecologically appropriate fire management and forest restoration can be tested and

demonstrated. Because mixed-intensity fires will continue to burn across the Plateau for years to come, defining ecologically appropriate post-fire rehabilitation strategies will be critically important in such a fire management and forest restoration context. Post-fire rehabilitation strategies should be focused on directing the disturbed ecosystems towards a system dominated by native trees, shrubs, forbs, and grasses in a spatial arrangement congruent with the ecosystems' natural range of variability, and resilient to recurring natural disturbance. Activities aimed at recovering economic value from burned timber, reforesting burned stands, and reducing fuels should occur if and only if they support such a rehabilitation trajectory in a broad ecological context. We feel that this context and our specific comments/concerns below are consistent with priorities outlined in the current Kaibab N.F. Plan to:

1) "Carry out an ecological approach to multiple use resource management" (KNF Plan, p. 7);
2) "(Conserve) the ecosystem and human environment" (KNF Plan, p. 7);
3) Emphasize watershed condition improvement (KNF Plan, p. 10);
4) Commit to "improving diversity, providing quality old-growth habitats, and composition of successional stages of vegetation and integrating desired wildlife habitat characteristics as a major consideration in the design of all vegetative treatments, whether they are for habitat improvement or for other purposes" (KNF Plan, p. 12);
5) "Improve wildlife habitats (on the North Kaibab R.D.) through expanding knowledge of species requirements, development of habitat quality and diversity, and the identification and protection of key habitats" (KNF Plan, p. 18);
6) "Maintain soil productivity and watershed condition" (KNF Plan, p. 19);
7) "Apply ecosystem approaches to manage for landscape diversity mimicking natural disturbance patterns, incorporating natural variation in stand conditions and retaining special features such as snags and large trees, utilizing appropriate fires, and retention of existing old growth in accordance with forest plan old-growth standards and guidelines (KNF Plan, p. 26);
8) "Encourage diversity of plant species in the overstory, understory, and ground cover" (KNF Plan, p. 42)

II. Proposed activities are not congruent with the specified Purpose and Need:

We are concerned that the proposed activities will not meet the intent of the specified Purpose and Need. Specific elements of the Purpose and Need, and our related comments follow:

<u>Purpose and Need statement #1</u>: Recover the economic value from burned timber
We fully support the development of community-based industries utilizing forest products from appropriately scaled forest restoration projects, and have been working to develop such industries in the greater Flagstaff area for the last decade. While we support the development of such industry, feel that it can be sustainable, and provide important economic benefits to local communities, we are highly doubtful that the proposed salvage operations will, in fact, generate revenue that exceeds cost of material removal (see, for example, DellaSala et al. (2006) for discussion of salvage revenue vs. costs in remote harvest areas). As such (and due to our serious concerns regarding the ecological impacts of salvage logging activities), we do not support trade-off arguments supporting salvage as a revenue generator for restoration-related activities. We

strongly encourage investment in pro-active fire management and restoration and related community-based industries as a more sustainable means of maintaining long-term forest health and supporting local economies.

<u>Purpose and Need statement #2</u>: Reforest burned conifer stands and move toward longer-term desired conditions

We appreciate the Proposed Action's specified need to achieve long-term desired conditions based *in part* on reference conditions, and offer our datasets collected in 2005 describing tree density, basal area, crown base height and tree height across the burn area for your consideration in determining structural reference conditions. We look forward to a more complete description of process, composition, and structure reference conditions, and the natural/historic range of variability of affected ecosystems in the EIS.

Despite the stated intention to restore forest conditions based on reference characteristics, it may be very difficult to do so. Across 10 historic (1948-1977) stand-replacing fires in New Mexico and Arizona studied by Savage and Mast (2005), all sites had not regained substantial mature overstory components after five decades. Five of the sites shifted to shrub or meadow-type ecosystems, and five regenerated to dense thickets, indicating a relatively low resilience to crown fire. Salvage logging occurred at all 10 sites. Passavoy and Fule (2006) studied a chronosequence of seven high intensity fires surrounding Flagstaff and found that regeneration was variable. One site had no regeneration after 4 years, another converted to an oak-dominated woodland, and another is currently densely stocked with aspen. Generally, the authors found that pine survivorship declined along a 27 year chronosequence, though the oldest site (the Radio Fire) had regained 79 pines/ha.

Existing post-fire recovery evidence suggests that re-planting in some sites where replacement of coniferous species may be warranted, but also suggests that we should not be overly optimistic about replanting success rates. We would like to see within the DEIS a strong evaluation of predicted re-planting success rates, based on historic re-planting activities that have occurred across the Kaibab Plateau.

Given our preliminary review of pertinent literature, it seems highly unlikely that extensive salvage logging (as a component of reforestation across the intensely burned portion of the Warm Fire) will provide ecological benefit to the burned area. Conversely, we are very concerned that such salvage logging will hinder healthy recovery in the area. Salvage logging has had deleterious and unintended impacts on ecosystems across the globe (see, for example, Lindenmayer et al. 2004). Relatively little literature has been published on salvage logging effects in the Southwest. This does not, however, obviate the need to consider potential (and in many cases probable) effects through an examination of a broader base of literature on the issue. Salvage logging has generally been shown to prevent or slow ecosystem recovery by:

1) Damaging soils through compaction (Kattleman 1996) and increased runoff and erosion (Waters 1995, Karr et al. 2004, Klock 1975, Potts et al. 1985, Maser 1996), which in turn may undermine the effectiveness of other postfire rehabilitation efforts aimed at reducting soil erosion and runoff (Robichaud et al. 2000);

2) Removing soil organic matter, reducing soil moisture retention capacity (Jenny 1980), and affecting soil biota and plant growth (Rose et al. 2001, Brown et al. 2003);
3) Increasing the severity of subsequent fires (CWWR 1996, Odion et al. 2004);
4) Spreading non-native invasive species as a result of logging and road construction (CWWR 1996, Beschta et al. 2004, Greenberg et al. 1994, Sexton 1998)

Beyond the aforementioned negative effects linked to salvage logging, we are very concerned about the effect of salvage logging on natural regeneration and successional processes in the burn area. Smith and Wass (1980) have shown that skid trails formed during logging operations can negatively impact long-term productivity of trees growing directly on those skid trails. Sexton (1998) has shown that salvage logging may reduce vegetation biomass, and overall plant species richness in the first years after logging. Kotliar et al. (2002), Roy (1956), and Grifantini et al. (1992) have shown that salvage logging can have pronounced negative effects on species that require early successional habitat – precisely the species land mangers should avoid putting under additional stress (Beschta et al. 2004, Karr et al. 2004). For instance, impacting early successional N-fixers (such as *Lupinus* spp.) can "significantly affect a major pathway of nutrient replenishment in the postfire environment" (Beschta et al., 2004). Sexton (1998) found that in an Oregon ponderosa pine fire site, salvage logging impaired regeneration by negatively affecting microsite conditions. Logged sites were warmer, drier, and windier than unlogged sites (Sexton, 1998). Even when salvage operations occurred over snow in an Oregon ponderosa pine forest, regenerating understory plants were significantly negatively affected (Sexton, 1998). Logging activities conducted beyond six months after a burn event may have the greatest detrimental effects by disrupting native plant colonization (Kolb, 2002). Beschta et al. (1995) argue that "there is no ecological need for the immediate intervention on the post-fire landscape….By acting quickly, we run the risk of creating new problems before we solve the old ones."

We are also concerned about the potentially negative effects of biomass removal on a variety of forest-dependent species. Lindenmayer and Possingham (1996) assert that salvage logging traditionally removes a high percentage of the largest dead woody structure on a given site and can thus significantly change postfire habitat for wildlife". Blake (1982), Saab and Dudley (1998), and Sallabanks and McIver (1998) describe the potentially negative "structural" effects (ie., removal of snags and downed wood), and "functional" effects (ie., reduction in insect populations that serve as food for numerous wildlife species) of salvage logging. McIver and Star (2001) assert that most cavity nesting bird species show "consistent patterns of decrease" after salvage logging. Kotliar et al. (2002) surveyed 23 burns across western forests in 7 states. All were predominantly stand replacement fires and less than 10 years old. Forest types included ponderosa pine/Douglas fir, Jeffrey pine, white fir, lodgepole pine, spruce/fir and mixed conifer. Despite the wide geographic area and great variety of forest types "many species showed remarkably consistent patterns" (Kotliar et al., 2002). They found that "severely salvaged burns may decrease the suitability of post-fire forests for most cavity-nesting species….However the effects of partial salvaging are more equivocal" (Kotliar et al., 2002).

Purpose and Need statement #3: Break up fuel continuity in the burned area.
We agree that management activities should be identified and implemented that will diminish the risk of large-scale intense fire throughout the burn area. We are concerned, however, that re-burn potential may not be nearly as significant an issue as is described in the Proposed Action, and as

such negligible fire hazard reduction benefit will be far outweighed by negative impacts of salvage logging. We recognize that a dearth of literature exists on this subject. In a general literature review, McIver and Starr (2001) found little evidence suggesting a reduction in fire hazard following salvage logging projects. Passavoy and Fule (2006) summarize the state of the literature on the issue in the Southwest, asserting that "the only well-documented occurrences of wildfire severity being affected by the fuels that remained after previous fire are from forests that are more productive than those of the southwest". We recognize that for southwestern forests, most arguments positing a reduction in re-burn intensity through salvage operations are anecdotal and/or based on models that are populated with very little relevant field-measured data.

Emerging evidence in the Southwest suggests, however, that the significance of the re-burn issue may not be as great as has been portrayed in the Proposed Action. In a study of seven historic fires that burned around Flagstaff, Passavoy and Fule (2006) found that post-fire downed fine woody debris ranged from 2.7 to 10 mg/ha^{-1} - well below the estimated range of 25.8 to 130.1 mg/ha^{-1} of slash in standard fire behavior models. The authors conclude that "the lower values at the seven wildfire sites imply that surface fire behavior at these sites would likely be substantially less intense than even that of a light logging slash fuel model". Furthermore, downed coarse woody debris (CWD) never exceeded the amounts (11.2 to 44.8 mg/ha^{-1}) deemed appropriate for maintaining long-term forest productivity and wildlife habitat while minimizing fire hazard and soil heating in warm, dry forests. In fact, CWD measured within the most recent of the fires studied fell below the recommended thresholds. Recognizing the dearth of data (especially pertaining to southwestern forests) for this topic, Passavoy and Fule (2006) are measured in their recommendations. However, the authors do assert that "since the fuel loads in our study fell within the ranges that are recommended as being both beneficial to the ecology of the site and not a wildfire threat, salvage logging based on future fire hazard does not seem appropriate for these sites". The authors go on to offer two alternatives for managing post-fire fuels. Prescribed burning is suggested as a management technique for lowering fuel loads in areas where post-fire fuels are deemed excessive. Such burning can lower near-term fire hazard by reducing fine fuels, lower fire hazard associated with CWD in a controlled manner, and preserve soil intactness and wildlife habitat in the area treated. For those areas where fuel loading is not deemed excessive, the authors suggest passive management (no treatment). The authors conclude that, "there is no evidence that continued passive management of these sites would have negative effects".

III. NEPA and NFMA concerns:

Grand Canyon Trust intends to participate in all phases of the National Environmental Policy Act ("NEPA") process regarding the Warm Fire Recovery project. We are committed to ensuring that the environmental impact statement for the Warm Fire Recovery project complies with all applicable NEPA requirements and fulfills both of NEPA's primary goals: (1) ensuring the Forest Service fully contemplates the environmental effects of the agency's action on the Warm Fire project site, and (2) ensuring that the public at-large has information sufficient to fully engage in the NEPA process. See League of Wilderness Defenders v. Forsgren, 184 F. Supp. 2d 1058, 1068 (D. Or. 2002).

We recognize that meeting these two goals may be challenging in the Warm Fire context given the dearth of scientific literature on the effects of post-fire salvage logging in the southwestern United States. As the Ninth Circuit has noted, "the manner in which an agency addresses scientific evidence … can promote meaningful public involvement and advances the goals of NEPA: 'Agency regulations require that public information be of 'high quality' because '[a]ccurate scientific analysis … and public scrutiny are essential to implementing NEPA.'" Id. at 1066, citing Idaho Sporting Cong. v. Thomas, 137 F.3d 1146, 1151 (9th Cir. 1998) (citing 40 C.F.R. § 1500.1(b)). In order to preserve the scientific integrity of the NEPA process and to ensure meaningful public participation, we request that the Forest Service conduct a searching review and perform an in-depth analysis of the scientific evidence both supporting and opposing salvage logging on the Warm Fire site. We also request an explicit recognition from the Forest Service of the scientific uncertainty surrounding post-fire salvage logging in the southwestern United States, and a reasoned explanation of the Forest Service's approach to making an informed decision in the face of this uncertainty.

We further request that the Forest Service conduct a thorough cumulative impacts analysis that addresses all past, present, and reasonably foreseeable future actions related to the Warm Fire Recovery project. See Blue Mountains Biodiversity Project v. Blackwood, 161 F.3d 1208, 1214 (9th Cir. 1998). Finally, we request that the Forest Service ensure that the alternatives evaluated in the Warm Fire EIS are consistent with the Kaibab National Forest Land Management Plan and otherwise comply with the National Forest Management Act ("NFMA"). See, e.g., Earth Island Inst. v. U.S. Forest Serv., 442 F.3d 1147, 1173-76 (9th Cir. 2006).

IV. Recommendations:

Recognizing again the complexity of this issue, and the interest this issue has generated and will surely continue to generate across the region, we strongly encourage you to take a step back and envision a science-based, restorative and long-term management strategy. Components of this strategy might include:

1) Dramatically reduced salvage operations. There may be significant value in identifying limited areas where the effects of salvage-based management can be comprehensively and rigorously compared to alternate management strategies (see #2 below), to inform the highest priority questions relating to the ongoing salvage debate. Such a research program should be identified collaboratively, and undergo a multi-stakeholder peer review process. Research areas should be minimal in spatial extent, and strategically placed to meet multiple research, restoration, and fire management objectives.
2) Identification of prescribed burning and passive management strategies that occur across a great majority of the burn area, and allow ecosystems to regain resilience, and move towards an envelope of natural range of variability.
3) Strategic tree replanting. Replanting should occur with local genotypes in areas with scarce natural seed sources, and where replanting will neither negatively impact natural regeneration processes, nor create unacceptable future fire hazard conditions.

4) Limited hazard tree removal along roads anticipated to be open following travel management planning in a manner that reduces short-term risk and long-term maintenance needs. Existing road densities across the project area are extremely high (see **Appendix 1**). Across the suppression portion of the Warm Fire burn area (approximately 61 sq. miles), 417 miles of roads are shown to exist. Mean road density across this area is approximately 6.8 miles per square mile. Across the entire Coconino National Forest – in a much more highly populated region – mean road densities are less than 2.4 miles per square mile. Much of the road network in the Warm Fire area has not been maintained, and has been allowed to begin the slow process of restoration, and we applaud the Forest Service for this. "Re-opening" these functionally closed (or very lightly used) roads and using such roads for salvage operations would be entirely inappropriate and detrimental with respect to desired watershed, wildlife habitat, and fire ignition conditions. We suggest that you identify a reasonable and conservative road network, and remove hazard trees along these roads for safety concerns.
5) Restoration-based small diameter tree removal in encroached meadows, and in unburned pockets and lightly burned areas within the burn perimeter where restoration needs dictate. Tree removal in these situations would effectively enhance public safety, restore ecological integrity, and (combined with limited hazard tree removal along a conservative road network) likely generate significant commercial timber volume.
6) Consideration of on-site "mastication" of burned trees across some portions of the burn area as a means of re-distributing nutrients to the forest floor and creating microsites for native species re-establishment.
7) Development and implementation of an invasive non-native species early detection, monitoring, and management plan.
8) Re-seeding with native species on a limited basis and only where necessary to prevent invasive non-native species colonization and establishment, and watershed protection.
9) Identification of science-based and cautious post-fire livestock management in the burn area that allows for meaningful and sufficient rehabilitation of edaphic and vegetation resiliency.
10) Development of and allocation of funds to a rigorous multi-stakeholder implementation and effectiveness program.

Lastly, we strongly recommend that the Kaibab National Forest support a collaborative, science-based landscape assessment process designed to identify long-term landscape-scale fire management and restoration priorities for the Kaibab Plateau. We can, through such an assessment, build the capacity to proceed with ambitious fire management and restoration initiatives across the Plateau for decades to come.

Thank you for your consideration of our comments. We look forward to working with you extensively over the coming months to formulate and evaluate management strategies that are ecologically, economically, and socially viable. We also look forward to assisting substantially with on-the-ground ecologically appropriate rehabilitation activities over the coming years.

Please feel free to contact me with any questions you might have about Grand Canyon Trust's comments on this proposed action.

Sincerely,

/s/

Ethan Aumack
Director of Restoration Programs
Grand Canyon Trust

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Appendix 1. Existing road densities in the Warm Fire area.