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Comments: The California Deer Association (CDA) is a wildlife conservation nonprofit dedicated to supporting California deer and other wildlife species through habitat restoration projects since 1996. From inception, CDA has developed diverse partnerships with federal, state, local, and private entities to increase the pace and scale of landscape-level restoration projects that benefit forest and wetland resilience, wildlife habitat, and human health and safety. CDA works throughout California on a variety of critical landscape projects that strengthen forests, watersheds, meadows, native vegetation, wildlife migratory routes, and historically and culturally significant sites and artifacts.

CDA is proud to support the Antelope and Tennant Fire Recovery Project proposed by our federal partner, the USDA Forest Service[rsquo]s Klamath National Forest (KNF). The proposed project is located within Klamath Basin Priority Landscape, and nearly one-third of the total acreage of the Goosenest Ranger District burned in the 2021 Tennant and Antelope Fires. The BAER data compiled from these incidents demonstrates 57% of affected area burned at high severity, meaning over 55,000 acres lost between 75- 100% of their vegetation. Studies have shown that high severity fires significantly decrease critical ecosystem services provided by forests, meadows, and grasslands and that habitats will further degrade if post-fire impacts to the landscape are not mitigated. CDA agrees that the proposed action by KNF Goosenest Ranger District is essential to restoring the affected environment to the desired condition for the benefit of the communities and wildlife species that depend on them. In the sections below, we highlight the actions proposed for this project and offer the logic behind our support for them.

Hazard Tree Removal and Reforestation

KNF proposes to implement hazard tree removal and reforestation to alleviate imminent and future threats, lessen non-native plant species introduction and spread, enhance slope stability, and decrease sediment transport to waterways, increase carbon sequestration, and restore scenic quality of forested landscapes. In areas of high burn severity, a significant number of trees often succumb to storm events, high winds, disease, and beetle kill, creating unsafe conditions for visitors and increasing fuel loading within the forest. KNF receives over 144,000 recreational visitors each year and hazard trees present an immediate danger to forest visitors accessing lakes, rivers, trails, and campgrounds via falling trees and limbs. Roadside hazard tree removal will also create a fuel break, maximizing future firefighting and suppression efforts, civilian evacuation, and protecting neighboring communities in the event of wildfire ignition. Utilizing these areas as fuel breaks will allow KNF resource specialists to return fire to the landscape through prescribed burning in a way that is safer, more cost effective, and requires less ground disturbance for fire line construction. Furthermore, increased visibility along roads will allow for more opportunities to view wildlife and avoid vehicle-wildlife collisions.

CDA suggests that the roadside hazard tree removal and reforestation will benefit multiple resources within the project area beyond public safety and fire suppression efforts. Strategic replanting efforts will enhance natural regeneration, restore function of these forest habitats, and minimize invasion of non-native plant species like cheatgrass. Furthermore, with increased sunlight able to penetrate the canopy and reach the forest floor following tree removal, planted seedlings will more rapidly establish, supporting native plant diversity and diversity. Per USDA (2019), KNF currently sequesters .06 million Metric Tons of Carbon (MMTC) annually and stores over 165 MMTC. Additionally, Bowman et al. (2012) finds that forested areas that have burned at high severity have a considerable increase in carbon emissions and are at high risk of converting to shrubland, which significantly reduces capacity for high long-term carbon storage. If post-fire restoration efforts are executed, active management will greatly reduce the carbon emissions and accelerate the ability for the forest to sequester carbon.

Reforestation of the Forest Interior

Prior to the 2021 fires, the fire-impacted environments in KNF were well suited to provide habitat for diverse wildlife due to its mosaic nature. Proposed replanting by KNF strives to achieve desired conditions in regions of high burn severity where no live vegetation remains and will restore habitat connectivity, critical nesting, nursery, and forage habitat for a variety of native wildlife such as predators, ungulates, migratory birds, and pollinators. The Klamath National Forest is home to 11 Threatened and Endangered species that may benefit from accelerated forest regeneration, including coho salmon, marbled murrelet, western yellow billed cuckoo, Northern spotted owl, gray wolf, and Yreka phlox.

High severity wildfires such as the Antelope and Tennant fires can heavily impact critical ecosystem services such as erosion control, water infiltration, and nutrient cycling. The effects on these processes can further diminish post-fire vegetation recovery, biodiversity and productivity, and overall forest health. Healthy forest ecosystems can effectively supply, filter, and regulate water quality and quantity. KNF supplies approximately 995 billion gallons of water per year, enough drinking water for over 7.5 million households on an annual basis (USDA, 2019). CDA promotes KNF[rsquo]s approach on conducting active revegetation strategies to achieve desired conditions for water quality and quantity, soil health, wildlife habitat, and species diversity.

The USGS Rapid Assessment of Vegetation Condition after Wildfire (RAVG) program produces data demonstrating post-fire conditions, such as basal area loss and canopy cover loss, on National Forest System lands. The RAVG map for Tennant and Antelope reveals that they did not burn in a way that created patches of early seral habitat among in-tact late-successional habitat, rather created large contiguous swaths of denuded habitat. Subsequently, the direct and indirect impacts of these fires should not be considered a natural or benign continuation of the ecology of the affected habitats, nor should a hands off approach be considered the appropriate action for managing the post-fire landscapes.

Meadow and Riparian Restoration

In conjunction with hazard tree removal and reforestation efforts, KNF proposes to implement meadow and riparian restoration. Meadow restoration activities will include encroaching conifer removal, hydrologic function restoration, and prescribed burning. CDA supports these proposed activities to restore the historic structure and function of meadows for native plant, wildlife, and aquatic habitat, water supply and filtration, and cultural significance.

Within Klamath National Forest, 618 meadows can be found that contain key habitat for a multitude of fauna and flora. The meadows found in the project area are biodiversity hotspots that support important plant, aquatic, and wildlife species. Meadows are also culturally significant resources to tribes that used to inhabit these landscapes. Missed fire return intervals have contributed to conifer encroachment that is reducing meadow, fen, stream, and aspen habitat footprint, structure, and functionality. Without action, conifers will continue to encroach upon meadows, sequestering large amounts of ground moisture from wetlands, decreasing the surface water availability, and degrading wetland habitat and biodiversity. As this happens, the ability for these upper-watershed ecosystems to store and filter water decreases, causing impacts to water quality and quantity downstream and diminishes the ability of these wetland habitats to serve as natural fire breaks.

To address the declining structure and function of these critical ecosystems, meadow habitats within the project area will be treated with encroaching conifer removal and prescribed burning. KNF proposes to utilize operational strategies such as hand thinning, hand pile and burning, lop and scatter away from remaining vegetation, or aerial lifting in order to achieve the desired conditions within these sensitive habitats with minimal ground disturbance. Additionally, structures like beaver dam analogs (BDAs) may be constructed in strategic locations to expand inundation and hydrologic capacity of the meadows in the project area. CDA has planned and

implemented meadow restoration projects across California for over 26 years, and we agree that the action proposed by KNF resource specialists will effectively restore degraded meadow habitat structure, function, and resilience to future wildfire.

The breadth of CDA[rsquo]s experience restoring meadows also encompasses post-fire impacts mitigation to meadow ecosystems. We commonly observe the direct and indirect damage that these sensitive ecosystems can experience as the result of catastrophic fire. Fires that burn at high severity can result in soils becoming hydrophobic, meaning precipitation is no longer able to filter into the ground and simply runs off the slope carrying sediment with it to surface water sources. Furthermore, high severity fire can kill seeds stored within the seed bank, which often results in non-native weed invasions. Finally, loss of vegetation cover and root systems following high-severity wildfire can lead to slope instability and rapid rates of streambank erosion, which can eventually lead to significant and permanent reduction of meadow habitat area. CDA believes that failure to protect these critical habitats from catastrophic wildfire will inevitably result in a greater degree of habitat loss, loss of biodiversity, and degradation of watershed health.

Native Grass Seeding

CDA supports KNF[rsquo]s proposal for native grass seeding and agrees that it will increase soil stabilization, improve feeding opportunities, reduce risk of spread of weed and invasive species, and provide support for early seral species to recover from wildfire and suppression. Across the American West, there is an ever-growing threat of invasions of exotic and non-native plants and their ability to outcompete native vegetation recovery, particularly in post-fire disturbance areas. Invasive species establishment presents several negative impacts on ecosystem functionality that include a decline in biodiversity, wildlife habitat, livestock forage, and overall fire resilience. Thompson et al. (2006) found that postfire aerial and mechanical native grass seeding efforts had been successful in re-establishing perennial species and suppressing invasive and noxious weeds such as cheatgrass in post-fire landscapes. In areas of high burn severity where the seed bank has been decimated by fire, native seeding efforts will be crucial to establish native grasses for critical forage habitat for black bear, elk, birds, and pollinators; improve slope stability and reduce sediment delivery to waterways; and increase capacity for the ecosystem to sequester carbon.

Dwarf Mistletoe Sanitation

Dwarf mistletoe infestations are heavily impacting lodgepole and ponderosa pine stands in the project area. CDA concurs with KNF that high levels of mistletoe have degraded stand conditions, including the lack of sufficient canopy closure, tree size, and structure for wildlife habitat, and that active management is required to improve forest health and resilience. Treatments of dwarf mistletoe are necessary to enhance forest health and regeneration of lodgepole and ponderosa pine stands, protect public health and safety, enhance/maintain critical wildlife habitat, and improve aesthetic and recreational value. Infestations of disease such as mistletoe often contribute to dieback and mortality of the forested stands, especially when paired with other environmental stressors present such as drought conditions. High mortality rates will slow down successional dynamics, reduce canopy cover, decrease biodiversity and critical habitat for recognized species such as the Northern Spotted owl, drastically further heavy fuels accumulation within the forest, and threaten the safety of visitors. Additionally, decline in a healthy forest decreases ecosystem functions on a grander scale including the ability for the forest to sequester carbon. CDA supports and encourages interference in the expansion of dwarf mistletoe to safeguard and enhance the present forest health and long-term ecosystem functions.

Conclusion

CDA agrees with the intent of the Proposed Action for the Antelope and Tennant Fire Recovery Project to restore structure, function, and resiliency to the affected habitats critical for supporting the native biodiversity of the region to facilitate the reintroduction of fire to the landscape in a way that is safe and beneficial for humans and

wildlife, and to enhance public safety from the imminent and future hazards posed by the post-fire conditions. We also agree that the methodologies and prescriptions proposed to achieve these objectives exceed industry standards, incorporate empirical evidence into their design, and thoroughly consider the needs of multiple resources, including public safety, water quality, and biodiversity found within the project area. CDA thanks you for the opportunity to comment on the proposed Antelope and Tennant Recovery Project.