

Appendix A: Non-Impairment Determination

The Prohibition on Impairment of Park Resources and Values

NPS Management Policies 2006, §1.4.4, explains the prohibition on impairment of park resources and values: “While Congress has given the Service management discretion to allow impacts within parks, that discretion is limited by the statutory requirement (generally enforceable by the federal courts) that the Park Service must leave park resources and values unimpaired unless a particular law directly and specifically provides otherwise. This, the cornerstone of the 1916 Organic Act, establishes the primary responsibility of the National Park Service. It ensures that park resources and values will continue to exist in a condition that will allow the American people to have present and future opportunities for enjoyment of them. The impairment of park resources and values may not be allowed by the Service unless directly and specifically provided for by the legislation or by the proclamation establishing the park. The relevant legislation or proclamation must provide explicitly (not by implication or inference) for the activity, in terms that keep the Service from having the authority to manage the activity so as to avoid the impairment.”

What is Impairment?

NPS Management Policies 2006, §1.4.5, What Constitutes Impairment of Park Resources and Values, and §1.4.6, What Constitutes Park Resources and Values, provide an explanation of impairment. “Impairment is an impact that, in the professional judgment of the responsible NPS manager, will harm the integrity of park resources or values, including the opportunities that otherwise will be present for the enjoyment of those resources or values.” Section 1.4.5 of Management Policies 2006 states:

An impact to any park resource or value may, but does not necessarily, constitute impairment. An impact would be more likely to constitute impairment to the extent that it affects a resource or value whose conservation is:

- Necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park, or
- Key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park, or
- Identified as a goal in the park’s general management plan or other relevant NPS planning documents as being of significance.

An impact would be less likely to constitute an impairment if it is an unavoidable result of an action necessary to preserve or restore the integrity of park resources or values and it cannot be further mitigated. An impact that may, but would not necessarily, lead to impairment may result from NPS activities in managing the park, visitor activities, or activities undertaken by concessioners, contractors, and others operating in the park. Impairment may also result from sources or activities outside the park.

Per §1.4.6 of Management Policies 2006, park resources and values at risk for being impaired include:

- “the park’s scenery, natural and historic objects, and wildlife, and the processes and condition that sustain them, including, to the extent present in the park: the ecological, biological, and physical processes that created the park and continue to act upon it; scenic features; natural visibility, both in daytime and at night; natural landscapes; natural soundscapes and smells; 11 water and air resources; soils; geological resources; paleontological resources; archeological resources; cultural landscapes; ethnographic resources; historic and prehistoric sites, structures, and objects; museum collections; and native plants and animals;
- appropriate opportunities to experience enjoyment of the above resources, to the extent that can be done without impairing them;
- the park’s role in contributing to the national dignity, the high public value and integrity, and the superlative environmental quality of the national park system, and the benefit and inspiration provided to the American people by the national park system; and
- any additional attributes encompassed by the specific values and purposes for which the park was established.”

Impairment Determination for the Selected Alternative

Based on the evaluation of potential impacts identified in the EA, the topics evaluated for impairment include the following:

Cultural Resources – As documented in the EA and in NPS’ Assessment of Effect, should historic properties be present within these groves and fisher habitat, ground disturbance associated with planting activities, could have long-term direct and indirect impacts on cultural resources should tree seedlings be planted and grow within or directly outside archeological site boundaries. However, these impacts will be minimized, if not eliminated, through avoiding planting in identified sites and using an avoidance buffer outside the site. Given the ability to refine each area’s specific planting plan to avoid action within historic properties (if present), the project is unlikely to affect historic properties and will not directly, indirectly, or cumulatively result in impairment to these resources.

Invasives Species and Soil Pathogens – As documented in the EA, and as further described in the revised EA, planting seedlings and workers traveling off-trail through forested areas have the potential to disturb soil and result in the importation of contaminated fill, providing an opportunity for invasive species or soil pathogens to be introduced to the parks or become established and spread. Invasive plant seeds and propagules can also be introduced to the parks and transferred between project areas on project equipment, tools, and clothing. However, seedlings used in this project will be sourced from reforestation nurseries where best management practices employed by these nurseries will result in the project having a low risk for soil pathogens or invasive plant propagules being introduced via seedling sources. The application of mitigation measures including equipment and clothing inspections will further prevent the potential for invasive species introduction or persistence over existing conditions. Given the implementation of best management practices and mitigations both associated with this project and all other projects involving use of nursery grown plants or where propagules could otherwise be inadvertently transported, this project will not directly, indirectly, or cumulatively result in the impairment of vegetation and soils through the introduction of invasive species or soil pathogens.

Soils and Soil Erosion – Actions that disturb soil, including digging and foot traffic, can contribute to soil erosion, while restoring vegetative cover and roots serve to protect and stabilize soils.

However, planting crews will minimize their contribution to soil erosion in these areas to the maximum extent feasible by limiting the hole sizes to the minimum needed to plant seedlings, avoiding sensitive areas, and avoiding creation of social trails such that this project will not contribute to extensive soil disturbance beyond that already occurring in the system post fire. Given the limited potential for soil disturbance associated with project implementation, that project mitigations put in place to further prevent such impacts, and that all projects involving soil disturbance in these parks incorporate similar measures, the project will not directly, indirectly, or cumulatively result in the impairment of soil resources. Further, restoring forest cover is expected to benefit soils by stabilizing them against further erosion in the long term.

Wildlife, including Fisher – Tree planting crews, or mule pack trains delivering supplies, could trample delicate herpetofauna (i.e., salamanders, toads, frogs) causing injury or mortality to herpetofauna, though will have no impact to such fauna on a population level. As well, the presence of work crews—working and in some cases camping—in each of the seven planting areas over the course of five to six years, may startle or temporarily displace other wildlife (black bear, mule deer, various small mammals, reptile, and bird species) from these areas if they were present. For areas where seedlings need to be transported via helicopter, wildlife may be additionally impacted by removal of several snags per landing site, when necessary, which otherwise provide some habitat to birds and small mammals, and the noise associated with chainsaw or explosive use (if needed to create a helicopter sling load landing zone) and helicopter use.

While disturbances from human presence may occur, due to the current conditions of the affected environment in the action area (severely burned with little vegetation), the NPS expects wildlife use within large patches of high severity burn—by many species—will be limited during the timeframe of the planned activities (Fontaine and Kennedy 2012; Eyes et al. 2017; Jones et al. 2020); though wildlife use is expected to increase as the understory vegetation begins to recover and leaf litter begins to develop. However, for many species, the remaining live forest habitat adjacent to the proposed action areas offer habitat where wildlife can move to (if needed) to avoid human presence while continuing daily foraging or resting activities.

Due to the transitory nature of helicopters flying along a flight path, the NPS anticipates there will be no direct wildlife impacts (startling response or avoidance behavior) from this component of the action. While higher intensity actions (i.e. helicopter sling load deliveries or use of chainsaws or explosives) will disturb wildlife if present, these actions are of short duration (1-2 hours total at each site in the case of chainsaws, 10 seconds in the case of explosives, 5 minutes at a time in the case of sling load delivery). Therefore, wildlife are expected to recover—continue foraging or other activities—relatively soon after the chainsaw or explosive use ceases or the helicopter moves away, and no long-term impacts to wildlife (especially any sensitive species in the area) are expected.

The NPS will also protect wildlife and comply with the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act by implementing relevant U.S. Fish and Wildlife Service Nationwide conservation measures and additional NPS-developed measures. All other short-term, direct impacts associated with project implementation are expected to be limited to those temporary impacts described above, and the NPS will implement mitigations to further minimize, if not avoid, impacts such that the project will not directly, indirectly, or cumulatively result in the impairment of wildlife resources.

In the long term (a period of 10-50 years and beyond), re-establishment of forest cover will improve habitat suitability in the proposed action area for wildlife that prefer sequoia and mixed conifer forest (as opposed to shrub-dominated areas), such as fisher (as further described in Chapter 3),

pileated and white-headed woodpecker, tree squirrels (e.g., Douglas squirrel, Humboldt's flying squirrel), Sierra marten, western spotted skunk, and other forest dependent species.

California Spotted Owl – The NPS does not expect that the activity of planting of trees, the presence of work crews planting or camping in these areas, and/or the use of mules in severely burned areas will disturb owls, have a direct effect on individual owl nests, influence survival, or alter prey availability in active territories. Further, 85-90 dB noise from helicopters traveling over areas where owls are present is unlikely to result in an alert response for owls (Jones et al. 2020; Tempel et al. 2016; Pater et al. 1995).

Owls, if present, may directly experience noise disturbance for roughly 20-40 minutes over the course of five to six years in areas where sling-loads are delivered, and either up to 110 dB sound intermittently for roughly two hours over the course of one to two days if trees were felled using chainsaws, or up to 180 dB sound for five to ten seconds over the course of one day were trees to be felled using explosives. If owls were resting within 350 feet of such activities, these disturbances may cause them to “flush” (be startled into taking off and leaving the immediate area in a state of heightened stress) (Jones et al. 2020; Tempel et al. 2016; Pater et al. 1995).

As snags will be felled in preparation for sling-load delivery in some locations, potential disturbance from these two actions will be separated in time such that any owls that were present may experience noise disturbance on two separate days or multiple times over the course of one day. This said, as with other wildlife, the NPS does not expect spotted owls to be utilizing or nesting in areas where either tree planting or sling-load delivery would occur until vegetation—particularly the overstory canopy—begins to recover (a period of five to ten years) (Jones et al. 2020; Tempel et al. 2016).

Even were owls to be present during project activities, the NPS will avoid impacts to nesting owls by either conducting higher-disturbance activities (sling-load delivery or chainsaw use) entirely outside the owl nesting LOP (April 1-August 15) or not conducting these activities within the standard 0.25 miles nesting buffer where nests are documented. As well, helicopters, explosives, or chainsaw use will be of limited duration and occur in areas where owls are unlikely to be present (Jones et al. 2020; Tempel et al. 2016). For these reasons, this component of project implementation is not expected to impact nesting owls. Disruption to owl resting activities, if any were present in or near the action area, will be intermittent and of short duration.

Though temporary impacts may occur under the selected alternative, were owls to be present or nesting in the project areas, such impacts will not directly or indirectly, or cumulatively result in impairment of spotted owl and the NPS will implement mitigations to further limit impacts. Further, taking action will be largely beneficial for spotted owl in the long term as the NPS anticipates that forest cover will be largely restored across planting areas under the selected alternative.

Understory Vegetation—Including Special Status Plants or Shrub Communities – Though some trampling of vegetation generally will be expected due to the nature of the work, planting sequoia and other mixed conifers in areas that are unlikely to recover on their own will better enable forest recovery. Were forest recovery to be successful, it will provide a greater benefit to special status plants that may have survived high severity fire by providing suitable habitat in the future once forests are re-established.

This project will not impede natural sequoia regeneration via competition between natural regeneration and planted seedlings because the selected alternative does not propose to plant

seedlings in areas with adequate sequoia regeneration post fire, and the NPS would plant species based on species assemblages in the planting areas.

Due to anticipated low likelihood of current occurrence combined with minimal disturbance (potentially being trod upon once) and application of mitigations to further reduce potential impacts, the NPS does not expect that implementing the selected alternative will result in loss of special status or rare plant populations been present prior to the fires (and may either still occur in the area or in the immediate vicinity) and further, that these species will benefit from forest recovery as they are adapted to forested habitat.

Other common plant species, e.g., ceanothus species and other perennial shrub species, that exist in the action area are resistant to disturbance, including trampling at the levels expected for this project, or are so common that even were individuals lost, it will not affect the population as a whole. That said, if, as expected, tree seedlings that are planted become successfully established, shrub communities that would otherwise become increasingly established in burned areas will be crowded out over an estimated period of 50-100 years as the forest canopy recovers and competition with trees for light and water increase. However, this process would have also occurred naturally in these areas had they not burned at such high severity.

In summary, due to a combination of low probability of occurrence for special status plants, their reproductive life history strategy making their populations resilient to limited trampling generally, as well as mitigations that limit trampling to the maximum extent feasible, the selected alternative project will not directly, indirectly, or cumulatively result in the impairment of these vegetation resources.

Sequoia Groves – Planting sequoia seedlings under the selected alternative is expected to largely restore grove area and large sequoia density to pre-fire conditions in each of the sequoia groves where planting will occur, beneficially affecting sequoia groves. In sum, implementation of the selected alternative will not directly, indirectly, or cumulatively result in impairment of Sequoias and will instead beneficially affect sequoia grove recovery and resilience as described further below.

Resilience to Future Change

By increasing the genetic diversity of local populations, the selected alternative is expected to beneficially affect the overall ability of sequoias to persist in the long term for several reasons.

Some sequoia groves in more arid environments show evidence of adaptations to summer temperatures and precipitation (DeSilva and Dodd 2020; De La Torre et al. 2021), suggesting that groves which are currently more arid have genetic adaptations to improve their survival and fitness to higher temperatures and drought. Based on this finding, De La Torre et al. (2021) concluded that some groves, including Redwood Mountain Grove, will need increased genetic diversity to adapt to a warming climate. In addition to selecting for adaptation to drought, adding genetic diversity, particularly to small groves, will provide more options for sequoias to adapt to unforeseen factors in the future (Broadhurst et al. 2008; Aitken and Bemmels 2016). Based on these studies, the ecology of conifers, and their responses to past environmental changes, the NPS expects that increasing genetic diversity will boost overall grove resilience to future environmental changes including potential new pathogens, altered wildfire regimes, increasing temperatures, and hotter drought

Regardless of the seed source, the restored grove will increase the areas across which each grove can recover from environmental events (e.g., extreme flooding, the next high severity wildfire, or pathogens) because groves that occupy a larger area with more varied topography and microhabitats are both buffered by size and variable conditions from being lost due to a single

event or stressor. Similarly, over a period of many decades, the NPS anticipates planting sequoia seedlings will result in observed re-establishment of reproductive sequoias, restoring the regeneration potential to the affected groves. As the trees mature, they will create greater quantities of cones and seed and across a broader geographic area, bolstering their ability to respond to disturbance and environmental change in the future.

Future Fire Effects

As the standing dead trees fall and shrubs and herbaceous plants become established, there will be an increased potential for reburn at high severity, which could kill planted seedlings and those naturally regenerating (Coop et al. 2020). Planted seedlings' risk to reburning will be expected to peak between roughly 7 and 20 years, as fuels accumulate but saplings are not yet able to survive high fire intensities to ensure grove recovery (A.Caprio personal communication 2022; York et al. 2021; Coppoletta et al. 2016), however, future fire effects are not fully known due to the unprecedented scale of high severity fire experienced by these groves and associated unknowns with how fuels will accumulate post-fire. This said, the NPS anticipates long-term re-establishment of tree cover through replanting such that established trees will shade out some of the shrub cover and return fire and fuel dynamics to those of the historic frequent fire forest.

Genetic Structure

Under the selected alternative, up to 20% of nonlocal genotypes will be introduced into a population during replanting. Since the remaining 80% of seedlings will be sourced from the genetic neighborhood and some of the genotypes and genetic structure of the original groves are retained through the natural regeneration, the risk of swamping (loss of genetic diversity currently existing in the population) is low (Aitken and Whitlock 2013) and is not expected to affect sequoia grove genetic structure. Retention of original grove genetic diversity and use of 80% locally sourced seedlings means that any unique phenotypes such as twisted bark—if any such trees were present and survived the fire—will likely be retained since most of the genetic material will still be local in origin and some natural regeneration has occurred and will continue to occur from any remaining live large sequoias in the groves.

Regardless of NPS action or inaction, the NPS anticipates that the genetic structure of the groves within the action areas will change in the future in response to immigration, emigration, and selection (Allendorf et al. 2007). There is little risk of the selected alternative negatively impacting population fitness as those individuals not adapted to future stressors will perish and fail to pass on their genes to the next generation.

Fisher – As documented in the EA and further documented in Section 7 consultation documents, potential temporary effects will be like those described for wildlife generally (see page 3). No long-term negative effects on fisher were identified and implementation of the selected alternative will not result in the impairment of fisher.

Rather, the selected alternative is expected to benefit fisher over a period of 50-100 years and beyond, by improving stand structure across the 485-acre fisher habitat corridor project area. Improving habitat value in this area will, in turn, facilitate fisher movement dispersal and associated gene flow vital to the species conservation and meet fisher habitat requirements for foraging, resting, denning, and predator avoidance.

Visitor Use and Experience –Temporary impacts to visitor use and experience attributed to project work are fully described under opportunities for solitude or primitive and unconfined recreation. In

summary, implementation of the selected alternative will not directly, indirectly, or cumulatively, cause impairment of visitor use and experience.

Wilderness Character – As documented in the EA, the selected alternative will result in temporary negative effects to several qualities of wilderness character within the action area and along helicopter flight paths; however, actions undertaken under the selected alternative will not directly, indirectly, or cumulatively result in impairment of this resource as further described below.

Untrammelled

The untrammelled quality will be negatively affected over an area up to 1,131 acres in wilderness for the first planting year. Should additional planting be necessary after the first year, trammeling will continue to occur in smaller portions of the action area each year planting is completed for a period of up to a total of approximately five to six years (estimated at one to two times per grove following the initial planting). The degree of short-term trammeling actions will be greater under the selected alternative when compared to Alternative 3 due to the introduction of non-local genetic material in seedlings grown from non-local seed sources which will result in a different genetic makeup than was present prior to the fire.

Trammeling actions will occur for the duration of the project while actions are actively being implemented. Once planting actions entirely cease (after approximately five to six years), the untrammelled quality will return to pre-project levels such that the untrammelled quality will be preserved in the long term. In summary, the selected alternative will not directly, indirectly, or cumulatively, result in the impairment of the untrammelled quality.

Natural

The selected alternative will restore the natural quality of wilderness character diminished by the loss of sequoias, an identified attribute of natural quality of the Sequoia-Kings Canyon and John Krebs Wildernesses, from nearly 750 acres of these wildernesses. As outlined in the revised EA on pages 67-68, while speculative, seedlings propagated from a variety of sources under the selected alternative may demonstrate increased survival capacity, increasing the likelihood of success and long-term resilience to climate change.

Likewise, should seedlings grown from other sources prove key to successful replanting of these areas, this alternative will beneficially affect natural quality of wilderness character to a greater degree than Alternatives 1 and 3; though the characteristics of the population will be different from what will otherwise be present. In sum, the selected alternative will not directly, indirectly, or cumulatively result in the impairment of natural quality, rather is expected to eventually result in the restoration of currently diminished natural quality.

Undeveloped

Installations of up to 600 small plot markers and 60 other installations across the action area to monitor vegetation and other resources within areas that burned at high severity will temporarily and negatively influence undeveloped quality for at least 30-40 years until such installations are removed.

The undeveloped quality will also be negatively affected by up to six sling-load helicopter deliveries and roughly two to three hours of chainsaw use (when determined necessary) at each planting location the first year of planting, and up to one to two sling-load deliveries during each subsequent planting (estimated as one to two per planting location over the next five to six years) (see Table 3 on page 35 of the EA). The negative effects on undeveloped quality from motorized tool use and transport will return to pre-project levels once those tools are no longer being used.

If chainsaws, rather than explosives, are used to fell snags, evidence of up to ten cut stumps per delivery location will result in additional, though minimal, negative effects on undeveloped quality until stumps deteriorate naturally—a period of typically 10-20 years, depending on stump diameter and tree species. The small tree wells created around each seedling will likewise have a minor, though negative, effect on undeveloped quality until the wells are no longer evident on the landscape—a period of one to two years post planting. Despite these temporary impacts to undeveloped quality, the undeveloped quality will return to pre-project condition once project actions cease, such that the undeveloped quality will not directly, indirectly, or cumulatively be impaired.

Opportunities for Solitude or Primitive and Unconfined Recreation

As described on page 69 of the EA, though primitive and unconfined recreation will not be affected by this project, opportunities for solitude will be negatively affected by the sights and sounds of up to roughly 37 helicopter flights traveling over wilderness for up to 30 minutes per flight to each location over the course of approximately five to six years. The use of chainsaws running for up to an estimated two to three hours at each location to potentially fell snags within the first year of planting will further negatively affect this quality. Where explosives are used to fell snags (instead of chainsaws), the impacts to this quality will be more intensive and far reaching, but of shorter duration—a period of seconds. Finally, the sights and sounds of mule strings (8 mules per string for a total of up to 98 strings in Redwood Mountain area only) and 10-15 tree planters will negatively affect solitude up to 2-3 weeks annually per area will temporarily and intermittently diminish opportunities for solitude over the course of up to a total five years.

Post project, opportunities for solitude or primitive and unconfined recreation will return to pre-project levels, and this quality will be preserved in the long term. In summary, implementation of the selected alternative will not result in direct, indirect, or cumulative impairment of this quality of wilderness character.

Summary

As described above, adverse effects and environmental impacts anticipated as a result of implementing the selected alternative on a resource or value whose conservation is necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park, key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park, or identified as significant in the park, general management plan, or other relevant NPS planning documents, will not rise to levels that will constitute impairment of park values and resources in Sequoia and Kings Canyon National Parks.

In conclusion, as guided by this analysis, available science and scholarship, advice from subject matter experts and others who have relevant knowledge and experience, and the results of public involvement activities, the Superintendent has determined that there will be no impairment of park resources and values from implementation of the selected alternative.

Appendix A References

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